NORSK ENTOMOLOGISK TIDSSKRIFT

UTGITT AV

NORSK ENTOMOLOGISK FORENING

MED STATSBIDRAG OG BIDRAG FRA

NORGES ALMENVITENSKAPELIGE

FORSKNINGSRÅD

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NORSK ENTOMOLOGISK TIDSSKRIFT

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Det henstilles til forfatterne at de ved angivelse av den geografiske utbredelse av norske arter nytter den inndeling i faunistiske områder som er utarbeidet av *A. Strand*, NET, Bd. VI, side 208 o. flg.

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Nybeskrivelser

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Lepidoptera

Hymenoptera

A.s John Griegs Boktrykkeri, Bergen

Innhold:

Lepidoptera

Diptera

Siphonaptera

Hymenoptera

Diverse insekt-ordener

Forskjellig

Personalia

In memoriam

LEIF REINHARDT NATVIG

70 år

den 8. mars 1964

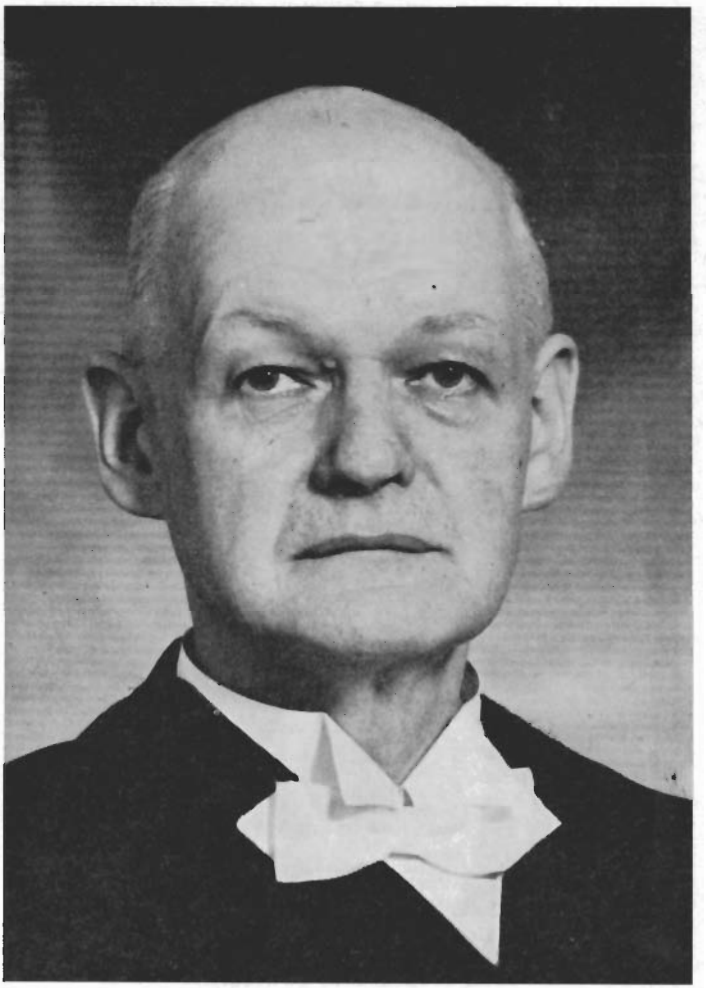
Dr. philos., styrer av Oslo Universitets Zoologiske Museum

Førstekonservator ved entomologisk avdeling

Formann for Norsk entomologisk forening 1937–1955

Redaktør av Norsk Entomologisk Tidsskrift 1952–1955

tilegnes dette hefte



Leif Reinhardt Natvig 70 år

Dr. philos. Leif Reinhardt Natvig fyllte 70 år 8. mars 1964 og kunne samtidig feire 50 års jubileum for sitt virke ved museet. Norsk Entomologisk Forenings nestor har dermed rundet milepelen for aldersgrensen. Selv ser han nå fram til å få konsentrere seg om forskningen og vi er glad for at hans arbeidsglede vil komme entomologien til gode. For amatører og yrkesentomologer i inn- og utland har dr. Natvig i decennier vært det sentrale midtpunkt og for mange er Natvig og den institusjon han representerer det samme. I sitt daglige arbeid på museet, ved en rekke vitenskapelige avhandlinger og foredrag, som universitetslærer, som medlem i norske, nordiske og internasjonale komiteer og som Norges representant i internasjonale møter har han gjort en uvurderlig innsats for norsk entomologi.

Allerede som gymnasiast deltok Natvig ivrig i Norsk Entomologisk Forening. Han tok eksamen artium i 1913 og begynte året etter å arbeide på museet idet professor N. J. T. Odhner ansatte ham som sin privatassistent. I 1916 ble han konstituert som konservator ved insektavdelingen, i 1948 ble han førstekonservator. Siden 1949 har han vært konstituert styrer ved Zoologisk Museum. Inntil landevertebratsamlingen ved Universitetet i Bergen ble opprettet i 1949 innehadde avdøde statsentomolog Th. Schøyen og dr. Natvig landets to eneste stillinger i entomologi. Med knappe bevilgninger bygget disse to ut sine avdelinger til internasjonalt kjente institusjoner. Når Natvig nå går fra borde er et grunnleggende kapitel i norsk entomologis historie avsluttet.

Dr. Natvig begynte som coleopterolog og publiserte allerede i 1914 sitt første arbeid. I 1916 ble han oppnevnt som sakkyndig i reinbeitesaken i Målselv og studiet av reinbremsenes biologi fenget hans interesse for parasittologien. I årene 1927, 1933, 1937 studerte han eksotisk patologi, medisinsk parasittologi og stikkemyggenes morfologi og systematikk ved Institut für

Schiff- und Tropenhygiene i Hamburg. I 1949 forsvarte han sin doktoravhandling: «Contribution to the knowledge of the Danish and Fennoscandian mosquitos, *Culicini*», et arbeide som bragte ham stor internasjonal anerkjennelse.

I 40 år, fra 1919 til 1959 har Natvig med få avbrytelser forelest og ledet kurser over landarthropoder for bifagsstudenter ved Oslo Universitet. Vi som har vært hans elever minnes hans timer og ekskursjoner som perler i universitetsundervisningen. Da kursene ble utvidet etter siste krig, utarbeidet han et kompendium «landarthropoder», et velillustrert, ypperlig arbeide som stadig nyttes i undervisningen og dessuten er til glede for mange entomologer.

Natvigs pedagogiske evner har også kommet populærvitenskapen til gode. I tallrike foredrag, artikler og ved omvisninger i museet har han gledet et stort publikum. Særlig populær ble han ved å bekjempe flueplagen på Langøyene i Oslofjorden i 1936. Fra 1929 var han i flere år styremedlem i Oslo Folkeakademi.

I de senere år har Natvig nyttet sin arbeidskraft på administrasjon og omordning av Zoologisk Museum, samt modernisering av publikumssamlingene. Sterke museale interesser har ført til at han i årene 1951—1963 har vært først sekretær, siden nestformann i den norske komitte av Int. Council of Museums (ICOM) og på rådets møter har han stadig representert Norge. Siden 1953 er han medlem av redaksjonskomitteen for Nytt Magasin for Zoologi.

Natvig har det alltid travelt og kjenner ikke begrepet fast arbeidstid når det gjelder seg selv. Han går intenst opp i arbeidet, men er langt fra noen ensidig fagmann. Hans verdifulle samlinger av japansk tresnitt, elfenbensarbeider, originalutgaver av illustrerte bøker og gamle våpen viser at hans samlerglede ikke bare gjelder insekter. Han har også rukket å skrive et større arbeide om japanske tresnitt.

Medlemmer av Norsk Entomologisk Forening står i stor takknemlighetsgjeld til sin nestor. Han ble innvalgt som medlem nr. 16 i 1912 og ble raskt varamann til styret; i årene 1915—1918 og 1930—1937 var han sekretær, og fra 1920 til 1941 dessuten medlem av redaksjonskomiteen for Norsk Entomologisk Tidsskrift; i tiden 1937—1950 var han foreningens formann og i årene 1952—1955 redaktør av tidsskriftet. Han var generalsekretær, henholdsvis president ved de nordiske entomologmøter i Oslo 1933 og i Helsingfors 1947. Kanskje ennå mere enn ved tidkrevende administrativ innsats har hans spirituelle bidrag ved møter og fester — de nådde vel sitt høydepunkt ved firtiårsjubileet under krigen — skapt trivsel og hygge blandt entomologene.

Samtidig med at vi bringer Leif Reinhardt Natvig vår hyldest, ønsker vi ham alt godt i årene fremover. Vi unner ham å bli fritatt for alle plikter, men vi håper fortsatt å få dra nytte av hans kunnskaper — og vi tar det som en selvfølge at han stadig vil være et inciterende element i foreningen.

Dr. Natvig er:

Medlem av Vitenskapsakademiet i Oslo. Korresponderende medlem av: Inst. Scandinave et Nederlandais, Praha; Société Tchécoslovaque de Zoologie, Praha; Tromsø Museum; Entomologiska Föreningen i Helsingfors; Entomologiska Sällskapet i Lund; Suomen Hyönteistieteellinen Seura, Helsinki; Societas Pro Fauna et Flora Fennica, Helsingfors. Han er Ridder av Tsjekkoslovakiske Hvite Løves Orden og har officerskors av samme orden. I 1964 fikk han Kongens fortjenstmedalje i gull.

Astrid Løken

Några spindelprov (Arachnoidea) från Nordmarka vid Oslo

Av Pontus Palmgren
Zoologiska institutionen, Helsingfors

Den 25. och 26. maj 1963 hade jag tillfälle att med hjälp av min hustru taga några kvantitativa prov på spindelfaunan i mosstäcket i skog i Nordmarka. Materialet är självfallet mycket litet; det omfattar 456 ex., varav 406 till arten identifierbara, av dem 255 adulta. Då de i markskiktet levande små spindlarna, särskilt av familjen Erigonidae (Micryphantidae), inte är mycket kända i Norge, kan publiceringen av insamlingsresultatet kanske försvaras.

Prov nr. 1: Granskog, medelgod bonitet, i fuktig sänka, i fläckar av ljusgrön *Sphagnum*, 0,5 m². — ½ km E om Sognsvatn.
Prov nr. 2: Grov, något utglesad granskog, medelgod bonitet, svagt fuktig sluttning, i ljusgrön *Sphagnum* under *Vaccinium myrtillus*, 0,5 m². — 1 km NE om Frognerseteren.
Prov nr. 3: Likadan biotop, 0,5 m². — Samma plats.
Prov nr. 4: Granskog av god-medelgod bonitet, i ljusgrön *Spagnum*, 0,5 m². — Sluttningen av Tryvasshögda mot Skådalen.
Prov nr. 5: Liknande biotop, i *Sphagnum* och i rel. svag *Hylocomium*, 1 m². — Frognerseteren — Skådalen.
Prov nr. 6: Gran-tallskog, medelgod bonitet, blockmark, i *Hylocomium schreberi* och *proliferum* under *Vaccinium myrtillus*, 0,5 m² (sållningen ineffektiv på grund av regn!). — ½ km E om Sognsvatn.
Prov nr. 7: Grov, något utglesad granskog, medelgod bonitet, i relativt tunn *Hylocomium* och *Dicranum*, 1 m². — 1 km NE om Frognerseteren (invid platserna 2—3).
Prov nr. 8: Granskog, god- medelgod bonitet, rel tät, i tunn *Hylocomium*, 0,25 m². — Sluttningen av Tryvasshögda mot Skådalen.

Vid provtagningen skakades mossan från provytan i små portioner hållna med fingrarna över ett såll, därpå behandlades portionerna på vanligt sätt i sållet, varefter spindlarna plockades från de genom sållet passerade mossfragmenten på ett ljus under-

lag. Det under den levande mossan liggande råhumusskiktet lämnades obeaktat. Kontrollprov har visat att blott en mycket liten del av en provytas totala spindelbestånd tränger ned dit. Enligt min erfarenhet undgår 5—10% av beståndet i den levande mossan upptäckt vid den använda metoden.

De arter, som nedan är betecknade med en *, torde enligt vad Dr. HANS TAMBS-LYCHE, Biologisk Stasjon, Espegrend, vänligen meddelat mig, inte förut vara förtecknade för den norska faunan.

	Summa			Proven							
	♂	♀	juv.	1	2	3	4	5	6	7	8
Wideria cucullata (C. L. Koch)		8	1	3				4		2	
— fugax (O. P.-Cambr.)*	1	4	2		2	3			2		
Trachynella nudipalpis (Westr.)		2						1			1
Minyriolus pusillus (Wider) ...	2	8	3	4	1		1	3		4	
Micrargus herbigradus (Blackw.)	2	1			2		1				
Diplocephalus latifrons (Cambr.)*	4	11		1		1	4	8		1	
Tapinocyba pallens (Cambr.) ..	5	13				6		4	2	4	2
Astenargus paganus (Simon)* .	13	37	13		10	16		37			
Erigonidae juv.			37		3	2	10	9	1	7	5
Centromerus arcanus (Cambr.)	18	61	108	24	25	49	18	43		24	4
Macrargus rufus (Wider)	1	1	11	2		4	1	4	2		
Leptyphantes alacris (Blackw.)		2	1		2					1	
— juv.			6	1		3	1	1			
Robertus scoticus Jacks.*	13	29	8	5	2	7	5	18		10	3
Cryphoeca silvicola (C. L. Koch)	1	7				2	3				3
Trochosa juv.			2		1				1		
Diverse arter (se nedan)	2	9	9								
		456		41	50	95	47	134	10	61	18

Diverse arter (företrädda bara i 1 prov): *Ceratinella* sp., prov. nr. 7, 2 juv.; *Wideria antica* (Wider), nr. 2, 1 ♀; *Cornicularia cuspidata* (Blackw.), nr. 7, 1 ♀; *Dicymbium tibiale* (Blackw.), nr. 7, 1 ♂ 4 ♀; *Porrhomma pallidum* Jacks.*, nr. 2, 1♂; *Hilaira excisa* (O. P.-Cambr.)*, nr. 4, 2♀; *Agyneta* sp., nr. 6, 1 juv.; *Bolyphantes crucifer*, nr. 1, 1 juv.; *Linyphidae* sp., nr. 3, 1 juv.; *Robertus lividus* (Blackw.), nr. 4, 1 juv.; *Hahnia pusilla* C. L. Koch, nr. 6, 1 ♀; *Xysticus cristatus* (Cl.), nr. 5, 1 juv.; *Tarentula pulverulenta* (Cl.), nr. 3, 1 juv.

Proven från de svagt försumpade ställena (*Sphagnum*) motsvarar populationstätheterna 82, 100, 190, 94, 134, M = 120 ex./m². Proven från icke försumpade ställen (*Hylocomium*) nr. 7 och 8 motsvarar 61 resp. 72 ex./m². (Prov nr. 6 måste på grund av regnet betraktas som icke representativt.) Dessa värden överensstämmer mycket väl med dem jag i talrika prov funnit i södra Finland i motsvarande typ av mosstäcke.

Bland de funna arterna är *Centromerus arcanus* (Linyphiidae) och *Robertus scoticus* (Theridiidae) också i södra Finland de tal-

rikaste i ljusgrön, locker *Sphagnum* som bildar smärre fläckar i skogsmark som icke egentligen är försumpad. *Astenargus paganus* (Erigonidae) stora individantal i proven från Nordmarka är anmärkningsvärt. Jag har aldrig fått den i mina talrika prov från trakten av Hangö, endast alldeles enstaka i trakten av Helsingfors, däremot i rätt stor mängd i Koli-området i östligaste Finland. I Lappland saknas den. I de österrikiska alperna har jag tagit den, visserligen relativt sparsamt, i mossa i granskog. Enligt W i e h l e (1960) finns den i de tyska »Mittelgebirge», i England enligt L o c k e t och M i l l i d g e (1953) lokalt, men ej i Skottland. T u l l g r e n (1955) anför några få fynd från Sverige ända upp till Västerbotten. Arten hör tydligen till den grupp som vandrat in i Finland från öster men inte hunnit till landets västra delar.

Alla övriga arter, med undantag av *Hilaira excisa*, kan påträffas på motsvarande biotoper i södra Finland och med liknande individantal.

Summary

A few samples of spiders from the forests of Nordmarka in the vicinity of Oslo. The spiders were collected May 25th and 26th, 1963, with a quantitative technique, from the mess in mixed pine-spruce-forests. The popolation densities found (M=120 Ind./m² in fairly moist places with *Sphagnum*, 65 Ind./m² on dryer soil) are comparable to corresponding density values from Southern Finland. Species denoted * are not mentioned earlier as found in Norway.

Litteratur

LOCKET, G. H., and A. F. MILLIDGE, 1953: British Spiders. Vol. II. — Ray Society Series No. 137. London.

TULLGREN, A., 1955: Zur Kenntnis schwedischer Erigoniden. — Arkiv för zoologi, ser. 2, band 7, no. 20. Stockholm.

WIEHLE, H., 1960: Die Tierwelt Deutschlands, 47. Teil. Spinnentiere oder Arachhoidea (Araneae). XI: Micryphantidae-Zwergspinnen. Jena.

Epagoge mehli, species nova, from arctic Norway. Notes on the Norwegian Tortricidae I. (Lepidoptera)

By M. Opheim, Oslo

Among the Lepidoptera collected in Northern Norway in the summer of 1962 by cand. mag. Reidar Mehl, Oslo, and which he kindly let me examine, a tortricid aroused my interest. Apparently, it belonged to the genus *Epagoge* Hb. judging from the superficial characters. After studying the genitalia of the specimen, a male, it seemed highly probable that it belonged to a new species. After the collector I name it *Epagoge mehli* sp. nov.

Description:

Palpus distal extended as in *Epagoge grotiana* (Fab.). Antenna simple. Fore wing without costal fold, veins 7 and 8 stalked, ground colour silvery grey, median band reddish-brown and connected with a broad band which almost extends to apex, only leaving a spot at costa and one between veins 5 and 7 of the light ground colour. Hind wing fuscous, veins 6 and 7 stalked, 3 from angle and separated from 4. Expanse 13 mm. (fig. 1)

Genitalia, male (figs. 2—4): Uncus spatula-shaped and broadly joined to tegumen; the apices of gnathos fused for a short distance; sacculus broad, extending to outer margin of the valva which is rounded triangular; transtilla bilobed, coarsely dentate, and attached to the middle of the valva and to the vinculum, aedoeagus pistol-shaped with 5 slender cornuti.

Type locality: Vardø, Finnmark, Norway. Collected by R. Mehl on July 20th 1962. The holotype (♂) is in the collection of the Zoological Museum, Oslo.

Regarding the bilobed transtilla *E. mehli* sp. n. has affinities to *Paramesia gnomana* (Cl.) and the *Clepsis* Gn. species (In Norway two species only, *C. helvolana* (Fröl.) (= *rusticana* Tr.) and *C. semialbana* (Gn.)).

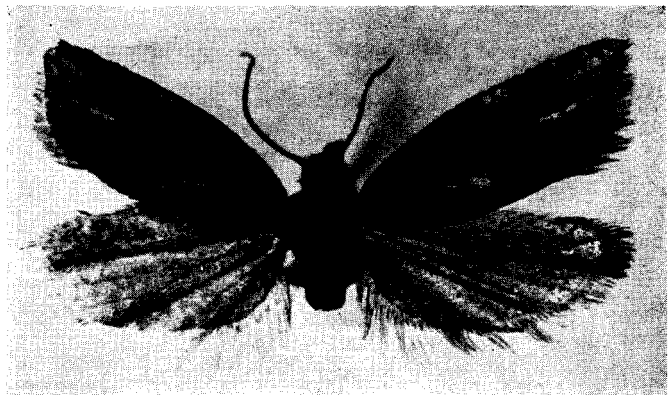
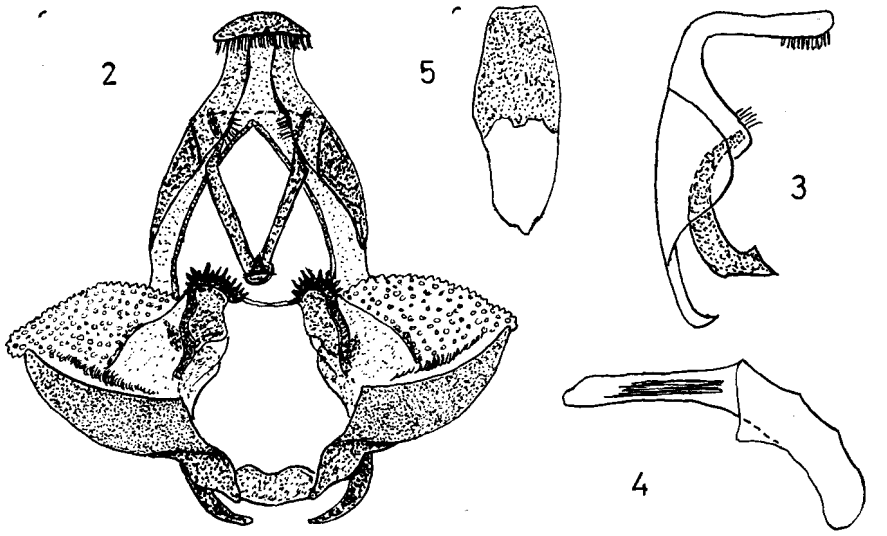


Fig. 1. *Epagoge mehli* sp. nov. ♂, holotype, Vardø, Norway. × 6,5. N. Knaben phot.

Vardø which is located on a 3.6 square km large island, just 2 km east of the mainland on 70°22', has an average July temperature of only +9.1°C. Besides the new tortricid, the following 5 Lepidoptera have been reported from Vardø, viz, *Celerio galii* (Rott.) (Sundkvist), *Pachnobia tecta* (Hb.), ? *Cidaria fluctuata* (L.), *Crambus furcatellus* (Zett.) and *Plutella maculipennis* (Curt.). The last four were collected by Sparre Schneider (The annual reports of Tromsø Museum for 1883).

Several of the species which Kennel (1910) placed in the genus *Epagoge* Hb. (*Dichelia* Gn.) are now been removed to other genera (Obraztsov 1944, 1954). With respect to the Norwegian fauna only, those with the long palpi, *E. rubicundana* (H. S.)* and *cinereana* (Zett.) were found to be related to *Sparganothis* Hb., a genus which is so different from the other tortricid genera that Obraztsov (1944) placed it in a new subfamily, Sparganothinae. He also removes, with good reason, *E. lapponana* (Tngstr.) from *Epagoge* to *Choristoneura* Led., because vein 7 is free, not stalked with 8 in the fore wing. Furthermore, what probably is more important, the uncus in *lapponana* is tapered to join the tegumen narrowly (fig. 5). In Norway *Choristoneura* Led. is represented by one more species, *C. sorbiana* (Hb.), known from Akershus, Vestfold and Aust-Agder only. In North America *Choristoneura* comprises 14 species (Freeman 1958), of which the northern species *C. albaniana* (Walker, 1863) seems to be quite similar to our *C. lapponana* (Tengström, 1869), especially in regard to the male genitalia (Feeman l.c., fig. 32). In both

* Already, as far back as 1895, J. Sahlberg proposed that *E. rubicundana* be placed in *Sparganothis* (Acta Soc. Fauna & Flora Fenn. 11, p. 14).



Figs. 2—4. *Epagoge mehli* sp. nov. Male genitalia: 2. Ventral view, 3. lateral view, uncus, tegumen, gnathos, 4. aedoeagus. Fig. 5. *Choristoneura lapponana* (Tngstr.), uncus, dorsal view. × 27. M. Opheim del.

species the pointed sacculus extends a little beyond the apex of the valva. If the two forms are conspecific the valid name would be *C. albaniana* (Walker) and *lapponana* would indicate the Scandinavian subspecies.

It only remains to mention that Obraztsov (1954) recognizes *E. gnomana* (Cl) as the genotype of *Paramesia* Steph.

The distribution of the "*Epagoge* Hb." species in Norway, is given below:

Choristoneura lapponana (Tngstr.)

Finnmark, eastern part: Sør-Varanger, Elvenes July 1878, ♀ (Sparre Schneider), Bosjavre, Sevvisuolo (Sandberg), Strand July 15th 1892 (Sparre Schneider), Kirkenes, Svanvand June 22nd to July 1st 1898 (Wessel). Altogether, 24 ♂♂ and only 1♀.

Epagoge grotiana (Fab.)

Østfold: Rauer July 7th 1920 (Barca); Akershus: Oslo, Blindern July 6th, August 28th 1958, 4 specimens (Gusgard), Spro July 2nd 1922, 8th 1923, 17th 1926, 4 specimens (Haanshus); Hedmark, southern part: Helgøy, Hovelsrud July 11th and 12th 1849, 7 specimens (Esmark); Opland, southern part: S. Aurdal June 28th 1888 (Sandberg), Ringebu (Barca); Opland, northern part: Dovre (Siebke); Sogn og Fjordane, inner part: Otternes June 14th 1939 (Knaben); Møre og Romsdal, inner part: Valdal, Geiranger July 1880 (Schøyen); Nordland, southern, inner part: Storjord July 10th 1898, July 1899 (Sparre Schneider), July 13th and 14th 1918 (Rygge); Finnmark, inner part: Kåfjord middle of July 1901 (Strand). Observed from June 14th to August 28th.

Paramesia gnomana (Cl.)
Østfold: Halden, Rauer, Moss (Barca); Akershus: Oslo (Esmark), Blindern (Gusgard), Bygdøy (Munster), Sandvika (Barca), Asker (Edland), Spro (Haanshus); Hedmark, southern part: Helgøy, Hovelsrud (Esmark); Opland, southern part: S. Aurdal (Schøyen), Odnes (Strand), Ringebu (Rygge), Fron (Siebke); Buskerud, eastern part: Sandum (Barca); Vestfold: Fredriksvern (Rygge); Telemark, outer part: Jomfruland (Opheim); Aust-Agder, outer part: Laget (Knaben), Tromøy (Bakke); Aust-Agder, inner part: Austad (Strand); Vest-Agder, outer part: Vigeland at Mandal (Schøyen), Gjemlestad (Knaben); Rogaland, outer part: Ogna (Schøyen), Tou (Strand); Hordaland, outer part: Bergen (Lie-Pettersen), Flesland, Nausthellar on Hufteren (Opheim); Hordaland, inner part: Voss (Grønlien), Granvin, Eidfjord (Barca); Sogn og Fjordane: Skjolden, Valeberget, Solvorn, Utladalen, Aurland, Hjelle, Nordfjordeid (Knaben). Observed from June 28th to August 15th.

Sparganothis rubicundana (H.S.)
Opland, southern part: S. Aurdal (Schøyen), Gåsøy seter in Svatsum, Ringebu (Barca); Opland, northern part: Løken (Barca), Jotunfjell (Schøyen), Vågåmo (Svensson), Fokstua (Barca); Buskerud, eastern part: Norefjell (Strand); Buskerud, western part: Ål, Hol (Strand); Hordaland, inner part: Voss, Odda, Seljestad (Grønlien); Sør-Trøndelag, inner part: Kongsvoll (Grønlien); Nordland, southern, inner part: Sandskarfjell, Pantdalsfjell, Mo i Rana (Strand), Saltdal (Schøyen); Nordland, northern, eastern part: Tysfjord (Strand); Troms, outer part: Tromsø, Tromsdal (Sparre Schneider); Troms, inner part: Altevand, Mauken (Sparre Schneider), Nordreisa (Strand); Finnmark, western part: Sopnes (Strand); Finnmark, inner part: Kåfjord (Strand), Reipasvarre, Skådavarre, Bosekop (Wocke), Romsdal, Jotkajv. st., Jotkajok, Cævdne (Barca); Finnmark, northern part: Kistrand (Schøyen); Finnmark, eastern part: Aleknjarg, Neiden, Kirkenes, Strand (Sparre Schneider). Observed from June 21st to August 8th.

Sparganothis cinereana (Zett.) is in Haanshus' list (1933), recorded from Opland, Sør-Trøndelag and Troms. However, no specimens were present in the different collections I have investigated.

(*S. pilleriana* (Schiff.) bred from strawberry 1926, is recorded from Arendal by T. H. Schøyen (1928). The specimen is probably lost.)

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Remarques concernant quelques coléoptères aquatiques australiens
Le genre *Megaporus* Brinck

Par Raymond Mouchamps, Liège

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Le genre *Macroporus* Sharp (on Aquat. Carn. Col., 1880—1882, pp 416 et 865) a été créé par l'auteur anglais pour trois espèces décrites par Clark en 1862. Le créateur du genre y ajoutait immédiatement trois autres espèces.

En 1943, Brinck (Kungl. Fysiograf. sällsk. Förh., Lund, Bd. 13, n° 13, p. 2) démontrait l'antériorité du genre *Macroporus* Uhler pour une espèce de *Cydnidae*, et proposait le terme *Megaporus* pour les espèces décrites par Sharp.

Aux six espèces connues, sont actuellement venues s'ajouter trois espèces, respectivement décrites par Régimbart (*dilatatus* et *piceatus*) et Zimmermann (*tristis*).

Megaporus piceatus Régimbart de Nouvelle Guinée et *Megaporus tristis* des Iles Fiji nous sont inconnus. Tous les autres représentants du genre sont australiens.

Grâce à l'amabilité de Monsieur A. N. Burns du «National Museum of Victoria»; du Docteur Natvig du «Musée Zoologique de l'Université d'Oslo» et de mon excellent Collègue anglais Monsieur J. Balfour-Browne du British Museum, j'ai eu l'occasion d'examiner un nombre assez important d'exemplaires de ce genre principalement australien.

Cette étude s'est révélée très intéressante, car elle a permis non seulement de préciser les caractères spécifiques des espèces déjà connues, mais en outre de décrire trois espèces nouvelles pour la Science.

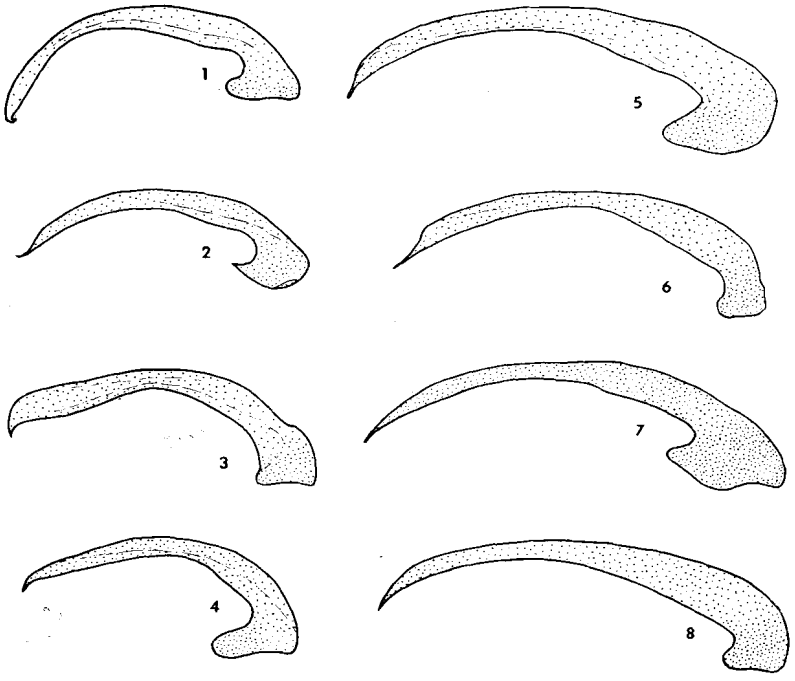
Megaporus howittii Clark

Clark, *Journ. of Ent. I*, **1862**, *p.* **406** (*Hydroporus*)
= *foveiceps* M'Leay *Trans. Ent. Soc. N. S. Wales II*, **1871**, *p.* **122**.

Cette espèce, essentiellement caractérisée par les élytres ferrugineux garnis, chacun, de deux tâches noires plus ou moins

anastomosées entre elles; est largement répandue à travers le Sud-Est Australien (Victoria). Toutefois, Sharp la signale aussi de Tasmanie.

Aedéage: fig. 1.



Figs. 1—8. Aedeages de *Megaporus*.
1. *Megaporus howittii* Clark. 2. *Megaporus hamatus* Clark. 3. *Megaporus ruficeps* Sharp. 4. *Megaporus fischeri* n. sp. 5. *Megaporus gardneri* Clark. 6. *Megaporus solidus* Sharp. 7. *Megaporus wilsoni* n. sp. 8. *Megaporus natvigi* n. sp.

Megaporus hamatus Clark

Clark, *Journ. of Ent. I*, **1862**, *p.* **406** (*Hydroporus*).

Autre espèce ferrugineuse mais garnie de deux bandes plus ou moins confluentes en avant et en arrière des élytres.

Cette espèce est aussi largement répandue dans l'Australie du Sud-Est (Victoria), mais je l'ai aussi rencontrée de Tasmanie (Georges town-National Museum of Victoria).

Aedéage: fig. 2.

Megaporus lateralis Sharp

Sharp, *On Aq. Carn. Col.* **1880—82**, *p.* **417** (*Macroporus*).

Cette espèce m'est restée inconnue. La description originale

concerne un seul exemplaire de l'Australie Occidentale. Elle se rapprocherait de *Megaporus hamatus* Clark, mais la forme serait plus largement ovale.

Megaporus ruficeps Sharp

Sharp, *On Aq. Carn. Col.*, **1880—82**, *p.* **418**.

Cette espèce, la plus largement répandue du genre et vraisemblablement aussi la plus commune, a été initialement décrite de Port Denison (= Bowen) (Queensland). L'exemplaire typique est un mâle. Il existe par ailleurs trois paratypes: une femelle également de Port Denison et deux mâles de Moreton-Bay. Cette espèce est actuellement connue d'Australie du Nord (Port Darwin); du Cap York (Zimmermann); largement répandue sur toute la côte orientale du Queensland, elle s'étend vers le Sud jusqu'à Sydney en Nouvelle Galle du Sud.

L'examen de quelques exemplaires de l'Institut Royal des Sciences Naturelles de Belgique, erronément déterminés par Régimbart comme *solidus* Sharp suggère une mauvaise interprétation de l'espèce par l'autesur français.

L'espèce est essentiellement caractérisée par son pronotum ferrugineux-brunâtre, régulièrement éclairci au milieu et sur les côtés. La forme est par ailleurs relativement étroite, et la coloration générale du dessus est brunâtre. La réticulation céphalique est à mailles polygonales; subarrondies, nullement allongées. La partie médiane du mésosternum est simplement convexe, à ponctuation espacée.

Aedéage: fig. 3.

Megaporus fischeri n. sp.

L'aimable collaboration du Docteur Natvig du Musée de l'Université d'Oslo m'a permis l'examen de quelques exemplaires de la collection Fischer qui avait été déterminés «*Megaporus ruficeps* Sharp». Ces exemplaires de Townsville (Queensland) s'écartent incontestablement des autres *Megaporus ruficeps* que j'ai pu examiner. Les deux formes sont extrêmement proches l'une de l'autre, et il est difficile de les séparer à l'examen externe uniquement. La coloration du dessus est cependant un peu différente. Chez *fischeri* n. sp., elle est plus uniformément foncée, tandis que chez *ruficeps* Sharp, la coloration pronotale, obscure en avant et en arrière est nettement éclaircie sur le disque et latéralements où elle paraît ferrugineuse. Ce signe distinctif avait d'ailleurs déjà été signalé par Sharp, dans sa description originale. Il n'y a malheureusement aucun autre caractère permettant la séparation des deux formes, mais l'exa-

men de l'aedéage montre des différences constantes et nettes· d'autant plus que l'aedéage du *Megaporus ruficeps* Sharp es+ caractéristique et immuable.

Type (Zoological Museum University of Oslo) de Townsville (Queensland). Quelques paratypes.

Aedéage: fig. 4.

Megaporus gardneri Clark

Clark, *Journ. of Ent. I*, **1862** *p.* **408**
= *brunnipennis* M'Leay, *Trans. Ent. Soc. N. S. Wales II*, **1871**, *p.* **122**.

Espèce bien distincte des précédentes par sa taille nettement plus forte et sa ponctuation élytrale bien plus dense; la partie médiane de mésosternum est simplement arrondie, mais un peu déprimée, et couverte d'une ponctuation forte et plutôt dense. Il existe chez cette espèce deux formes femelles, l'une brillante, et, l'autre mate.

L'espèce est uniquement connue de Tasmanie et de Nouvelle Galle du Sud.

Aedéage: fig. 5.

Megaporus solidus Sharp

Sharp, *on Aq. Carn. Col.*, **1880—82** *p.* **418**.

Rare espèce que je connais uniquement par le type et un paratype, qui sont peut-être les deux seuls spécimens actuellement connus.

Comme l'a suggéré Sharp, il s'agit incontestablement d'une espèce valable, et l'examen de l'aedéage est tout-à-fait démonstratif à ce sujet. Cette espèce est en fait intermédiaire à *ruficeps* et *gardneri*. Du premier, elle a la ponctuation plus espacée des élytres; du second elle en a la forme. La taille est intermédiaire aux deux espèces.

Régimbart a par ailleurs décrit en 1908 (Fn. Sudwest-Australie. I, 8 p. 311) un *Macroporus dilatatus* qui provenait du Lac Monger.

La description de l'autesur français concorde en tous points avec l'exemplaire de *Megaporus solidus* Sharp que j'ai eu l'occasion d'examiner.

Le *Megaporus solidus* Sharp qui m'a été aimablement communiqué par Monsieur Balfour-Browne a été décrit du Sud-Ouest de l'Australie (King's Georges Sound). On peut par conséquent se demander si le *Megaporus dilatatus* Rég. n'est pas synonyme de *Megaporus solidus* Sharp?

Semble par ailleurs confirmer cette hypothèse, la remarque antérieure au sujet de l'interprétation douteuse du *Megaporus*

solidus Sharp par Régimbart. Probablement, l'auteur français a-t-il méconnu le *Megaporus solidus* Sharp, qui aurait été chez lui synonyme de *ruficeps* Sharp.

Dans la description originale de *dilatatus* Régimbart, l'auteur insiste particulièrement sur la forme nettement ovale et large de l'espèce, qui s'oppose incontestablement à la forme oblongue de *ruficeps* Sharp. C'est aussi le cas pour *Megaporus solidus* Sharp.

Il serait certes intéressant de pouvoir examiner l'exemplaire typique et le comparer à un *Megaporus solidus* Sharp.

L'identité des deux espèces nous paraît probable.

Aedéage: fig. 6.

Megaporus wilsoni n. sp.

J'avais moi-même attribué à *solidus* Sharp un exemplaire qui m'avait été communiqué jadis par le regretté Monsieur Wilson de Melbourne.

Cet exemplaire ressemble, en tous points, au *Megaporus solidus* Sharp, dont il a la forme large et convexe, la coloration du dessus, ainsi que la ponctuation élytrale. Il s'en écarte immédiatement par le mode de réticulation du disque céphalique qui montre des mailles fortement étirées dans le sens antéro-postérieur, qui s'oppose ainsi aux mailles sub-arrondies de *Megaporus solidus* Sharp.

Un autre caractère distinctif important se retrouve au niveau du mésosternum. Alors que chez *solidus* Sharp la partie médiane du mésosternum est arrondie et légèrement déprimée sur la ligne médiane, et à peine séparée des parties latérales par un bourrelet peu saillant, visible tout au plus en avant; chez *wilsoni*, la partie correspondante du mésosternum est nettement déprimée, séparée des régions latérales par une arête vive limitant ainsi une plaque mésosternale à base postérieure élargie et à bords subparallèles en avant, et montrant à l'union de son tiers antérieur et des deux tiers postérieurs, une impression excavée nette. Ce dernier caractère me paraît tout-à-fait caractéristique de l'espèce. Quant à la réticulation pronotale, elle est faite, chez *wilsoni*, sur le disque, de mailles transversalement allongées, tandis qu'une fois de plus, chez *solidus* Sharp, les mailles pronotales sont très régulièrement circulaires, subhexagonales.

Type unique d'Australie: Mont Gambier — Wilson — type unique dans ma collection.

Aedéage: fig. 7.

Megaporus natvigi n. sp.

Parmi les *Megaporus ruficeps* Sharp du Musée Zoologique de l'Université d'Oslo, se trouvait un

male de Queensland (Fischer) sans autres précisions, qui s'écarte incontestablement de toutes les espèces connues.

A certains points de vue, cette espèce se rapproche de la précédente, mais la forme du mésosternum n'est pas caractéristique. Elle me parait en fait intermédiaire entre *fischeri* et *ruficeps* d'une part, et *Wilsoni* d'autre part.

Le dessus est brun ferrugineux; avec le pronotum légèrement éclairci sur le disque et latéralement. La ponctuation du dessus est assez dense, et la réticulation pronotale, à mailles polygonales, est assez forte.

Indépendamment de l'aedéage, le caractère distinctif siège une fois de plus dans le mode de réticulation du disque céphalique qui, dans la région inter-oculaire, est à mailles allongées dans le sens antéropostérieur, alors que les mailles sont simplement polygonales en avant et en arrière. A ce point de vue, l'espèce se rapproche incontestablement de *wilsoni*. Elle s'en écarte cependant, par la forme du mésosternum qui est simplement arrondi et convexe au milieu, à ponctuation espacée.

Type Queensland — (coll. Fischer).

Type unique à l'Institut Zoologique de l'Université d'Oslo.

Aedéage: fig. 8.

Je dédie cette espèce au Docteur Natvig, Directeur du Musée Zoologique de l'Université d'Oslo, qui m'a permis l'étude d'un matériel intéressant.

En y ajoutant les deux espèces non australiennes, qui me sont restées inconnues, le genre Megaporus compte actuellement douze espèces.

Il me paraît utile de résumer nos connaissances actuelles sur le genre, sous forme d'un tableau dichotomique, encore imparfait, mais qui facilitera certainement les déterminations ultérieures.

Table de détermination des Megaporus

A. Espèces australiennes

1. — Pronotum et élytres ferrugineux, les derniers avec des taches ou des lignes noires. Ponctuation élytrale faible et espacée.

2. — Elytres ferrugineux avec deux taches noires, l'une antéro-médiane, l'autre postérieure, plus ou moins anastomosées. Antennes testacées. Ponctuation élytrale très espacée à la base, un peu plus dense à l'apex. ♂. Ongles antérieurs très inégaux. ♀. Un peu moins brilliante, avec la ponctuation des élytres plus dense. Longuer: 5,2 à 6,2 mm. Australie, Tasmanie. *howittii* Clark

2' — Elytres ferrugineux avec deux bandes noires plus ou moins confluentes en avant et en arrière. Antennes testacées, rembrunies au sommet. Ponctuation élytrale un peu plus dense et plus égale. ♂. 3è art. des protarses et des mésotarses un peu plus grand que chez *howittii*;

ongles moins inégaux. ♀. Dimorphe: une forme comme le ♂, une forme mate et densément ponctuée. Longueur 5,7 à 6,2 mm.
Sud de l'Australie et Tasmanie. *hamatus* Clark

2''. — ♀. seule connue: dernier article des protarses et des mésotarses moins long que chez *hamatus*. Longueur 5,7 mm.
Ouest de l'Australie. *lateralis* Sharp

1'. — Pronotum et élytres bruns ou noirâtres plus ou moins éclaircis en dehors. Ponctuation élytrale plus forte.

3. — Réticulation céphalique à mailles polygonales, subarrondies, nullement allongées.

4. — Forme en ovale allongé. Partie médiane du mésosternum simplement arrondie à ponctuation espacée. Taille habituellement plus faible.

5. — Pronotum uniformément noir, tout au plus un peu éclairci latéralement. Pénis à pointe effilée. Longueur: 4,9 à 5,2 mm.
Queensland. ***fischeri*** Mouchamps

5'. — Pronotum ferrugineux bordé de brun en avant et en arrière. Penis à pointe renflée. Longueur: 5 à 5,3 mm.
Australie. *ruficeps* Sharp

4'. — Forme en ovale large. Partie médiane du mésosternum non uniformément arrondie.

6. — Ponctuation élytrale peu dense. Taille moyenne. Partie médiane du mésosternum déprimée sur la ligne médiane et séparée des parties latérales par un bourrelet à peine saillant mais visible en avant. Longueur: 5,6 à 5,9 mm.
Sud-Ouest de l'Australie. (*dilatatus* Régimbart.) *solidus* Sharp

6'. — Ponctuation élytrale plus dense. Taille plus forte. Partie médiane du mésosternum un peu déprimée à ponctuation forte et plutôt dense. Longueur: 6,2 à 6,3 mm.
Nouvelle Galle du Sud, Tasmanie. *gardneri* Clark

3'. — Réticulation céphalique à mailles au moins partiellement allongées dans le sens antéro-postérieur, sur le disque.

7. — Taille moyenne. Partie médiane du mésosternum simplement arrondie. Longueur: 5,6 mm.
Queensland. ***natvigi*** Mouchamps

7'. — Taille plus forte. Partie médiane du mésosternum déprimée en plaque nettement délimitée des parties latérales par un bourrelet. Longueur: 5,9 mm.
Australie: Mount Gambier. ***wilsoni*** Mouchamps

B. Espèces non autraliennes

8. — Nouvelle Guinée. Longueur: 5,5 mm. (?) ressemblerait à *ruficeps* Sharp *piceatus* Régimbart

8'. — Iles Fitji. Longueur: 5,3 mm. (?) serait largement ovale. *tristis* Zimmermann

Koleopterologisk bidrag til Vestfolds fauna

Av Arne Fjellberg, Tjøme

I den følgende liste har jeg tatt med en del biller som tidligere ikke er funnet i Vestfold (VE). Det kan være av interesse å legge merke til at nesten samtlige arter er funnet på Tjøme. Til slutt har jeg tatt med noen arter som A. Vik oppga som nye for VE. i dette tidsskrift i 1963. Han har tatt artene på andre lokaliteter enn jeg, og de fleste av dem i flomrusk.

Andreas Strand har kontrollert materialet, og jeg takker ham varmt for dette.

Caraboidea

Synuchus nivalis Panz. VE: Tjøme, 13/7—63. Under råtten sopp.

Dytiscus semisulcatus Müll. VE: Tjøme, juni 1961. 1. eksempl. i vegetasjonsrik dam. I Norge er den ellers tatt i VAy og Ry. I Sverige er den tatt nord til Bohuslän.

Palpicornia

Sphaeridium lunatum F. VE: Tjøme, 23/5—63. Svermende i solskinn. Ellers funnet sammen med *S. scaraboides* L. og *S. bipustulatum* F. på strandbeite (Mostranda), i ku- og hestegjødsel.

Staphylinoidea

Necrophorus humator Gze. VE: Tjøme, 6/5—63. Vanlig ved åtsler og i åtselfeller om våren.

Necrophorus investigator Zett. VE: Tjøme, 14/7—63. Vanlig i åtselfeller.

Ptomaphagus medius Rey. VE: Tjøme, 14/5—63. 1. eksempl. krypende på vindu i hus. Ellers funnet i AK.

Choleva angustata F. VE: Tjøme, 27/10—63. 4. eksempl. i jordrotteganger på grøftekant. Ellers funnet i Ø.

Choleva elongata Payk. VE: Tjøme, 28/7—63. 4 eksempl. i jordrotteganger i utkanten av gammel eng. Tidligere tatt i AK.
Catops fuscus Panz. VE: Tjøme, 19/10—63. Mange eksempl. ristet ut av kasse med råtne poteter i kjeller.
Sciodrepoides watsoni Spence. VE: Tjøme, 23/5—63. 1. eksempl. under restene av død fugl.
Micropeplus porcatus F. VE: Tjøme, 23/5—63. 1. eksempl. svermende i skogen en varm, stille eftermiddag. Ellers funnet i AK.
Astenus filiformis Latr. VE: Tønsberg, 9/5—63. Under løs bark på råtten granstubbe.
Creophilus maxillosus L. VE: Tjøme, 25/5—63. Ved åtsel og ved gjødselbinge.
Acidota crenata F. VE: Tjøme, 5/5—63. Under stein og i råtten furustubbe.
Claviger testaceus Preyssl. VE: Tjøme, 5/5—63. Tallrik i koloni av *Lasius flavus*. Flere av koloniene innen et lite område i en tørr skråning inneholdt *Claviger*.
Hister 12-striatus Schrk. VE: Tjøme, april 1962. 1 eksempl. under stein.
Hister cadaverinus Hoffm. VE: Tjøme, 14/5—63. Vanlig i gjødsel.
Hister merdarius Hoffm. VE: Tjøme, 30/4—63. Under stein i utkanten av gjødseldynge.

Diversicornia

Malthinus flaveolus Payk. VE: Tjøme, 29/6—63. 1 ♂ og 1 ♀ tatt ved håving på eik.
Helodes minuta L. VE: Tjøme, 15/6—63. Meget alminnelig ved håving på fuktige grøftekanter i juni.
Microcara testacea L. VE: Tjøme, 29/6—63. Tatt i stort antall ved håving på gras i halvtørr myr i skogen.
Dryops similaris Bollow, VE: Tjøme, 25/5—63 1 ♂, 9/6—63 1 ♂ og ♀ tatt i parring. Begge ganger på samme sted, (Mostranda) tatt ved håving på vannplanter i vegetasjonsrik dam. *D. similaris* skal ellers være tatt ved Narvik.
Omosita discoidea F. VE: Tjøme, 27/5—63. Svermende om kvelden.
Rhizophagus depressus F. VE: Tjøme, 12/4—62. 1 eksempl. under tørr furubark.
Rhizophagus nitidulus F. VE: Tjøme, 10/4—63. 1 eksempl. under barken på råtnende bjerkestubbe, der *R. bipustulatus* F. fantes i et antall på et par hundre.
Laemophloeus alternans Er. VE: Tjøme, 24/3—63. 1 eksempl. i barkbilegang på tørr gran. Ellers funnet i AK.

Laemophloeus abietis Wank. VE: Tønsberg, 27/3—63. Samme biotop som *alternans*.

Cryptophagus pubescens Sturm. VE: Tjøme, 27/10—63. 1 eksempl. i koloni av *Vespa vulgaris*.

Atomaria munda Er. VE: Tjøme, 13/10—63. Krypende på vegg i kjeller.

Cartodere elongata Curt. VE: Tjøme, 19/10—63. Henimot 100 eksemplarer krypende på mugne planker i potetbinge i kjeller. Det er nærliggende å anta at den ernærer seg av denne muggsoppen.

Cartodere filiformis Gyll. VE: Tjøme, 19/10—63. Sammen med *elongata*.

Corticaria pubescens Gyll. VE: Tjøme, 9/4—63. I komposthauger og i kjeller.

Mycetophagus populi F. VE: Tjøme, 23/5—63. 1 eksempl. med vanskapte følehorn under råtten bark på nedblåst ospetre.

Subcoccinella 24-punctata L. VE: Tjøme, 15/6—63. Tatt ved håving på *Rumex acetosella*.

Coccidula scutellata Hbst. VE: Tønsberg, 25/3—63. Flere stykker overvintrende under tykk askebark. Trærne står i utkanten av en bukt med mye takrør og siv (Kilen).

Myrrha 18-guttata L. VE: Tjøme, 15/5—62. Svermende i solskinn i skogen.

Cis pygmaeus Marsh. VE: Tjøme, 23/3—63. Noen få eksempl. under tørr eikebark, og delvis i den råtne veden på et lite eiketre. På samme sted var det en del *C. festivus* Gyll., *C. boleti* Scop., og *C. hispidus* Gyll. *C. pygmaeus* ble første gang tatt i Norge av Strand 19/5—59 i AK.

Ernobius abietis F. VE: Tjøme, 23/5—63. Svermende i solskinn i skogen.

Tipnus unicolor Pill. VE: Tjøme, 13/10—63. Vanlig å finne krypende på vegger og tak i kjeller.

Heteromera

Orchesia undulata Kr. VE: Tjøme, 6/4—63. 1 eksempl. krypende på sneen like ved bjerkestubbe med utflytende saft.

Pseudocistela ceramboides L. VE: Tjøme, 17/7—62. 1 eksempl. tatt ved håving på lave busker en varm, stille eftermiddag.

Opatrum sabulosum L. VE: Tønsberg, 4/6—63. Krypende på sti i skogen.

Hypophloeus linearis F. VE: Tjøme, april 1962. 1 eksempl. under råtten granbark.

Phytophaga

Cryptocephalus nitidus L. VE: Tønsberg, 7/6—63. På hassel.

Cryptocephalus punctiger Payk. VE: Tjøme, 14/7—63. På eik.

Chrysomela sanguinolenta L. VE: Tjøme, 19/5—63. Vanlig på *Linaria*.
Phaedon cochlearia F. VE: Tjøme, 26/5—63. 1 eksempl. tatt ved håving på planter i myr.
Longitarsus tabidus F. VE: Tjøme, 8/9—63. Vanlig på *Verbascum* om høsten.
Longitarsus succineus Foud. VE: Tjøme, 3/8—63. Vanlig ved håving på tørr mark i juli—august.
Psylliodes affinis Payk. VE: Tjøme, 28/6—63. Vanlig på *Solanum dulcamara* i juni—juli.
Psylliodes napi F. VE: Tjøme, 25/10—63. 1 eksempl. drivende i vanntønne.
Psylliodes picina Mrsh. VE: Tjøme, 29/9—63. Tallrik på fuktig eng i sept.—okt. Arten er ikke funnet på Østlandet før. Den er kjent fra Ry og SFy.
Bruchus loti Payk. VE: Sem, 2/6—63. Tatt ved håving på grøftekant.

Rhyncophora

Apion sedi Germ. VE: Tjøme, 22/5—63. Ved håving i eng.
Otiorrhynchus sulcatus F. VE: Tjøme, 14/7—62. Vanlig i jordbæråker.
Bagous limosus Gyll. VE: Tjøme, 26/5—63. 1 eksempl. tatt ved håving blant planter i vegetasjonsrik dam.
Ceuthorrhynchus erysimi F. VE: Tjøme, 15/5—63. Ved håving på grasmark.
Ceuthorrhynchus litura F. VE: Tjøme, 12/7—62. Ved håving på grasmark.
Hylastes cunicularius Er. VE: Tjøme, mai—juni 1962. Svermende i varmt, stille vær.
Polygraphus poligraphus L. VE: Tjøme, mai 1962. I barken på tørr gran.
Crypturgus subcribrosus Egg. VE: Tjøme, 24/3—63. I barken på tørr gran.
Trypodendron domesticum L. VE: Tjøme, 8/3—63. I boreganger i bjørkestubbe.
Trypodendron lineatum Ol. VE: Tjøme, 9/5—63. Svermende i stille, varmt vær.

Trechus rubens F. Vik tok denne i flomrusk i 1961. Selv har jeg tatt den VE: Tjøme, 27/10—63 i jordrottegang. Den langt sjeldnere *T. discus* F. har jeg også tatt i jordrotteganger.

Nemosoma elongatum L. Denne arten ble av Vik funnet i flomrusk i 1961. Hele våren 1962 fant jeg den i store mengder i barkbilleganger på granved i en vedstabel på Tjøme. I løpet av sommeren forsvant den herfra.

Rhizophagus parvulus Payk., ble av Vik funnet i flomrusk 1961. Jeg fant den VE: Sem, 2/6—63. Noen eksempl. under barkstykker på eikestubbe med gjærende saft.

Rabocerus gabrieli Gerh., ble av Vik funnet i flomrusk 1961. Jeg fant den VE: Tjøme, 19/4—62, under bark på råtten bjerk.

Aphodius merdarius F., ble av Vik tatt i flomrusk 1961. Jeg fant den VE: Sem, 19/5—63, svermende tallrik på varm, stille dag.

Litteratur

Catalogus Coleopterorum Fennoscandiae et Daniae, 1960.

HANSEN, VICTOR: Biller, Danmarks fauna.

VIK, ANDERS, 1963: Koleopterologiske notater. — Norsk Entomologisk Tidsskrift. Bd. XII, h. 3—4.

Social wasps in Norway (Hymenoptera, Vespidae)

By Astrid Løken
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Introduction

The social or stinging wasps belong to the true wasps which are distinguished by their reniform eyes and by the wings being folded longitudinally when not in flight. They are separated from the solitary true wasps by the simple claws, the intermediate tibiae with two apical spurs, and the surface of the mandible being without keels.

The occurrence of these striking, commonly-known insects is poorly known in Norway. Siebke (1880) reviews the scanty information known by then. Rengel (1912) presents the distribution of the species, mainly upon records of E. Strand (1897, 1898, 1899, 1901, 1903) and J. Sparre Schneider (1909). The few data given by Friese (1902) include those of Zetterstedt (1840) besides oral information from Schneider. Some more records by Soot-Ryen are added (1925). The following species are represented: *Vespa crabro* L., *Vespula media* (Retz), *Vespula sylvestris* (Scop.), *Vespula norwegica* (Fabr.), incl. var *saxonica* (Fabr.), *Vespula vulgaris* (L.), *Vespula germanica* (Fabr.), *Vespula rufa* (L.), *Vespula austriaca* (Panz.) and *Polistes biglumis* (L.). Each species is recorded from a few localities only. The biology and the behaviour are merely commented upon by Schneider (1885, 1909).

The few scattered particulars have for several years stimulated me to catch the individuals passing my way. By now the catch become a collection from all parts of the country and, supplemented by the museum collections, it may be worth while to present the reliable data. However, the previous material as well as the more recent, are casual collections, and the survey may be considered as preliminary only. It indicates, indeed, the need for more intensive study of the group. Moreover rather recently a slight species difference in the composition of the insect's poison has been recognised, which is of medical import-

ance when considering the various effects of wasp stings. Better knowledge of the distribution, seasonal variation, behaviour etc. of the occurring species, is therefore of common interest.

A c k n o w l e d g e m e n t s : I am indebted to the authorities of the following museums for permission to examine their collections: Curator B. Christiansen, Tromsø Museum, Tromsø; Director Dr. E. Sivertsen, The Royal Norwegian Society of Science, Trondheim; Director Dr. L. R. Natvig, Oslo University Zoological Museum; J. Fjelddalen, Government Entomologist, State Plant Protection Institute, Vollebekk; Director H. Holgersen, Stavanger Museum. Prof. Dr. A. Semb Johansson, cand. mag. R. Mehl and cand. mag. T. Nielsen have kindly allowed me to identify and include their personal collections. My thanks are furthermore due to Dr. H. Wolf, Plettenberg, Westfalen, Germany for controlling 14 specimens of *V. norwegica* and *V. saxonica* and to Professor Dr. C. Lindroth, Zoological Institute, Lund, for lending me 3 specimens of *V. saxonica* for comparison. The preparators Miss S. Dommersnes and Mr. J. Haugsbø have kindly given me technical assistance in preparing the maps, drawing and photographs.

Classification and material

In this paper the social wasps are classified in the genera *Vespa* L., *Vespula* Ths. (subgenera *Dolichovespula* Rohwer, *Vespula* Ths.), and *Polistes* Latr. There are different opinions about the generic and subgeneric treatment of the two first genera, and those interested in the discussion are referred to Bequaert (1931, 1932), Beaumont (1944) and Blüthgen (1938, 1943, 1961). The latter elevates the subgenera *Dolichovespula* Rohwer, *Pseudovespula* Bisch. and *Paravespula* Blthg. to genera and introduces three more subgenera. I recognise his reasons but hesitate to split this homogenus group. The nomenclature used by Blüthgen has, however, been added for each species with a reference to his last paper where he has compiled further references and information about the types as well.

Besides my own collection, all available material has been identified, resp. revised with the aid of the Blüthgen's keys (1961). The keys of Beaumont (1944) and Fæster (1958) have also been consulted.

A key to the Norwegian species has been made. In a short description of each species mainly characters of taxonomic importance are included. The size of the Norwegian species is not measured and those given refer to Blüthgen (1961). For the reference of distribution, locality records are plotted on maps and all data

are listed. The geographical division follows A. Strand (1943). Most of the previously published material is kept and, therefore, revised and included. Data from published material not available, eventually, lost, are not included as identification may be doubtful.

The following abbreviations are used: ASJ = Johansson, A. Semb; Ba = Bakke, A.; Bra = Brattström, H.; Chr = Christiansen, B.; D = Dommersnes, S.; El = Ellingsen, E.; Em = Esmark, L.; Ev = Evjenth, A. G.; Fj = Fjeldså, A.; G = Godskeleiren; Grø = Grønlie, A.; Hg = Hagemann, A.; HH = Holgersen, H.; Ho = Holmboe, A.; IMS = Sætren, I. Meidell; IRD = Dahlby, I. R.; Ki = Kiær, H.; Kj = Kjennerud, J.; Kn = Knaben, N.; La = Larsen, A.; L-P = Lie-Pettersen, O. J.; LRN = Natvig, L. R.; Lü = Lühr, C. F.; Lø = Løken, A.; M = Mehl, R.; Mei = Meidell, O.; Moe = Moe, G.; Mü = Münster, Ths.; Nie = Nielsen, T.; P = personal collection; R-H = Roll-Hansen, J.; RH = Rost, H.; Ro = Rosenlund, B.; S = Strompdal, I. T.; Schn = Schneider, J. Sparre; Schø = Schøyen, W.; Si = Sivertsen, E.; Sie = Siebke, J. H. S.; Sn = Snekvik, Ø.; SPV = Statens Plantevern, Vollebekk; S-R = Soot-Ryen, T.; St = Stavanger Museum; Str = Strand, E.; T = Museet, Trondheim; Th = Thorstensen, I. B.; Tjø = Tjønneland, A.; TLH = Tambs Lyche, Harold; Tr = Tromsø Museum; Ul = Ullmann, A. C.; Y = Young; ZMB = Bergen Univ. Zoologisk Museum; ZMO = Oslo Univ. Zoologisk Museum; Ø = Østvold, J.

Key to the Norwegian social wasps

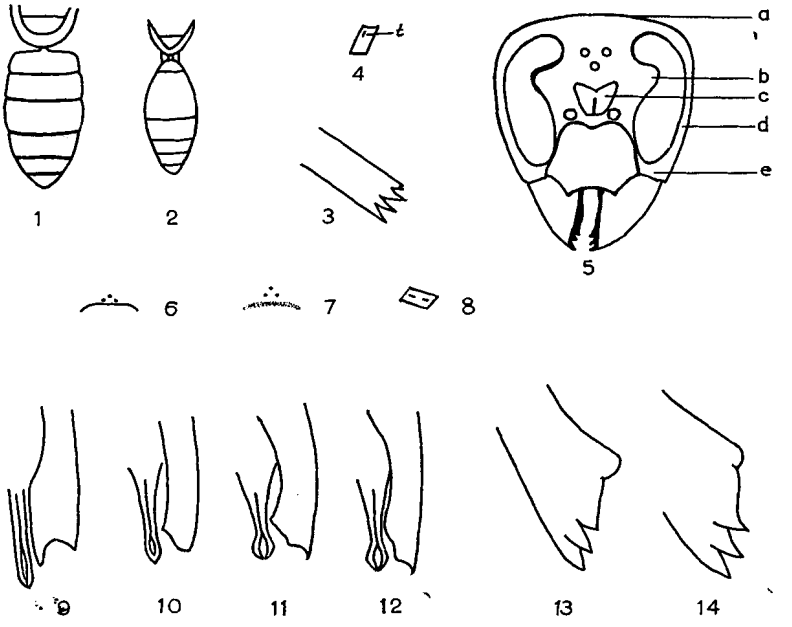
1. Abdomen broad, base of first segment sharply truncate and attached to the thorax by a short slender petiolus, fig. 1. Mandible widened apically, distal margin inclined and the outer part with three teeth, figs. 13, 14. 2

– Abdomen slender, fusiform, gently tapered at both ends and attached to the thorax by an elongated narrow petiolus fig. 2. Mandible parallel sided, distal margin transverse and toothed, fig. 3.
Genus ***Polistes*** Latr.
One species, *P. biglumis* (L.)

2. Head enlarged beyond and above the compound eyes; subgenae swollen; distance from the lateral ocelli to the occipital carina exceeding twice the distance between the resp. ocelli, fig. 5, plate I, 1. Head, thorax with red markings. Male antennae with distinct tyloids (fig. 4) in two rows. Superior size.
Genus ***Vespa*** L.
One species, *Vespa crabro* L.

– Head not enlarged beyond and above the compound eyes; subgenae at most barely swollen; distance from the lateral ocelli to the occipital carina less than twice the distance between the resp. ocelli, figs. 6, 7. Head without red markings. Male antennae with or without tyloids.
Genus ***Vespula*** Ths. 3

3. Malar space longer than half the width of the scape of the antennae. Pronotum with anterior vertical carina. Male with the sagittae divided distally, figs. 9—12, plate II, 11—15.
Subgenus ***Dolichovespula*** Rohwer. 4



Figs. 1—14. — 1. *Vespa, Vespula* abdomen. — 2. *Polistes*, abdomen. — 3. Right mandible of *Polistes*. — 4. Antennal joint with carina, t = tyloid. — 5. *V. crabro*, a = occipital carina, b = sinus of eye, c = front area, d = subgena, e = malar space. — 6. *V. norwegica*, vertex. — 7. *V. saxonica*, vertex. — 8. Antennal joint of *V. saxonica* ♂, two tyloids. — 9. *V. sylvestris*, stipes and penis. — 10. *V. adulterina*, stipes and penis. — 11. *V. saxonica*, stipes and penis. — 12. *V. norwegica*, stipes and penis. — 13. *V. vulgaris*, right mandible. — 14. *V. germanica*, right mandible.

3 Malar space shorter than half the width of the scape of the antennae. Pronotum without vertical carina. Male with the sagittae fused throughout, saddle- or spoon-shaped distally, plate II, 16—19.
Subgenus ***Vespula*** Ths. 8

4. Apical margin of clypeus projecting in two prominently raised, acute angles (less prominent, about 90°: in male); black marking on the disc usually tapering to the middle of the margin, plate I, 2. The flattened sting and last abdominal segment bending downwards. Male antennae without tyloids. Male genitalia, plate II, 13, stipes and penis fig. 10. Workers absent. *Vespula adulterina* (Buyss.)

– Apical margin of clypeus projecting in two obtuse angles (may be 90°:), not prominently raised (less projecting, rounded in male). The almost pin-shaped sting and last abdominal segment only slightly bending. Workers present. 5

5. Sinus of eye completely yellow; clypeus usually yellow or with a black-brown point in the centre of the disc plate I, 3 (may be more dark points or a narrow dark line extending partially downwards from

the middle of the base). Yellow hind margin of pronotum usually produced downwards along the anterior vertical carina. Male antennae with distinct tyloids. Male genitalia plate II, 11.
Vespula media (Retz.)

5 Sinus of eye with only lower part of the border marked yellow. Male antennae with or without tyloids. 6

6. Greater part of clypeus with fine dense punctures in between the coarse ones, oral part usually less punctured, shining; broad black line running down the middle of the disc, widened centrally, usually extending from the base to the margin, plate I, 5 and 6. Male antennae with more or less distinct tyloids. 7

– Surface of clypeus slightly chagrinated with an even distribution of moderate punctures; clypeus all yellow or with a black pin point centrally, plate I, 4 (widened, sometimes to short longitudinal line in worker, male). Male antennae without tyloids. Male genitalia plate II, 12, stipes and penis fig. 9. *Vespula sylvestris* (Scop.)

7. Occipital carina well defined; distance between the lateral ocelli longer than the distance from resp. ocelli to occipital carina fig. 6. Hairs of pleurae preferably black. Disc of scutellum usually flattened around the median impression. Seventh to thirteenth of male antennal joint with one more or less distinct tyloid fig. 4. Male genitalia, plate II, 14, stipes and penis fig. 12. *Vespula norwegica* (Fabr.)

Forma *typica*: Lateral red markings on first and second tergite or either one of them; forma *zetterstedti*: no red markings.

– Occipital carina poorly defined, rounded i. e. lacking; ocelli forming almost an equilateral triangle fig. 7; distance from lateral ocelli to occipital carina vary, often about as long as the distance between the resp. ocelli. Hairs of pleurae light brownish. Disc of scutellum usually not flattened around the median impression, which may be poorly defined. Abdomen without red markings. Each of seventh to twelfth male antennal joint with two distinct tyloids, fig. 8, thirteenth joint with one tyloid. Male genitalia plate II, 15, stipes and penis fig. 11.
Vespula saxonica (Fabr.)

8. Apical margin of clypeus projecting in two prominently raised, acute angles (less prominent, only slightly projecting in male); disc of clypeus with one to three black points (or small irregular-shaped markings), plate I, 7. Outer surface of intermediate and hind tibiae bearing long, black, erect hairs. Flattened sting and last abdominal segment bending downwards. Sagittae of male genitalia saddle-shaped, plate II, 16. Workers absent. *Vespula austriaca* (Panz.)

– Apical margin of clypeus moderately projecting in two angles, not prominently raised. Outer surface of intermediate and hind tibiae without, or with only a few, light-coloured long erect hairs. Pin-shaped sting and last abdominal segment only slightly bending. Workers present. 9

9. Sinus of eye all yellow. Surface of tergited dull. No red markings. Male with seventh tergite depressed apically, emarginated distally. Sagittae spoon-shaped distally, plate II, 18, 19. 10

– Sinus of eye with only a narrow border of the lower part marked yellow; black, broad line running down middle of the clypeus, widened centrally, either ending at a distance before the margin, plate I, 8, or tapering to the margin. Tergites with deep, coarse punctures sparsely

distributed, shining, first and second tergite with red markings. Seventh tergite of male not depressed and not emarginated distally. Sagittae saddle shaped, plate II, 17. *Vespula rufa* (L.)

10. Inner third tooth of the mandible projecting, the middle part of distal edge therefore slightly emarginated fig. 14. Sinus of eye completely yellow, the inner-side may partly coalesce with the yellow front area; yellow of subgenae continuous throughout; disc of clypeus with one to three black points or small irregular spots, plate I, 9. Sagittae of the male with triangular or rounded appendage on each side close to the base of the terminal spoon, which is truncate, often emarginated distally, plate II, 18. *Vespula germanica* (Fabr.)

– Inner tooth of the mandible not projecting, the middle part of distal edge almost straight, fig. 13; yellow marking covering sinus of eye is slightly emarginated inside, never touching the front area; subgenae black and yellow, (in male usually yellow continuously throughout). Black band down the middle of the clypeus widened like an anchor at apex, plate I, 10, or reaching the margin, (black markings reduced, or lacking in male). Sagittae with sharp tooth-like appendage on each side close to the base of the terminal spoon, which is rounded distally, plate II, 19. *Vespula vulgaris* (L.)

Genus *Vespa* Linnaeus, 1758

Vespa crabro L.

Vespa crabro Linnæus (Syst. Nat. 1758 p 572 n 1.)
Vespa crabro L. cfr. Blüthgen (1961 p 27)

Queen, plate I, 1.

Diagnostic characters: Head fig. 5 enlarged beyond and above the compound eyes; subgenae swollen; eyes nearly reaching the base of the mandibles; all ocelli in front of the upper edge of the eyes; distance from the lateral ocelli to occipital carina exceeding twice the distance between the resp. ocelli; clypeus dark yellow or reddish-yellow with dense, even distribution of deep, coarse punctures; lateral apical angles about 90°, somewhat rounded; reddish-yellow front area is flattened, coarsely punctured and with a distinct median impression; subgenae and the enlarged vertex reddish-yellow throughout. Pronotum with an anterior vertical carina, the lobe usually marked red brown; mesothorax and scutellum black. Male antennae with distinct tyloids in two rows. Size: ♀ 25—35 mm, ☿ 18—24 mm, ♂ 21—28 mm.

Variation: With the exception of a single queen and a single worker which have mesothorax and scutellum with red-brown markings, the specimens examined are typical with only slight variations in the colour pattern. Only a total of 11 ♀♀, 27 ☿☿ and 3 ♂♂ are examined.

Distribution: Map, fig. 15. The species is restricted to the south-eastern part of the country which is the northern

limit of its distribution. However the records, listed below, reveal no recent find. Once in a while laymen report they have found this gorgeous wasp or its nest; however, as far as I have been able to control, it has been due to mis-identification. The present occurrence of this rare species is therefore uncertain.

List of records:

Ø: Jeløy: ♀ and 7 ☿☿ IX. 1877 (Schø) ZMO; **AK**: Drøbak: ♀ 1911 (?) St.; Oppegård: ♀ VI. 1895 (Y) ZMO; Asker: 2 ♀♀, 7 ☿☿ (Schø) SPV; Bærum: Høvik 6 ☿☿ (Schø) ZMO and 2 ☿☿ (Schø) ZMB; Aker: 4 ☿☿ (?) ZMO; Oslo: ♀ ☿ (Sie) ZMO; Frogner 2 ♀♀ (Em) ZMO; **HEs**: Eidskog: ♂ (Str.) ZMO; **O**: ?: Gudbrandsdalen ♀ VII. 1907 (?) ZMB; **Bø**: Ø. Eiker: Vestfossen, Teie ♀ XI. 1880 (Em) ZMO; **TEy**: Kragerøy: 2 ♂♂ (Ul) ZMO; **AAy**: Risør: ♀ (Th) ZMO.

Genus ***Vespula*** Thomson, 1869

Subgenus *Dolichovespula* Rohwer, 1916

The "long-cheeked" wasps are distinguished by the well-defined malar space. This is rarely shorter than the width of the scape of the antennae, always exceeding half this width. The pronotum has an anterior vertical carina. The elongated antennal joints are partially swollen underneath in the female and partially, have tyloids in the male (except *V. sylvestris* ♂ and *V. adulterina* ♂). Sagittae of the male genitalia are divided distally.

The nesting site is preferably above the ground. The subgenus includes species which produce a rather weak poison.

Vespula media (Retz.)

Vespa Crabro media Retzius (Gen. & spec. Insect., 1793 p 63 n 230)
Dolichovespula (*Dolichovespula*) *media* (Retz.) cfr. Blüthgen (1961 p 30)

Queen, plate I, 3.

Diagnostic characters: Malar space about as long as the width of the scape of the antennae; sinus of eye completely yellow; clypeus all yellow or with a brown to black point in the centre, (perhaps several dark spots or a narrow dark line usually extending downwards from the middle of the base, not reaching the apex); surface of clypeus slightly chagrinated in between the coarse, rather evenly distributed punctures; projecting angles of the margin approx. 90° (rounded, barely indicated in male). The yellow hind margin of pronotum usually produced partially downwards along the anterior vertical carina. Male antennae with distinct tyloids. Male genitalia, plate II, 11. The second largest species of social wasps, the queen as large as *V. crabro* ☿. Size: ♀ 18—22 mm, ☿ and ♂ 15—19 mm.

Variation: The female, particularly the queen, may have red markings in the lobe of pronotum, apical part of mesonotum and scutellum. About a third of the workers examined are melanotes. They have the yellow markings of abdomen reduced to a narrow apical edge of the tergites, the last tergite may be somewhat more yellow. Otherwise, the colour pattern varies as usual for the typical form. Only a total of 33 ♀♀, 28 ☿☿ and 3 ♂♂ are examined.

Nest: No nest is recorded. The species is said to build small aerial nests preferably in bushes.

Distribution: Map, fig. 16. The rather scarce species is not yet recorded above the tree-line or in the western counties Hordaland and Sogn & Fjordane, which I have visited on numerous occasions. The main records are from the conifer region, the northernmost observations from a forest valley just north of the polar circle. The deficient records are insufficient for indicating the limit of the distribution.

List of records:

Ø: Hvaler: Kirkøy ♂ IX. 1925 (Mü) ZMB; S. Sandø 2 ☿☿ 15. and 2 ☿☿ 28. VII. 1962 (ASJ) P; Halden: ♀ (Schø) ZMO; Jeløy: ♀ ☿ (Schø) ZMO; **AK**: Frogn: Degerud, Sønderstøa ☿ 9. VIII. 1935 (S-R) Tr; Bærum: Blommenholm ♀ 23. VI. 1946 (Chr.) ZMO; Aker: 5 ☿☿ (?) ZMO; ☿ (Schø) SPV; Bygdøy, Bukten ☿ VIII. 1933 (Mü) ZMO; Sørkedalen ♀ 23. VI. 1955 (Lø) ZMB; Oslo: ☿ (Schø) SPV; ♀ (Mü) ZMO; Briskeby ♀ 5. VI. 1954 (Ba) ZMO; Tøyen 2 ♀♀ ☿ (Schø); 3 ♀♀, 3 ☿☿ (no date) and 3 ☿☿ 8. VIII. 1846 (Sie) ZMO; Eidsvoll: Sundet ♀ 20. VI. 1955 and Eidsvoll 12. VI. 1957 (M) P; **HEs**: Hamar: ♀ 28. VI. 1953 (Ba) ZMO; **HEn**: Y. Rendal: Renåsen ☿ 9. VIII. 1941 (LRN) ZMO; **On**: Nord-Fron: ☿ (Schø) ZMO; Vågå: ♀ 7. VII. 1961 (Nie) ZMB; **Bø**: Hurum: Holmsbu 2 ♀♀ 5. and ♀ 6. VI. 1960 (ASJ) P; **VE**: Sande: ♀ VII. 1891 (Schø) ZMO; Larvik: ☿ 2. VIII. 1946 (HH) ZMO; **AAy**: Grimstad: ♀ 2 ☿☿ ♂ 19. IX. 1937 (R-H) ZMO; **Ri**: Forsand: Lerang ♀ 10. VII., ☿ 3. VIII. 1934 and ♀ 5. VIII. 1935 (Mei) ZMB; Sauda: Saudasjøen ♀ 25. V. 1935 (Mei) ZMB; **STi**: Horg: Benna ♀ VII.—VIII. 1937 (Sn) ZMB; **Nsy**: Velfjord: Storbjøra ☿ 24. VIII. 1954 (S) T; **Nsi**: Grane: Kløvjemoen 2 ♀♀ 1899 (Str) ZMO; Nord-Rana: Storvolden, Drangedal ♂ 20. VIII. 1926 (Grø) Tr; Svartisdal 3 ♀♀ 14. VII. 1948 (S-R) Tr; Saltdal: ♀ (Hg) Tr; ♀ (Schø) ZMO; Storjord 2 ♀♀ VI. and ♀ VII. 1898 (Schn) Tr.

Vespula sylvestris (Scop.) (= *holsatica* (Fabr.))

Vespula Sylvestris. Scopoli (Ent. Carnio. 1763, p 309 n 826)
Dolichovespula (*Metavespula*) *s. sylvestris* (Scop.) cfr. Blüthgen (1961 p 39).

Queen, plate I, 4.

Diagnostic characters: Lower border of the sinus of eye yellow; maler space slightly longer than the width of the scape of the antennae; clypeus all yellow or with a black pinpoint in the middle of the disc (black marking rarely widened in

female, often a longitudinal median line in male); surface of clypeus slightly chagrinated with an even distribution of moderate punctures, lateral angles of the oral margin 90° or obtuse, rounded and not much projecting (almost without angles in the male). The anterior vertical carina of pronotum black. Male antennae without tyloids. Male genitalia plate II, 12, stipes and penis fig. 9. Size: ♀ 15—19 mm, ☿ 13—15 mm, ♂ 14—16 mm.

Variation: The species is stable, the colour variations are small. A total of approx. 310 females and 50 males are examined.

Nest: There are no reliable records of the nesting site, which is known to be aerial. The nest mentioned by Schneider (1909 p 115) is due to mis-identification (cfr. p 210).

Distribution: Map, fig. 17. The species is locally common in southern Norway. It prefers foliaceous forest and open areas and has not yet been recorded above the tree-line. The northernmost record is at the latitude of 64° but it may occur further north.

List of records:

Ø: Hvaler: Asmaløy ☿ 20. VII. 1958 (Lø) ZMB; Kirkøy, Dødvika ☿ 21. VII. 1958 (Lø) ZMB; S. Sandø 4 ☿☿ 21. VII. 1958 (Lø, IMS) ZMB and ♂ 18. VIII. 1963 (ASJ) P; Kråkerøy: Ødegård 3 ☿☿ 19. VII. 1958 (Lø, IMS) ZMB; Onsøy: Ramseklo ☿ 19. VII. 1958 (Lø) ZMB; Råde: Åven 2 ☿☿ 7. VII. 1958 (Lø, IMS) ZMB; Jeløy: ☿ (Schø) ZMO; Rødenes: Rødenes 2 ☿☿ 11. VII. 1958 (Lø) ZMB; Frogn: Sollia ☿ 1. VIII. 1926 (S-R) Tr; **AK**: Bærum: ♀ (Schø) SPV; Blommenholm 2 ♀♀ 18. V. and ♀ 8. VI. 1946 (Chr) ZMO, ♀ 18. V. 1946 (Chr) ZMB; Aker: ♀ 6. VI. 1889 (Ki) ZMO; Blindern 2 ♀♀ IV. 1950 (Ba) ZMO; Kjelsås ♀ 20. V. 1960 (M) P; Ryenberg ♀ 24. VI. 1851 (Sie) ZMO; Tåsen ☿ 1. VIII. 1935 (S-R) Tr; Østensjø 2 ☿☿ 20. VIII. 1888 (Ki) ZMO; Oslo: ♀ ☿ (Em), ♀ 2 ☿☿ (Schø), 2 ♀♀ ♂ (Sie) and ♀ (Str.) ZMO; Frogner ♀ 6. I. 1873 (Schn) ZMO; Tøyen 7 ☿☿ 3 ♂♂ (Sie), 5 ♂♂ (Moe), 2 ♂♂ (Schø) and ♂ VIII., ♂ IX. 1845, ☿ 6., 2 ♀♀ 10. VIII. 1846, ♀ 10. VI., 2 ☿☿ 28. VII. 1847 (Sie) ZMO; ♂ (Sie) ZMB; **HEs**: Hamar: ♀ 29. V. 1949 (RH) Tr; 2 ♀♀ 27. V. 1954 (Ba) ZMO; Hoff: ♀ (Schø) ZMO; Sør-Odal: ♂ (Schø) ZMO; **Os**: Ringebu: ☿ (Schø) ZMO; **On**: Lom: Lom ♀ 3. VII. 1958, ♀ 26. V. 1960 and 3 ♀♀ 12. VI. 1964 (Lü) ZMB; **Bø**: Hurum: Holmsbu 12 ♀♀, 5 ☿☿, 4 ♂♂ VII.-VIII. 1959, 26 ♀♀ 5., 11 ♀♀ 6., 7 ♀♀ and 6 ☿☿ 19. VI. 1960 (ASJ) P; Modum: ♀ ☿ (Schø) ZMO; **VE**: Skoger: Konnerud ♀ 16. VI. 1922 (TLH) ZMB; Ramnes: s. Lunde ☿ 28. VII. 1961 (Lø) ZMB; Stokke: Langø gård ☿ 30. VII. 1952 (Ø) ZMB; Brunlanes: Tronsrød ♂ 29. VII. 1961 (Lø) ZMB; Larvik: 3 ☿☿, 2 ♂♂ 3. VII., 10 ☿☿ 3 ♂♂ 14. VII., 6 ☿☿ 3 ♂♂ 23. VII., 6 ☿☿ 4 ♂♂ 30. VII. and ☿ 2 ♂♂ 7. VIII. 1911 (LRN) ZMO; **TEi**: Mo: v. Vråliosen ☿ 22. VII. 1960 (IMS) ZMB; **AAy**: Vegårdshei: Ljøstad ☿ 23. VII. 1960 (IMS) ZMB; Stokken: Saltrød ☿ 12. VII. 1960 (Lø) ZMB; Barbodalen ☿ (Em) ZMO; Arendal: ☿ (Ba) and 7 ♀♀ 25. V. 1953 (Ba) ZMO; ♀ 25. V. 1953 (Ba) ZMB; Høvåg: Kvåse ♀ 10. VII. 1960 (IMS) ZMB; Natvik ☿ 22. VII. 1961 (Lø) ZMB; **VAy**: Randøysund: Strømme ☿ 8. VII. 1960 (Lø) ZMB; Kristiansand: ☿ (Schø) ZMO; Lista: Lodshavn ☿ 11. VII. 1961 (Lø) ZMB; **Ry**: Bjerkreim: Ivesdal ♀ 5. VII. 1960 (Lø) ZMB; Hovland 2 ♀♀ 5. VII. 1960

(Lø) ZMB; Ogna: ♀ (Schø) ZMO; Klepp: Skasheim ♀ 18. VII. and ☿ 1. VIII. 1964 (Nie) P; Høyland: 5 ♀♀ 14. VI. 1960 (Nie) P; Håpet ♀ 14. VI. 1960 (Nie) P; Osli ♀ ☿ 29. VIII. 1963 (Nie) ZMB; Sola: Gimre 2 ☿☿ 12. VII. 1964 (Nie) P; Madla: ☿ 23. VII. 1957 (M) P; **Ri**: Forsand: Lyse ☿ 9. VII. 1933 (Mei) ZMB; **HOy**: Hålandsdal: Berge gård 2 ♀♀ 7. VI. 1958 (Lø) ZMB; Fana: Biol. st. ☿ 14. VII. 1950 (Bra) ZMB; Espeland, small nest ☿☿ pupae VII. 1951 (Ro) ZMB; Natland 23 ♀♀ 66 ☿☿ 11 ♂♂ VIII. 1910 (L-P) ZMB; Skipanes ☿ 23. and 3 ☿☿ 27. VII. 1963 (Lø) ZMB; Bergen: ♀ 27. V. 1957 (Lø) ZMB; ♀ 31. V. 1960 (Ev) ZMB; **HOi**: Voss: Tyrlingen 7 ♀♀ 18. V. 1959 (Lø) ZMB; **SFy**: Hyllestad: Hyllestad ☿ 30. VI. 1963 (Lø) ZMB; **SFi**: Sogndal: Kaupanger ☿ 5. VII. 1963 (Lø) ZMB; **STy**: Stadsbygd: Stadsbygd ♀ 2 ☿☿ 3. VII. 1959 (Lø) ZMB; **STi**: Trondheim: Museet ☿ 25. VII. 1952 (?) T; NTi: Sandvollan: Skjelvågen ☿ ♂ 10. VIII. 1959 (Lø) ZMB.

Vespula norwegica (Fabr.)

Vespa norwegica Fabricius (Spec. Insect. I 1781, p 460 n 12).
Dolichovespula (*Boreovespula*) *n. norwegica* (Fabr.) cfr. Blüthgen (1961 p 35).

Queen, plate I, 5.

Diagnostic characters: Lower border of the sinus of the eye yellow; malar space one to one and a half times longer than the width of the space of the antennae; greater part of clypeus with fine punctures densely distributed in between the coarse ones; oral part of the disc usually shining, often without fine punctures and with the coarse punctures more or less coalescing; broad black band down the middle of the disc, widened centrally, usually extending from the base to the oral margin and slightly narrower at the base; lateral angles of the margin usually exceeding 90°, not projecting much; distance between the lateral ocelli distinctly longer than the distance from the resp. ocelli to the occipital carina, which is well defined fig. 6. Vertical anterior carina of pronotum black. Disc of the scutellum flattened around the median impression (oftest less pronounced in ☿☿ and ♂♂). Pleurae usually with black hairs, occasionally with light hairs. Each of seventh to thirteenth male antennal joints with a more or less distinct tyloid. Male genitalia, plate II, 14, stipes and penis fig. 12. Size: ♀ 15—18 mm, ☿ 11—14 mm, ♂ 13—15 mm.

Variation: The typical form has laterally red markings on the first and second tergite or on either one of them. A variety, *V. norwegica* (Fabr.) forma *zetterstedti* (= *Vespa borealis* Zett.) has no red markings and has earlier been confused with *V. saxonica* (Fabr.), cfr. this species. Though no nomenclatorial recognition, the naming of the variant is kept for practical purposes.

A total of approx. 425 females and 75 males, of *V. norwegica*

forma *typica*, respectively 250 females and 15 males of *V. norwegica* forma *zetterstedti* are examined.

N e s t : The species usually builds its nearly global, light-grey nest above the ground. It is recorded in branches of trees, in bushes, and is often observed hanging down from *Juniperus communis* L. A few nests are found in the ground, just below the moss cover. Inhabitants of nests inside houses, lofts, underneath roofs, etc., have not been examined. Records of such nesting sites are therefore not reliable as they might as well have belonged to *V. saxonica.*

D i s t r i b u t i o n : Map, fig. 18. *V. norwegica* is frequently recorded in all regions, from the southern lowlands to the artic tundra and inland, as well as along the coast.

Blüthgen (1961 p 36) indicates that the species has a preference for woodland biotopes. Weyrauch (1937 p 283) states that species with red markings, i. e. *V. norwegica* f. *typica* and *V. rufa*, develop from nests situated in humid biotopes. They dominate, therefore, the conifer region and other areas with great precipitation. The two forms of *V. norwegica* are plotted separately on the map which reveals they have the same wide distribution, both occurring in districts with a dry, as well as humid, climate. Along the coast of Rogaland and Hordaland county *V. norwegica* f. *zetterstedti* is locally recorded as frequently as the red marked typical forms; these districts have an average annual precipitation exceeding 2000 mm. On the other hand, the typical form dominates in northern Gudbrandsdal, Oppland county, a district which has the driest climate in the country, the average of the annual precipitation being below 400 mm. Thus the present material does not coincide with the Weyrauch's statement but a larger collection and thorough ecological research is needed. The local humidity at the nesting site, eventually inside the nest, should be recorded and correlated with the colour markings of the inhabitants of the resp. nests. The sympatric distribution of the two forms indicates, however, that the development of red markings could be due to genetic or other ecological factors than humidity.

L i s t o f r e c o r d s is deposited at Bergen University Zoological Museum.

Vespula saxonica (Fabr.)

Vespa saxonica Fabritius (Ent. Syst. 1793 II p 256 n 12).
Dolichovespula (*Boreovespula*) *saxonica* (Fabr.) cfr. Blüthgen (1961 p 37)

Queen, plate I, 6.

D i a g n o s t i c c h a r a c t e r s : The species is closely related to *V. norwegica* from which it is separated by the following characters:

Figs. 15—18. The distribution of: 15. *Vespa crabro* L., 16. *Vespula media* (Retz.), 17. *Vespula sylvestris* (Scop.), 18. *Vespula norwegica* (Fabr.), the closed rings and X represent *V. norwegica* (forma *typica* and the open rings represent *V. norwegica* forma *zetterstedti*.
A dot may represent several close localities. X = inaccurate locality. PC = Polar circle.

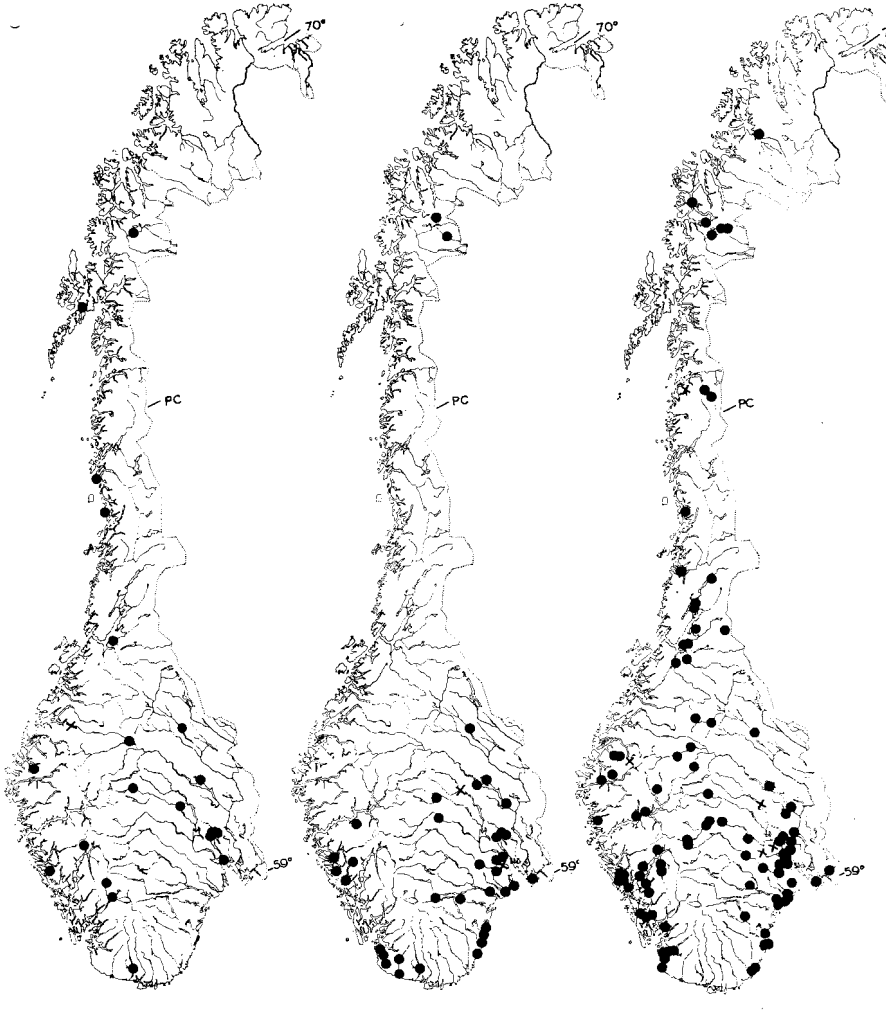


Fig. 19
V. adulterina

Fig. 20
V. saxonica

Fig. 21
V. vulgaris

Figs. 19—21. The distribution of: 19. *Vespula adulterina* (Buyss.), 20. *Vespula saxonica* (Fabr.), 21. *Vespula vulgaris* (L.).
A dot may represent several close localities. X = inaccurate locality. PC = Polar circle.

Ocelli forming an almost equilateral triangle; distance between lateral ocelli barely or not longer than the distance from the resp. ocelli to the occipital carina, which is poorly defined, usually rounded, i. e. lacking, fig. 7; broad black band of clypeus widened in the centre, usually broader at the base than at the margin (often more or less reduced). Disc of scutellum usually not flattened around the median impression. Pleurae with light hairs. Yellow markings of sternites, eventually, also of tergites, often broader than by *V. norwegica*. No red markings. Male antennae with two rather distinct tyloids on each of the seventh to twelfth joint fig. 8; last joint with one tyloid. Male genitalia plate II, 15, stipes and penis fig. 11.

V a r i a t i o n : Besides variation of the yellow markings, the corresponding taxonomic characters in *V. saxonica* and *V. norwegica* vary individually, and a few specimens are difficult to identify, being either *V. saxonica* or the *zetterstedti* form of *V. norwegica*. A total of 71 ♀♀, 59 ☿☿ and 10 ♂♂ are examined.

N e s t : Two workers from a nest situated in the intermediate space of a wall in a summer-house at S. Sandø, Ø: Hvaler, collected by A. Semb Johansson, are the only safe record of a nest. The nesting site coincides with reliable records on the continent, indicating that the species nests inside houses, underneath roofs etc. However, also further south *V. saxonica* has been confused with *V. norwegica* and more information about the various nesting sites is needed.

D i s t r i b u t i o n : Map, fig. 20. The northernmost records, two typical males collected by T. Soot-Ryen, labelled Tabmok, resp. Frihetsli, just north and south of 69° N, are surprising. They make it difficult to indicate the distribution of the species as the other finds are restricted to Southern Norway. It has not yet been observed above the tree-line and it could be that the northern specimens were from a population immigrating from Sweden. As, however, the Swedish distribution of *V. saxonica* is also poorly known, the Scandinavian occurrence as well as the close relationship with *V. norwegica* need more investigation to settle the status of this wasp.

L i s t o f r e c o r d s :

Ø: Hvaler: Kirkøy, Dødvika ☿ 21. VII. 1958 (Lø) ZMB; S. Sandø, 3 ☿☿ medio VII. 1961, 3 ☿☿ 2. and ☿ 5. VIII. 1962, 2 ☿☿ 28. VII. 1963 (ASJ) P; **AK**: Bærum: Blommenholm ♀ 23. V., ♀ 8. VI., ☿ 1. VIII. 1946 (Chr.) ZMO; V. Bærum ♀ 10. VI. 1961 (ASJ) P; Aker: Blindern ♀ 5. and ☿ 27. VI. 1960 (ASJ) P; Ø. Aker 4 ☿☿ (Schø) SPV; Oslo: ♀ (Schø) SPV; Tøyen ♀ (Sie) ZMO; Eidsvoll: Sundet ♀ 20. VI. 1955 (M) P; **HEs**: Hamar: 3 ☿☿ 4. VII. 1954 (Ba) ZMO; **HEn**: Y. Rendal: Solbakken ☿ 24. and ♀ ♂ 30. VII., 2 ☿☿ 2., ☿ and 2 ♂♂ 9., ♂ 13. and ☿ 16. VIII. 1954 (LRN) ZMO; ☿ 30. VII. 1954 (LRN) ZMB; **Os**: Gjøvik: ☿ 25. VII. 1943 (HH)

ZMO; N. Land: Land ☿ 11. VIII. 1869 (Sie) ZMO; Nord-Aurdal: Åbjør ♀ 25. VI. 1961 (Lø) ZMB; Bø: Hurum: Holmsbu 5 ♀♀ 5., 3 ♀♀ 6. and ♀ 19. VI. 1960 (ASJ) P; Kongsberg: 2 ♀♀ 1902 (?) Tr; **Bv**: Nes: ♀ 16. VII. 1869 (Sie) ZMO; **VE**: Sande: sv. Sande ☿ 16. VII. 1958 (Lø) ZMB; Botne: ♀ (Str) ZMO; Ramnes: s. Lunde ☿ 28. VII. 1961 (Lø) ZMB; Hedrum: Ringdal ♀ 20. 5. 1964 (Lø) ZMB; Larvik ♀ ☿ 25. VI., ☿ 3., 2 ☿☿ 14., 5 ☿☿ 23., 6 ☿☿ 30. VII., 2 ♂♂ 7. VIII. 1911 (LRN) and 2 ☿☿ 2. VIII. 1946 (HH) ZMO; Tjøme: Hvasser ♀ 5—6. VI. 1960 (ASJ) P; **TEy**: Porsgrunn: ♀ 1900 (Str) ZMO; Drangedal: Tomyra ☿ 22. VII. 1960 (Lø) ZMB; **TEi**: Mo: Grimdalen ☿ 22. VII. 1960 (IMS) ZMB; **AAy**: Dypvåg: Askerøy ♀ 24. VII. 1960 (Lø) ZMB; Flosta: Tverrdalsøy ☿ 13. VII. 1960 (Lø) ZMB; Arendal: 2 ☿☿ (no date), ♀ 24. V., 19 ♀♀ 25. V., 2 ☿☿ 25. VII. 1953, ☿ 20. VII. 1956 (Ba) ZMO and ♀ 25. V. 1953 (Ba) ZMB; Tromøy: ♀ 26. VI. 1955 (Ba) ZMO; Hisøy: Flødeviken ♀ 20. VI. 1946 (?) ZMO; ☿ 12. VII. 1960 (Lø) ZMB; Eide: puclic scool ☿ 18. VII. 1960 (Lø) ZMB; **VAy**: Bakke: Sireosen ♀ 1902 (Str) ZMO; **Ry**: Egersund: 2 ☿☿ 4. VIII. 1960 (Nie) P; Bjerkreim: Ivesdal 2 ♀♀ 5. VII. 1960 (Lø) ZMB; Time: Mossige 2 ♀♀ 2. VII. 1960 (Lø) ZMB; Høyland: Håpet 7 ♀♀ 14. VI. 1960 and Myrland ♀ 5. VII. 1964 (Nie) P; Sandnes: 2 ♀♀ (HH) St. and ☿ 18. VIII. 1960 (Nie) P; Stavanger: 2 ♀♀ VI. 1946 (HH) ZMO; **HOy**: Os: Moldegård ♀ 31. V. 1963 (Lø) ZMB; Samnanger: Høyseter ♂ 24. VII. 1950 (Tjø) ZMB; Laksevåg: Bjørndalsvann ♀ 3. V. 1962 (Lø) ZMB; Bergen: Natland ♂ 20. VII. 1952 and Zool. Museum ☿ 1. VIII. 1964 (Lø) ZMB; Hamre: Fyllingsnes ♀ 23. V. 1963 (Lø) ZMB; **SFi**: Vik: Brossliegji ♂ 29. VII. 1940 (Kn) ZMB; **TRi**: Øverbygd: Frihetsli ♂ 27. VII. 1922 (S-R) Tr; Balsfjord: Tabmok ♂ 11. VIII. 1922 (S-R) Tr.

Vespula adulterina (Buyss.)

Vespa norwegica var. adulterina R. du Buysson (Ann. Soc. Ent. France 73 (1904) 1905, p 660).
Pseudovespula ad. adulterina (Buyss.) cfr. Blüthgen (1961 p 41).

Female; plate I, 2.

Diagnostic characters: Malar space slightly longer than the width of the scape of the antennae; apical margin of clypeus projecting in two prominently raised acute angles (less prominent, about 90° in male); surface of clypeus chagrinated, the disc with uneven distribution of coarse punctures, centrally with a broad black marking tapering to the middle of the margin (may be reduced); sinus of eye all black or the lower front part with a narrow yellow border; subgenae slightly swollen. Yellow hind margin of pronotum usually produced partially downwards along the anterior vertical carina. The strong, flattened sting and the apex of the last tergite bending downwards. Male antennal joints without tyloids. Genitalia plate II, 13 and fig. 10, reveal a close relationship with the host *V. saxonica*, eventually, also *V. norwegica*. Size: ♀ 14—17 mm, ♂ 12—15 mm.

Variation: A total of 33 ♀♀ and 16 ♂♂ are examined and display only slight variations.

Nest: As a parasite, the species builds no nest, produces no workers. The only specimens found in a nest, were collected

by Schneider (1909 p 115) who did not recognise the parasite. He identified the specimens as well as the nest as *V. sylvestris*. The photo and the description of the nesting site, being in branches of a birch tree, may indicate that the host was *V. norwegica*. It may, however, be pointed out that this nest was located at 69° N and within the same great area as the two questioned northern records of *V. saxonica* ♂♂. Reliable record of this species building open arial nest does not, however, exist.

Distribution: Map, fig. 19. *V. adulterina* is new to Norway, and its occurrence presents a far more northern distribution of the species than earlier presumed. When it was recognised in 1962, a revision of my collection revealed four more specimens. The recent examination of the museum collections revealed more individuals, a few of which had already been separated by K. Fæster.

The records indicate a distribution which coincides more with that of *V. norwegica* than *V. saxonica*, the latter known to be the host of this parasite. Blüthgen (1961 p 42) reviews the discussion about *V. norwegica* possibly also being a host, but points out that reliable data does not exist owing to the confusion of *V. norwegica* with *V. saxonica*. The present material may indicate that *V. adulterina* parasite *V. norwegica*, but the uncertain distribution of *V. saxonica* makes it difficult to make any statement.

List of records:

Ø: Jeløy: ♀ (Schø) ZMO; **AK**: Bærum: Blommenholm ♀ 30. V. and ♀ 8. VI. 1946 (Chr) ZMO; ♀ 8. VI. 1946 (Chr) ZMB; Aker: Kastellet ♀ 26.-28. VI. 1898 (Ki) ZMO; Ø. Aker ♀ (Schø) SPV; Oslo: Tøyen ♀ no date, ♀ 10. VI. 1846, ♂ 28. VII. 1847 (Sie) ZMO; ♀ (Sie) ZMB; **HEs**: Hamar: 2 ♀♀ 2. VII. 1952, ♀ 28. VI. 1954 (Ba) ZMO; **HEn**: Y. Rendal: Solbakken ♀ 10. VII. 1950 (LRN) ZMO; **On**: V. Slidre: Hausåker ♀ 7. VII. 1944 (Kn) ZMB; Sel: Laurgard ♀ (Sie) ZMO; **Bø**: Ådal: Smedrud ♀ 21. VI. 1962 (Lø) ZMB; **VAy**: Bakke: Sireosen ♀ 1902 (Str) ZMO; **Ri**: Suldal: Sandvatn 2 ♂♂ 3. VIII. 1960 (HH) St; **HOy**: Bergen: Zoologisk Museum ♀ 12. II. 1964 (D) ZMB; **HOi**: Røldal: Valldal ♂ 10. VIII. 1958 (Lø) ZMB; Granvin: Skjervet ♀ 18. V. 1959 (Lø) ZMB; **MRy**: Volda: v. Bjerkedalsvann ♂ 24. VII. 1957 (Lø) ZMB; **MRi**: Grytten: Romsdal ♀ 1864 ? (Sie) ZMO; **STi**: Trondheim: Museet ♀ 11. VI. 1953 (?) T; **Nsy**: Sømna: Sømnes 2 ♀♀ VII. 1928 (S-R) Tr; Alstahaug: Alstahaug ♀ 21. VIII. 1947 (S-R) Tr; **Nnv**: Hadsel: Kongselv ♀ 10. VII. 1955 (Si) T; **TRi**: Målselv: Nordmo 7 ♀♀ 11 ♂♂ 25. VIII. 1906 (Schn) Tr; Rundhaug ♀ 11. VII. 1955 (Lø) ZMB.

Subgenus *Vespula* Thomson, 1869

The "short-cheeked" wasps are distinguished by the malar space which usually is reduced to an almost linear stripe and never is longer than half the width of the scape of the antennae.

The pronotum has no anterior carina. The individual joints of the rather short antennae are not swollen underneath in the females and lack the tyloids in the males. Sagittae of the male genitalia are fused throughout and are saddle or spoon-shaped distally.

The nest is usually terrestrial. The subgenus includes species which produce a rather strong poison.

Vespula vulgaris (L.)

Vespula vulgaris. Linnæus (Syst. Nat. 1758 p 572 n 2).
Paravespula (*Paravespula*) *vulgaris* (L.) cfr. Blüthgen (1961 p 43)

Queen, plate I, 10.

D i a g n o s t i c c h a r a c t e r s : Sinus of eye yellow; apical teeth of the mandible, particularly the third inner tooth, only slightly projecting, the middle part of the edge therefore almost straight, fig. 13; disc of clypeus with broad black band down from the middle of the base, either widened like an anchor ending at a distance before the margin, or less widened and reaching the margin (black markings reduced to small points, irregular lines in male); lateral angles of front margin of clypeus approx. 90° (less projecting in male); subgenae partly black, partly yellow (usually yellow continously throughout in the male). Surface of head, thorax, tergites dull. Outer surface of intermediate and hind tibiae with few or no erect hairs. No red markings. Seventh tergite of male depressed at apex, emarginated distally. Sagittae with sharp tooth-like appendage on each side close to the base of the terminal spoon, this being rounded distally, plate II, 19. Size: ♀ 16—19 mm, ☿ 11—14 mm, ♂ 13—17 mm.

V a r i a t i o n : The yellow markings, particularly on the tergites, vary, and may be enlarged to a pattern similar to that of *V. germanica*. A total of approx. 500 females and 30 males are examined.

N e s t : The species usually builds large terrestrial nests, but is also recorded inside houses. No reliable record of aerial nest. The population of a nest often exceeds a thousand inhabitants and the number increases considerably in good seasons.

V. vulgaris often modify the construction of the nest according to the nesting site chosen. In 1952 a family in a suburb of Bergen noticed increasing wasp activity in their garage which was in the basement of the house, just underneath the living room. A nest of *V. vulgaris* was located in the intermediate space between the floor of the living room and the roof of the garage. The frightened family made holes in the floor, anaesthetized the wasps by pouring down an insecticide and plugged the holes.

Later a large piece of the floor was cut out and revealed a flattened nest, approx. 50 × 30 × 5 cm in size, crowded with wasps. The space had not allowed for more than two combs.

Another nest, built almost around a log in a loft of a military barrack at Torpo, Bv: Ål, was removed in October 1956. The nest was approx. 30 × 25 × 25 cm in size and had seven combs. The total number of cells exceeded 3500. As the cells are used two or three times, a new egg being laid soon after a young adult emerges, the total number of inhabitants may have exceeded 7 thousand. Such large nests make laymen believe once in a while they belong to *V. crabro*.

V. vulgaris is more annoying to human beings than any other Norwegian species. It is quick-tempered and very aggressive. It is evidently irritated by strong scents and attacks particularly people who give off odour from perfume, leather, perspiration, etc. It produces a very strong poison which may explain the painful effect of certain stings. The typical "wasp years" may correspond to good seasons of this species.

Distribution: Map, fig. 21. *V. vulgaris* occur in all parts of the country and is observed in all regions north to the arctic circle. The species has great seasonal variations, sparsely recorded some years and numerous other years. The rather few records in, particularly, the northern part of the country, are due to poor investigation. My two seasons in the northernmost counties were exceptionally wet and cold and this species may be more sensitive to poor weather conditions than, for instance, *V. norwegica*. Further investigation will surely reveal a denser distribution probably also north of the arctic circle.

List of records is deposited at the Bergen University Zoological Museum.

Vespula germanica (Fabr.)

Vespula germanica Fabricius (Ent. Syst. II., 1793 p 256 n 11).
Paravespula (Paravespula) germanica (Fabr.) cfr. Blüthgen 1961 p 45.

Queen, plate I, 9.

Diagnostic characters: The species is distinguished from *V. vulgaris* by the following characters:

Sinus of eye completely yellow, the inner-side of the yellow marking may be rather convex and may partly coalesce with the yellow frontal area; subgenae yellow continuously throughout; apical teeth of the mandibles rather strongly projecting, middle part of the apical edge therefore slightly emarginated, fig. 14; black markings of the clypeus reduced to one to three points or small irregular spots; lateral angles of front margin slightly less than 90°. Sagittae of the male genitalia with triangular or

rounded appendage on each side close to the base of the terminal spoon, which is truncate, slightly emarginated distally, plate II, 18. Size: ♀ 17—20 mm, ☿ 12—16 mm, ♂ 13—17 mm.

Variation: The colour pattern varies as usual for the typical form. A total of 46 ♀♀, 68 ☿☿ and 4 ♂♂ are examined.

Nest: No reliable records of nest; the nesting site and the size are said to be as with *V. vulgaris*.

Distribution: Map, fig. 22. The species is collected in the south-eastern lowlands and the southern coastal areas. The occurrence indicates a northern limit for the distribution as is usual for southern insects.

List of records:

Ø: Hvaler: Bølinghavn ☿ 21. VII. 1958 (Lø) ZMB; Råde: Åven ♀ 9. VI. 1961 (ASJ) P; **AK**: Drøbak: ☿ 2. VIII. 1946 (HH) ZMO; Oppegård: S. Oppegård, 2 ☿☿ 9. IX. 1954 (Ba) ZMO; Nesodden: 4 ♀♀ 12 ☿☿ (Schø) SPV; Berger ☿ 12. IX. 1954 (Ba) ZMO; Asker: ♀ 17. V. 1939 (Lø) ZMB; Bærum: Blommenholm 3 ☿☿ 7. IX. 1944, ♀ 30. V. 1946 (Chr) ZMO; ☿ 7. IX. 1944 (Chr) ZMB; Aker: Blindern ♀ 3. VI. 1953 (Ba) ZMO and ♀ 8. V. 1950, ☿ 6. IX., 3 ☿☿ 22. IX., ♂ 29. IX., ♂ 30. IX. 1960, ♀ 28. IV., ☿ 7. VIII., ♂ 2. X., ♀ 3. X., ♀ 4. X. 1961 and ♀ 14. VI. 1962 (ASJ) P; Bygdøy 2 ♀♀ ☿ 10. VI. 1934 (Mü) ZMO; ♀ V. and ☿ 12. VIII. 1926 (Mü) ZMB and 4 ☿☿ 4. IX. 1960 (ASJ) P; Frøn ☿ 25. VIII. and 2 ☿☿ ab. 10. IX. 1953 (ASJ) P; Kastellet ♀ 15.-16. VI. 1888 (Ki) ZMO; Lille Langerud ☿ 21. VIII. 1949 (HH) St; Nedre Frøensdam ♀ 22. V. 1888 (Ki) ZMO; Nordstrand ♀ 14. V. 1959 (M) P; Smestad ♀ 18. V. 1962 (ASJ) P; Ø. Aker ☿ (Schø) SPV; Ø. Gravlund ☿ 5. IX. 1954 (Ba) ZMO; Oslo: ♀ 3 ☿☿ (Em), 4 ♀♀ ☿ (Schø), ♀ 2 ☿☿ (Sie) and ♀ 14. V. 1953 (Ba) ZMO; ☿ (no date) and 2 ♀♀ V. 1872 (Schø) SPV; ♀ 7. X. 1960, ♀ 29. V. 1962 (ASJ) P; Bjølsen ♀ 17. III. 1961 (ASJ) P; Frogner ♀ 16. V. 1887 (Ki) ZMO; Tøyen ☿ (Moe) 4 ♀♀, 2 ☿☿; ♂ (No date) and ♀ 13. VI. 1847 (Sie) ZMO; Lillestrøm: Strømmen ☿ 22. VIII. 1954 (Ba) ZMO; **HEs**: Hamar 5 ☿☿ 17. VIII. 1948 (RH) Tr; ♀ 24. V., ☿ 5., ☿ 13., ☿ 31. VII. 1954 (Ba) ZMO; **VE**: Borre: Adal 2 ☿☿ 29. VII. 1961 (Lø) ZMB; Brunlanes: Berg 2 ☿☿ 28. VII. 1961 (Lø) ZMB; Dolven 2 ☿☿ 29. VII. 1961 (Lø) ZMB; **TEy**: Porsgrunn: ♀ (Str) ZMO; Kragerøy: ♀ (El) ZMO; **AAy**: Arendal: ♀ ☿ (Ba) ZMO; Hisøy: ☿ 22. VII. 1935 (S-R) Tr; Høvåg: Kjøbmansvik ☿ 22. VII. 1961 (Lø) ZMB; **VAy**: Lyngdal: ♀ (Ho) Tr; **Ry**: Høyland: ♀ 14. VI. 1960 (Nie) P; Stavanger: ♀ 25. IX. 1953, ☿ 2., 3 ☿☿ 5. IX. 1954, ♀ 7. V. 1962 (HH) St.

Vespula rufa (L.)

Vespa rufa Linnæus (Syst. nat. 1758 p 572 n 3).
Paravespula (*Allovespula*) *r. rufa* (L.) cfr. Blüthgen (1961 p 46)

Queen, plate I, 8.

Diagnostic characters: Sinus of eye black with the exception of a narrow yellow line bordering the lower part; oral margin of clypeus less bidentate than that of *V. vulgaris* and *V. germanica*, yet the angles approx. 90° (obtuse in male); black broad band running down the disc of clypeus from middle

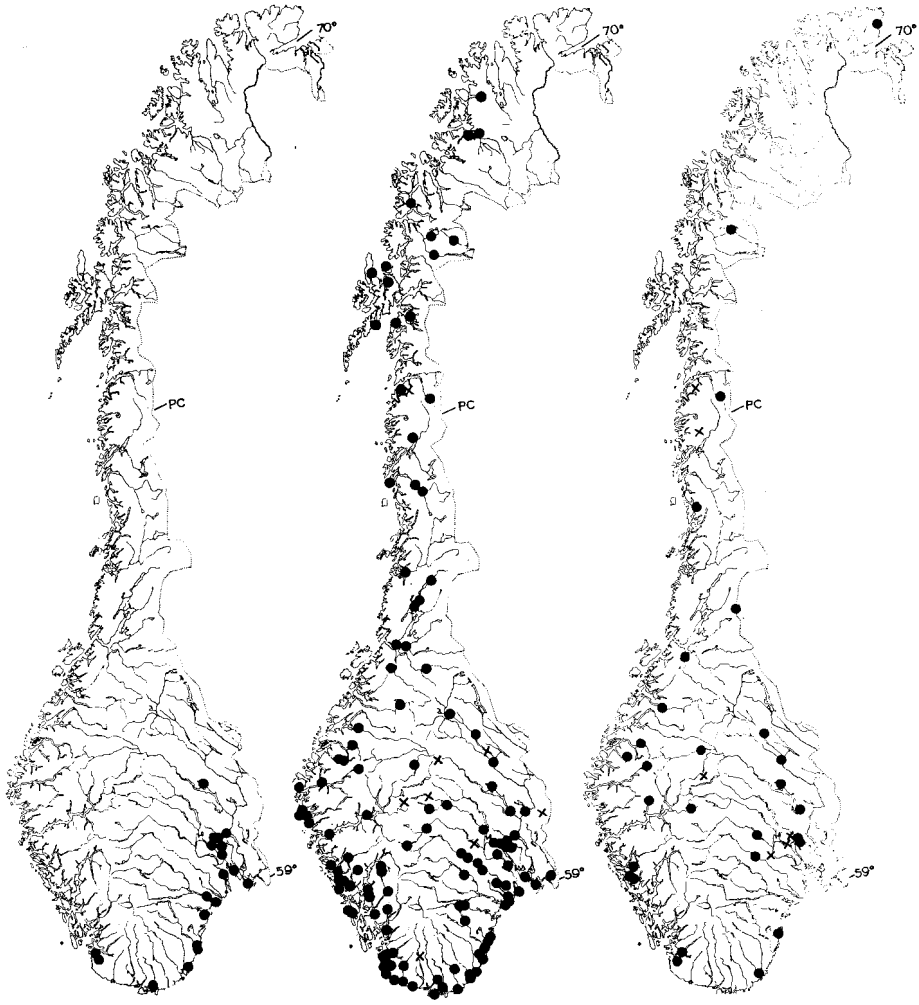


Fig. 22
V. germanica

Fig. 23
V. rufa

Fig. 24
V. austriaca

Figs. 22—24. The distribution of: 22. *Vespula germanica* (Fabr.), 23. *Vespula rufa* (L.), 24. *Vespula austriaca* (Pans.).
A dot may represent several close localities. X = innaccurate locality. PC = Polar circle.

of the base, either centrally widened and converging to the oral margin, or ending like an anchor at a distance from the margin as in *V. vulgaris*. Surface of the tergites pronounced shining, coarsely punctured, colour markings rather indefinite; first and second tergite with red markings, occasionally entirely red. Intermediate and hind tibia without long erect hairs. Sagittae of the male genitalia fused and saddle-shaped apically, plate II, 17. Size: ♀ 16—20 mm, ☿ 10—14 mm, ♂ 13—16 mm.

Variation: The species has considerable individual variation of the colour pattern, particularly in the tergites where black may be strongly reduced. A total of approx. 430 females and 30 males specimens are examined.

Nest: *V. rufa* nests in the ground, usually just underneath the moss cover and often in humid biotypes. No reliable records about the size of the nest which, on the continent, is said to vary from 50 to 3000 inhabitants.

Distribution. Map, fig. 23. The species is recorded in all parts of the country and certainly has a wider and denser distribution, particularly in the arctic, than indicated on the map. It is observed in all regions inland as well as along the coast. In the western counties, it occurs locally more frequently than any other species. *V. rufa* is parasited by *V. austriaca*.

List of records is deposited at Bergen University Zoological Museum.

Vespula austriaca (Panz.)

Vespa Austriaca Panzer (Faun. Insect. Germ VI. 1799, p 63)
Vespula austriaca (Panz.) cfr. Blüthgen (1961 p 47).

Female, plate I, 7.

Diagnostic characters: Oral margin of clypeus projecting in two prominently raised oblique angles (less pronounced in the males, the angles almost 90°); surface of clypeus with even distribution of moderate punctures, one to three brown or black points (rarely small irregular spots) on the disc; lower third to half of sinus of the eyes yellow. Intermediate and tibiae with long black hairs erecting from the outer surface. No red markings. The flattened sting and apex of abdomen bending downwards. Male genitalia plate II, 16, reveal the close relationship with the host *V. rufa*. Size: ♀ 15—19 mm, ♂ 13—16 mm.

Variation: The colour pattern is clearly defined, that of the tergites may vary. A total of 65 females and 20 males are examined.

Nest: The species is a parasite, "cuckoo-wasp", builds no nest and produces no workers. Individuals are not observed in

nests, but reliable records from other countries state *V. rufa* as being the only host.

Distribution: Map, fig. 24. Cuckoo-wasps are preferably observed in the field early in the season when the female is searching for a nest belonging to the host, or late in the season when the new ♀♀ and ♂♂ have emerged. It is naturally collected more rarely than the host. The records present a wide distribution, indicating that it follows the host in all regions. It is even collected further north than the host, which evidently must occur in the same area.

List of records:

AK: Bærum: 4 ♀♀ (Schø) ZMO; Aker: Kastellet ♀ 26. VI. 1887 (Ki) ZMO; Nordmarka ♀ (Schø) ZMO; Nordstrand 16 ♀♀ (Schø) SPV; Tråkka ♀ 14. VII. 1946 (ASJ) P; Oslo: ♀ (Em) ZMO; Tøyen ♀ (Em) 5 ♀♀ (Sie) ZMO; Ø. Gravlund ♀ 3. VII. 1953 (Ba) ZMO; Eidsvoll: Sundet ♀ 18. VI. 1957 (M) P; **HEs**: Hamar ♀ 28. VI. 1953 (Ba) ZMO; **HEn**: Åmot ♀ (Sie) ZMO; Y. Rendal: Solbakken 2 ♀♀ 13 ♂♂ 16.–17. VIII. 1954 (LRN) ZMO; 2 ♂♂ 16—17. VIII. 1954 (LRN) ZMB; **On**: ?: Jotunfjell ♀ (Mü) ZMO; Vågå: Klones ♀ 11. VII. 1953 (Lø) ZMB; Bø: Krødsherad: Veikåker ♀ 14. VI. 1963 (Lø) ZMB; Modum: ♀ (Em) ZMO; **Bv**: Rollag: Kjomme ♀ VII. 1962 (ASJ) P; **AAy**: Dypvåg: Fjordgløtt ♀ 24. VII. 1960 (Lø) ZMB; **VAy**: Kristiansand ♀ (Schø) ZMO; **Ry**: Høyland: Myrland 5. VII. 1964 (Nie) P; **Ri**: Forsand: Lerang ♀ 13. VII. 1934 (Mei) ZMB; **HOy**: Fana: Natland ♂ VIII. 1910 (L-P) ZMB; Storetveit ♀ 30. VI. 1958 (La) ZMB; Bergen: ♀ 19. VI. 1957 (Lø) ZMB; ♀ 3. VI. 1960 (Kj) ZMB; Haus: Kleppe ♀ 2. VII. 1955 (G) ZMB; **SFi**: Borgund: Bergstølen ♀ 6. VII. 1963 (Lø) ZMB; Balestrand: Horpedalen ♀ 9. VII. 1957 (IMS) ZMB; Stryn: Videdalen ♀ 27. VII. 1957 (Lø) ZMB; **MRi**: Hjørundfjord: Øye ♀ 26. VII. 1957 (Lø) ZMB; Norddal: Valldal ♀ 1880 (Schø) ZMO; Øksendal: Brandstad ♀ 5. VIII. 1957 (Lø) ZMB; **STi**: Orkanger: Draulia ♀ 24. VI. 1951 (IRD) T; **NTi**: Verdal: Sandvika ♂ 11. VIII. 1959 (Lø) ZMB; **Nsy**: Velfjord: Hommelstø ♀ 28. VI. 1946 (S-R) Tr; Bodin: ♀ 3 ♂♂ summer 1962 (Fj.) ZMB; **Nsi**: N.-Rana: Svartisen ♀ 13. VII. 1950 (S-R) Tr; Saltdal: Storjord 2 ♀♀ VII. and 2 ♀♀ 6. VII. 1898 (Schn) Tr; **TRi**: Øverbygd: Bjerkeng ♀ VII. 1888 (Schn.) Tr; **Fn**: Vadsø ♀ VII. 1890 (Schn.) Tr.

Genus ***Polistes*** Latr.

Polistes biglumis (L.)

Vespa biglumis Linnæus (Sys. Nat. I. 1758 p 573 n 11).

A total of nine individuals are the only Norwegian *Polistes* in the collections examined. They all belong to *P. biglumis* which is distinguished by the dark antennae and the well-defined hairs of the dorsal part of thorax.

Nest: No records exist of nests, which are said to be small and suspended above the ground. They look like single or double irregular wasp combs and are never surrounded by an envelope.

Distribution: The south-eastern part of Norway may be the northern limit of the distribution of the species.

List of records (♀♀ and ☿☿ are not separated):

AK: Oslo: 2 females (Mü); female (Sie); **Os**: Sør-Aurdal: Valdres, female 1872 (Em); **Bø**: Drammen: 3 females VIII. 1907 (C); **AAy**: Risør: ♂ (Th); Froland: Bøylefoss bru, female 16. VII. 1953 (Ba). All specimens are kept at ZMO.

Summary

The Norwegian social wasps represent eleven species. A key to the species, description and distribution of the respective species are given. The sympatric occurrence of two forms of *V. norwegica* (Fabr.) i. e., forma *typica* and forma *zetterstedti*, is discussed. *V. adulterina* (Buyss.) which is new to Norway, has a wide and northern distribution; the question of *V. norwegica* possibly being the host besides *V. saxonica*, is touched upon.

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Plate I

1. *Vespa crabro* L., ♀. — 2. *Vespula adulterina* (Buyss.), ♀. — 3. *Vespula media* (Retz.), ♀. — 4. *Vespula sylvestris* (Scop.), ♀. — 5. *Vespula norwegica* (Fabr.), ♀. — 6. *Vespula saxonica* (Fabr.), ♀. — 7. *Vespula austriaca* (Panz.), ♀. — 8. *Vespula rufa* (L.), ♀ — 9. *Vespula germanica* (Fabr.), ♀. — 10. *Vespula vulgaris* (L.), ♀.

Plate II

11. *Vespula media* (Retz.), ♂. — 12. *Vespula sylvestris* (Scop.), ♂. — 13. *Vespula adulterina* (Buyss.), ♂. — 14. *Vespula norwegica* (Fabr.), ♂. — 15. *Vespula saxonica* (Fabr.), ♂. — 16. *Vespula austriaca* (Panz.), ♂. — 17. *Vespula rufa* (L.), ♂. — 18. *Vespula germanica* (Fabr.), ♂. — 19. *Vespula vulgaris* (L.), ♂


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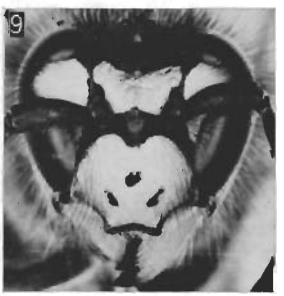
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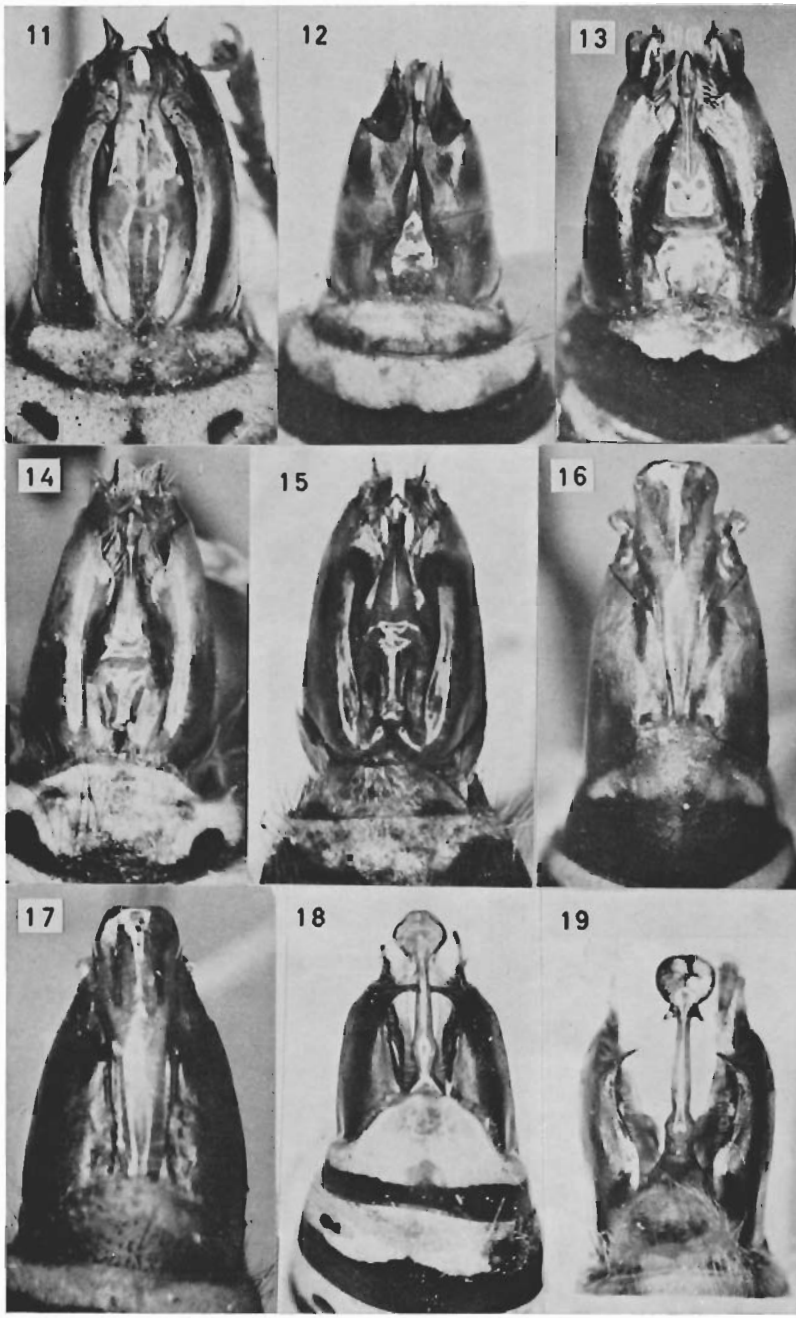
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The Identity of Specimens of *Scolopostethus* Fieber and *Drymus* Fieber (Heteroptera, Lygaeidae) in the Zoological Museum, Oslo, with Habitat Notes, Distributions, and a new Record of *Trapezonotus desertus* Seidenstucker from Norway

By A. C. Eyles

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The species studied in this paper either as pinned material in the Zoological Museum, Oslo or in the field were: *Scolopostethus affinis* (Schilling), *S. thomsoni* Reuter, *S. decoratus* (Hahn), *S. pilosus* Reuter, *S. pictus* (Schilling), *Drymus sylvaticus* (Fabricius) and *D. brunneus* Sahlberg.

A. Determinations

One specimen of *S. decoratus* had been wrongly identified as *S. thomsoni*. Approximately half of the specimens labelled *S. affinis* were in fact *S. thomsoni*. I was doubtful about the identity of four of these specimens and sent them to Mr. G. E. Woodroffe who confirmed their identification as *S. thomsoni*.

The distinction between *S. affinis* and *S. thomsoni* is that *S. affinis* possesses mesosternal spurs (males) or tubercles (females) which are lacking in *S. thomsoni* (Southwood and Leston 1959). *S. decoratus* is distinguished from *S. thomsoni* in possessing dark antennae.

Amongst the specimens labelled *D. sylvaticus*, five were undoubtedly a mixture of *D. brunneus* and *D. ryeii* Douglas and Scott, and I was doubtful about eight others which were probably *D. ryeii*. These thirteen specimens were referred to Dr. W. J. Le Quesne who confirmed that three were *D. brunneus*, and eight *D. ryeii*, whilst two were *D. sylvaticus*. The distinctions between these species of *Drymus* are given by Le Quesne (1956).

Five female and two male specimens of *Trapezonotus desertus* Seidenstucker were taken at Holmenkollen on 1 June 1961 from amongst moss and *Calluna vulgaris* (L.) leaf litter. These were determined by Mr. G. E. Woodroffe who has studied the closely

allied species of *Trapezonotus* Fieber, (Woodroffe 1960). According to the distribution of this species given by Stichel (1959) this is the first record from Norway.

B. Notes on habitats

A minor field survey was carried out in Norway to collect information on the habitat of these species in that country. Six Rhyparochromine species were collected.

Scolopostethus thomsoni and *S. affinis* adults and fifth instar nymphs were taken together amongst grass (mostly *Poa* sp.) under silver birch (*Betula* sp.) at Blindern on 6 June 1961. Many fallen birch seeds were amongst the grass. Some females of *S. affinis* oviposited immediately after capture, which indicates that breeding occurs in that habitat. *S. thomsoni* adults were also taken under moss, grass and chickweed (*Stellaria media* (L.)) at Holmsbu on 4 June 1961. Neither of these species was found amongst nettles, but searches in this habitat were short.

The above account is of interest for in England both species occur on nettles, although *S. affinis* is not confined to them (Southwood and Leston 1959, Eyles 1963), whilst in America *S. affinis* does not occur and *S. thomsoni* is found in marshland and grass under birch and is not associated with nettles (Sweet 1962).

At Holmsbu on 4 June 1961 *Stygnocoris fuligineus* (Geoffroy) was taken, in the fourth larval instar, amongst moss and grass, and adult *D. brunneus* from leaf litter and grass. Adults of *Macrodema micropterum* (Curtis) were taken under and around *C. vulgaris* and sheep sorrel (*Rumex acetosella* agg.). The habitat of *T. desertus* is given above.

In addition, second to fifth instar nymphs of *Nysius thymi* (Wolff) were taken in abundance near *C. vulgaris* and sorrel at Holmsbu on 4 June 1961. When fed dandelion (*Taraxacum*) seeds, two late larvae were reared through to adults.

C. Species localities

In the enumeration of localities below, the paper of Strand (1943) has been followed. For practical purposes the majority of the 18 counties of Norway, are here divided into several parts, viz.: southern (s), northern (n), eastern (ø), western (v), outer (y), inner (i) or combinations of these. The sequence is from Østfold county in the south-east to Finmark county in the north. Each division embraces a number of administrative districts and the exact boundaries of the divisions may therefore be gained from official Norwegian maps. The main purpose of this new division of Norway is a practical one, to divide the vast counties into more convenient areas thereby facilitating the identification

of the localities. The lists below start, for each species with the name of the county (or part of it), then the name of the administrative district and the name of the locality proper with data. The name of the collector is placed within parenthesis.

Nysius thymi (Wolff)

AK: 8. Drøbak, 4. IX. 1898. (Warloe). 13. Ormøen, (Siebke). 14. Kr.ania, (Esmark). Tøien, (Siebke). 1. VIII. 1851. (Siebke). Hasle, 4. VIII. 1851. (Siebke). Etter stad, VII. 1871. (Siebke). HEs: 1. Eidskog, VIII. 1871. (Siebke). Bø: Ringerike, 22. VII. 1902. (Warloe). 1. Holmsbu, 4. VI. 1961. (A. C.Eyles). Bv: 24. Bjøberg, (Strand). 25. Aal, (Strand). TEi: 24. Siljord, (Münster). AAy: 3. Risør, 8. VII. 1903. (Warloe). 13. VII. 1903. (Warloe). VAy: 4. Kr.sand, 20 VII, 1937. (Warloe). 27. Lister, X. 1921. (Münster). Ry: Jæderen, 14. VIII. 1901. (Warloe). SFy: 5. Lavik, (Strand). MRi: 54. Geiranger, VII. 1926. (Münster). STi 41. Trondhjem, (Strand). Nsi: 23. Hatfjelddal, (Strand). : 23. Røvsand, (Strand). Fi: 9. ZF. Exp. Jotkajvr, (J.). 24. VII. 1924. (Münster).

Drymus brunneus F. Sahlb.

Ø: 1. Kirkøen, Hvaler, IX. 1925. (Münster). 33. Rømskogen, 14, VIII. 1921. (Münster). AK: 8. Drøbak, 16. V. 1897. (Warloe). 9. IX. 1897. (Warloe). 6. V. 1898. (Warloe). 8. V. 1898. (Warloe). 13. V. Aker, IV. 1897. (Münster). 14. Kristiania, 4. X. 1898. (Warloe). HEs: 33. Kongsvinger, 19. V. 1923. (Münster). On: 32. Otta, 14. IX. 1912. (Münster). Bø: 15. Kongsberg, (Münster). TEy: 13. Sandnes, Dr. dal. IX. 1919. (Münster). AAy: 15. Grimstad, X. 1920. (Münster). VAy: 31. Flekkefjord, (Helliesen). R: Ryfylke, (Helliesen), Ry: Jæderen, (Helliesen). Nnv: 63. Bø, Vesterålen, VII. 1919. (Münster). V. 1924. (Münster).

D. sylvaticus F.

Ø: 3. Onsø, (Strand). AK: 8. Drøbak, 21. IV. 1898. (Warloe). 12. Engervand, Sandviken, 28. IX. 1918. (Münster). Snarøen, Kr.nia, XI. 1920. (Münster). 13. V. Aker, IV. 1897. (Münster). 14. Julius H. (Chr.ia = Oslo), 4. IV. 1848. (Siebke). Tøyen, 4. IV. 1848. (Siebke). Tøyen, (Siebke). Kr.ania, (Münster). Kr.ania, (Strand). Bø: 15. Kongsberg, (Münster). VAy: 4. Kr.sand, 27. VIII. 1936. (Warloe). Chr.sand, (Ullmann). HOy: 22. Bergen, 1871. (Schneider).

D. ryeii D. & S.

Bø: Ringerike, (Seip). 15. Kongsberg, (Münster). VAy: 10. Mandal omg. X. 1921. (Münster). 28. Farsund, (Münster). HOi: 42. Sunde, S.-hordal., V. 1920. (Münster).

Stygnocoris fuligineus (Geoffroy) (*Stygnocoris*, Dougl + Sc = *Stynus* Fieb.).

Bø: 1. Holmsbu, 4. VI. 1961. (A. C. Eyles).

Macrodema micropterum (Curt.)

AK: 8. Drøbak, 17. V. 1897. (Warloe). 23. V. 1897. (Warloe). 8. V. 1898. (Warloe). 28. IV. 1899. (Warloe). Bø: 1. Tofte, Hurum, IX. 1921. (Münster). Holmsbu, 4. VI. 1961. (A. C. Eyles). 15. Kongsberg, (Münster). AAy: 3. Risør, 31. V. 1900. (Warloe). 21. IX. 1901. (Warloe). 15. Grimstad, X. 1920. (Münster). 25. Lillesand omg., X. 1921. (Münster). VAy: 10. Mandal omg., X. 1921. (Münster).

Scolopostethus affinis (Schill.)
AK: 13. V. Aker, IV. 1897. (Münster). 14. Oslo: Bukten, Bygdøy, 19. IV. 1929. (Münster). 4. V. 1929. (Münster). Kr.ania (= Oslo), Bygdøy, 22. IV. 1929. (Münster). Oslo, Blindern, 6. VI. 1961 (A. C. Eyles). AAy: 3. Risør, 17. IX. 1904. (Warloe).

S. thomsoni Reut.
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AK: 8. Drøbak, 31. VIII. 1894. (Warloe). 9. IX. 1894. (Warloe). 23. IX. 1894. (Warloe). 28. VIII. 1896. (Warloe). 27. IV. 1898. (Warloe). 28. IV. 1899. (Warloe). 20. IX. 1904. (Warloe). AAy: 3. Risør, 21. IX. 1899. (Warloe). 2. VI. 1900. (Warloe). 4. VI. 1900. (Warloe). 9. IX. 1901. (Warloe). 15. Grimstad, X. 1920. (Münster). 25. Lillesand omg., X. 1921. (Münster). VAy: 10. Mandal omg., X. 1921. (Münster). 24. Liknes, Kv.dal, VI. 1919. (Münster). 27. Lister, X. 1921. (Münster). 31. Flekkefjord, (Münster). HOi: 42. Sunde, S. Hordal., V. 1920. (Münster).

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Studies of the Fauna of the River Suldalslågen, West Norway.

I. Prøving og vurdering av noen metoder for bunnundersøkelser

Av A. Lillehammer, Oslo

Innledning

Ved undersøking av bunnfaunaen i elver er det av stor betydning å komme fram til metoder som gir et gyldig bilde av den tilstedeværende dyrebestand. I enhver slik undersøkelse vil de naturlige forhold begrense anvendeligheten av metodene. I Suldalslågen, hvor mine undersøkelser ble utført, var det i første rekke variasjoner i vannstanden som gjorde det påkrevet å forsøke flere metoder. Først ble det gjort forsøk med brett- og rammemetoden (H. P. Moon 1935, E. Josefsen, upublisert hovedfagsoppgave 1953, og J. Økland 1962) men det viste seg imidlertid at disse hadde sine meget store begrensninger der vannstandsvariasjonene var store. Videre ble det gjort forsøk med steinprøvemetoden, (G. Alm 1919) og en «Surber sampler» (Albrecht 1959). For å få rede på om disse metodene ga samme bildet av bunnfaunaen, ble det foretatt testinger, der resultatene fra de forskjellige metoder ble sammenliknet. E. Josefsen sammenliknet sine resultater fra ramme med steinprøver, det han fant at steinprøver ga langt dårligere resultater enn rammer. T. T. Macan (1958, s. 8 og 9) nevner brett- og rammemetoder sammen med «Surber sampler», steinprøver og «Skyffelmetoden» (Macan fig. 3) der han konkluderer med at den siste metode synes mest brukbar. Den siste metode ble dog ikke benyttet av meg. Undersøkelsen ble foretatt i tidsrommet mai—august i 1961, 1962 og i juli 1963.

Suldalslågen

Suldalslågen er ca. 2 mil fra utløpet av Suldalsvatnet og til den renner ut i Sandsfjorden i Rogaland (figur 1). I elven finnes laks, ørret, stingsild (*Gasterosteus aculeatus* L.) og ål. I Suldalsvatnet finnes foruten de nevnte fiskearter rør (*Salmo alpinus* L.). I elven veksler det med svake stryk og mere stillerennende vann. Bunnen er dekket av noenlunde jamstore steiner som sitter i

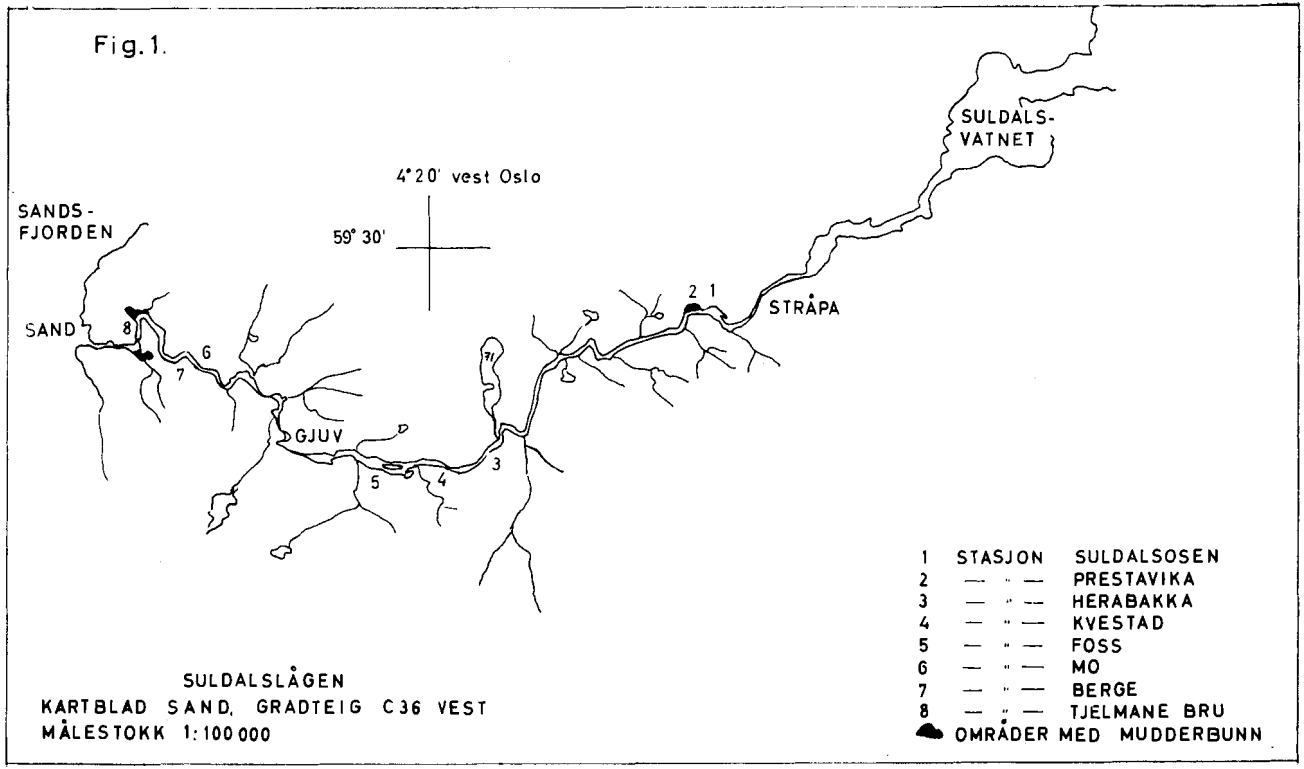

Fig. 1. Kartskisse over Suldalslågen.

eller ligger oppå en bunnmasse som består av sand, grus eller leire. Vegetasjonen består for det meste av mosen *Fontinalis dalecarlica* og *Marsupella emarginata* på steingrunn, og karplantene *Subularia aquatica* og *Callitriche stagnalis* foruten mosene *Calliergonella cuspidata* og *Sphagnum subsecundum* var. på mudderbunn. Ellers er det alminnelig med algevegetasjon i visse deler av elven. Temperaturen varierer fra 4—5° C i april—mai og tildels juni til 12—13° C i august ifølge målinger utført av Iskontoret i Norges Vassdragsvesen. I 1962 ble surhetsgraden målt, i mai, juni og september var den 6.2, mens den i juli og august var 6.5. Til målingene ble brukt en «Heliges komparator». Vannstanden varierer meget raskt og der er stor forskjell på høyeste og laveste vannstand i løpet av sommerhalvåret, mellom 2 og 3 m.

Material og metode

Bunnundersøkelsene består i å finne antall og vekt pr. m^2 av larver, pupper og nymfer av insekter, sammen med andre dyr som Mollusca, Entomostraca, Hydracarina og Oligochaeta som utgjør bunnfaunaen i elven.

Ved valg av prøveplassene ble disse undersøkt for bunn og strømforhold, der en måtte ta hensyn til vannstandsvariasjonene. Til testing av metodene på steingrunn ble fem stasjoner brukt og ca. 12 m^2 bunn undersøkt. Noen prøver ble også foretatt i Storelva i Sauda på et sted der bunn og strømforhold var som i Suldalslågen. Vannhastigheten var mellom 30 og 50 cm/sek. på steder med langsomtrennende vann, mens den på de mere hurtigrennende steder var mellom 60 og 80 cm/sek. Alle målinger ble foretatt i overflatevannet.

Brett og rammer til bruk for bunnfaunaundersøkelser (figur 2) er beskrevet av H. P. Moon (1935) og brukt i elveundersøkelser av E. Josefsen. Josefsens fremgangsmåte ble i det vesentligste fulgt i undersøkelsene. Brett og rammer har hatt et areal fra 40 × 40 til 49 × 49 cm. Steinprøvemetoden er beskrevet av G. Alm (1919 s. 17—20). Den ble dessuten brukt av E. Josefsen i hans hovedfagsarbeide. Nå går det ikke fram av teksten hos noen av de to forfattere om prøven, som består av et bestmt antall stein, er tatt fra et på forhånd avgrenset areal, eller mere tilfeldig. I mine undersøkelser ble følgende fremgangsmåte fulgt: På prøvestasjonene ble det talt hvor mange steiner som fantes på en m^2. I de fleste tilfeller ca. 80 stein, som svarer til ca. 20 stein på 50 × 50 cm, et areal omtrent som det brett og rammer dekker. Steinprøven ble så tatt fra arealer på ca. 50 × 50 cm.

Til nettprøver ble brukt en innsamlingsmetode der apparaturen er konstruert etter en tegning av en «Surber sampler», M. L.

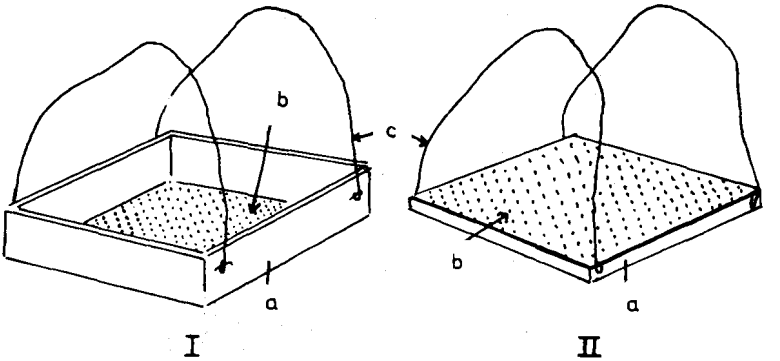

Fig. 2. I ramme, II brett, a = treramme, b = perforert blikkplate c = wire.

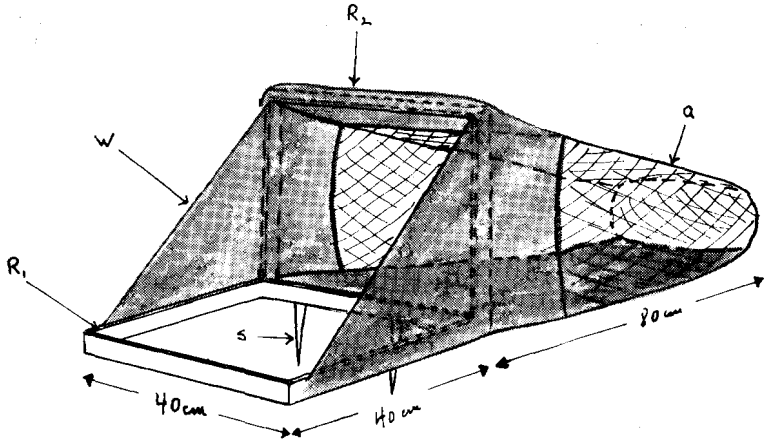

Fig. 3. Nettsamler for bunndyr (Surber sampler) ■ = lerret, a = planktonduk, 15 tråder pr. cm, S = 15 cm lange spikre som er loddet til rammen, W = wire til å holde lerretet på plass, R_1 og R_2 = jernrammer, begge 40 × 40 cm, jerntykkelsen 0.3 × 3 cm.

Albrecht (1958). Jeg mener å ha forbedret dette apparat (figur 3) ved å sette to spikre i bunnen, idet en derved oppnådde å kunne bruke apparatet selv i sterk strøm. Apparatet plasseres med de to spikre festet i bunnen, deretter føres bunnmassen i R_1 inn i nettposen og det hele løftes på land og avplukkes for dyr. Det ble forsøkt å unngå den feil i resultatet som skyldtes at en del av de dyr som ble fanget opp i nettprøvene kom drivende med elvevannet fra ovenforliggende områder. En ramme med et oppsamlingsnett med samme maskestørrelse ble derfor satt opp

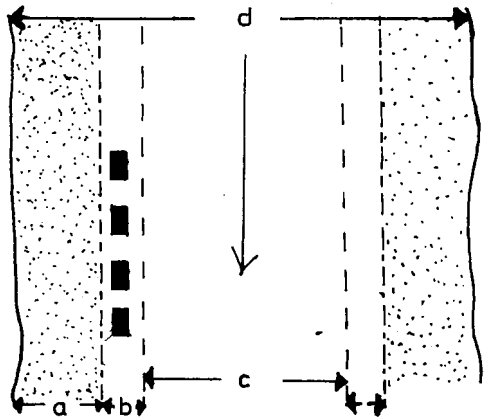

Fig. 4. Plassering av brett og rammer i elven. a = antatt variasjon i vannstand i løpet av en måned. b = det området hvor brett og rammer kan plasseres. c = for dypt vann. d = vannstanden i elven ved utsetting av apparatur.

ved siden av nettsamleren i den tid som ble brukt til å ta prøver. Dyr fanget i oppsamleren ble trukket fra nettprøven. Nettsamleren har meg bekjent ikke tidligere vært i bruk i Norge men ifølge M. L. Albrecht (1958) er «Surber sampler» benyttet ved en rekke undersøkelser: Surber, E. W. (1936), Moffet, I. W. (1936), Pennak, R. W. and Van Gerpen, E. D. (1947), Slack, K. V. (1955). Dessuten har Illies, J. (1952), Badcock, R. M. (1949) og Dittmar, H. (1951) benyttet lignende metoder.

Mellom brett- og rammeprøver på den ene side og stein- og nettprøver på den andre side, består den forskjell at mens en må grave brett og rammer ned i bunnmassen og la de stå i 4 uker for kolonisering, så kan de to siste taes når som helst og hvor som helst.

Det viste seg at under prøvetakingen med brett og rammer kom en opp i vanskeligheter på grunn av den store variasjon i vannstanden og beregningene ble ikke alltid vellykket. Rammer og brett måtte settes så grunt at en kunne nå dem under flom, men samtidig såpass dypt at de ikke ble liggende tørre ved lav vannstand. I de fleste tilfeller begrenset området seg til et felt på mellom en og to meters bredde parallelt med elvebredden (figur 4b). For å kunne sammenlikne resultater fra stein- og nettprøver ble også disse tatt i dette felt. Under prøvingen ble apparaturen satt «vegg i vegg» og plasert på bunnen som vist i figur 5, for derfor å minske variasjoner i resultatene som skyldtes forskjell i bunnforhold. Resultatene er satt opp i tabell 1.

Tabell 1. *Resultatet fra en testing av fire metoder på steder med vekslende vannhastighet og vegetasjon. Prøvene er tatt «vegg i vegg» på hver stasjon. Nettprøver er prøver tatt med «Surber sampler».*

	Fangst i %		Stasjon	% vegetasjon	Vann-hastighet	Antall prøver
	Antall	Vekt				
Rammeprøver*	100	—	3	80	langsomt	6
Steinprøver	98	—				
Rammeprøver	100	100				
Steinprøver	38	58	5	20	hurtig	6
Rammeprøver	100	100				
Steinprøver	47	26	8	0	hurtig	6
Brettprøver	100	—				
Steinprøver	93	—	7	0	langsomt	10
Brettprøver	100	—				
Steinprøver	43	—	8	0	hurtig	4
Rammeprøver	100	—	Storelva			
Brettprøver	92	—	i Sauda	50	langsomt	6
Rammeprøver	100	100	Storelva			
Brettprøver	86	87	i Sauda	50	langsomt	6
Rammeprøver	100	100		Alge-		
Nettprøver	88	58	1	vegetasjon	langsomt	8
Brettprøver	100	100				
Nettprøver	76	88	7	0	langsomt	8

* For rammer er gjennomsnittet 444 dyr med vekten 7,5 gram pr. m^2.

Tabellen viser en forskjell i antall dyr fanget med de forskjellige metoder selvom de var plasert «vegg i vegg». Forskjell i antall følges av vektforskjeller. Det synes å gå frem at forskjellen mellom resultater fra steinprøver og brett-rammer var størst der strømmen var striest. Det skulle derfor tyde på at avvasking under opptak spiller en stor rolle for steinprøver. Det ble derfor nødvendig å undersøke dette spesielt.

Såvidt jeg vet er det ikke tidligere gjort forsøk på å finne hvor stor avvaskingen kan være ved opptak av steinprøver. G. Alm (1919 s. 18—19) mener at avvaskingen gir de største feil ved steinprøver, men sier likevel at dersom en ikke tar steinene for fort slik at løstsittende dyr vaskes bort i vannoverflaten, heller ikke for sakte, så får en med flertallet av dyrene som hører til på steinene. Idet Alm's instrukser er fulgt, ble det foretatt en undersøkelse over avvaskingen den 12/7 1963. Den besto av 100 steiner. Forsøket ble utført på følgende måte: Nett-

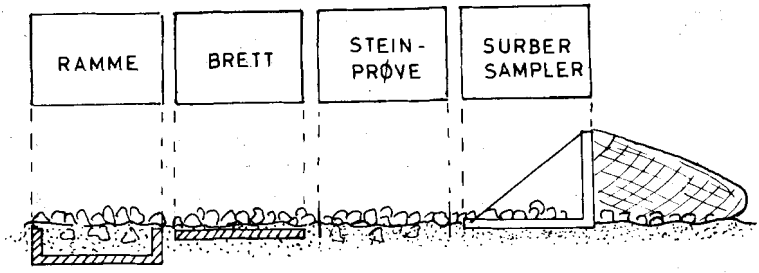

Fig. 5. Plassering av apparaturen.

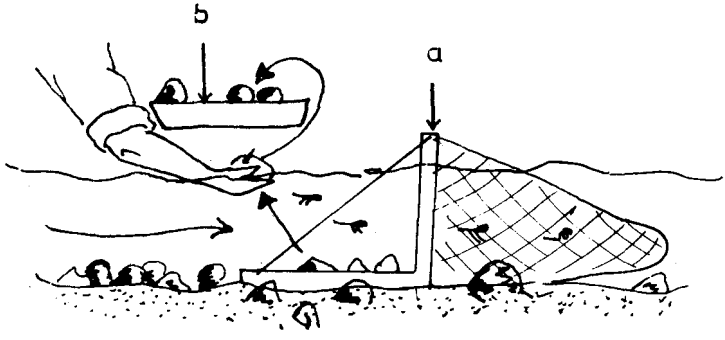

Fig. 6. Apparatur som ble benyttet for å finne avvaskingen ved steinprøver. a = nettsamler, b = kakeform 30 × 20 cm til oppsamling av steiner.

prøveapparat, areal 40 × 40 cm, ble satt ned i bunnen, steinene ble plukket opp, og de dyr som ble skyllet bort med strømmen ble fanget opp av nettet i apparatet (fig. 6). For at en ikke skulle få med de dyrene som forekom drivende med elvevannet, ble det satt opp et fangstnett for dette ved siden av. Dyr fanget her ble trukket fra antall dyr av samme art i selve prøvenettet. Avplukking av dyr på steinene ble utført på samme måte som vanlig prøvetaking. Ved å telle antall dyr på steinene og i oppsamlingsnettet for avvasking ble avvaskingsprosenten funnet (tabell 2). Der prøvene ble utført var det ingen vegetasjon.

Der var få arter på prøvestedene. Selve avvaskingsprosenten kan muligens forandre seg noe med et økende antall arter og en større dyretetthet. Forsøket skulle likevel kunne antyde at noen dyr vaskes lettere bort enn andre og at vannhastigheten innvirker på resultatet.

Tabell 2. *Avvaskingsprosenten for endel insektlarver (L), pupper (P) og nymfer (N) ved opptak av steinprøver.*

Antall stein		40	60
Vannhastighet		langsom	hurtig
		Avvaskingsprosenten	
Ephemeroptera			
Baetis sp.	N.	—	90
Plecoptera			
Amphinemura sulcicollis Steph. og Nemura sp.	N.	0	10
Leuctra fusca L.	N.	25	—
Perlodidae sp.	N.	0	—
Trichoptera			
Rhyacophila nubila Zett.	L.	50	50
Rhyacophila nubila Zett.	P.	0	0
Polycentropus flavomaculatus Pict.	L.	0	—

Den samlede avvaskingsprosenten var 18 på steder med langsomt-rennende vann, mens den var omtrent 40 % der en hadde hurtigrennende vann.

Avvaskingen syntes å være avhengig av strømhastighet og sammensetning av faunaen (tabell 2). Særlig stor var avvaskingen for *Baetis sp.*, men også for *Rhyacophila nubila* larver var den betydningsfull selvom den var konstant. Ifølge H. B. Hynes (1960, s. 32) sitter *Baetis sp.* oppå steiner og kan svømme aktivt. T. T. Macan (1958 s. 15) nevner at *Baetis* unnviker ved å svømme bort når de blir forstyrret. Disse opplysninger bekreftes også av mine iakttagelser. *Rhyacophila* larver er ifølge C. Wesenberg-Lund (1911, s. 6) de eneste virkelig frittlevende hurtigbevegelige larver av Trichopterne. Den skulle således være utsatt for avvasking. Særlig liten er avvaskingen for *Amphinemura sulcicollis* nymfer. *Polycentropus flavomaculatus* larver og *R. nubila* pupper viste ingen avvasking ved forsøkene, begge sitter festet til steiner, den første i sitt fangnett og den andre i sitt puppehus (C. Wesenberg-Lund, 1943). Heller ikke for Perlodidae nymfer ble det registrert avvasking. Sammen med *Amphinemura sulcicollis* ser de ut til å leve mest oppå steiner der den holder seg fast. Dette er iakttatt på rammer og brett som nettopp er tatt opp av vannet.

Diskusjon

På steder med langsomtrennende vann var det for det meste små forskjeller i resultatene (tabell 1), selvom rammer og brett alltid syntes å fange noe mere enn de andre metodene.

Der det var hurtigrennende vann ble imidlertid forskjellen stor mellom brett og rammer på den ene side og steinprøver på den andre. Resultatet fra avvaskingsundersøkelsene (tab. 2) syntes å bekrefte at en fikk en større avvasking med økende vannhastighet, der også variasjonen i faunasammensetningen var delaktig i forskjellene. Rammeprøvene ga det største antall dyr pr. m^2, der forskjellen mellom rammer og brett muligens kan ha den årsak at de høye kantene på rammene gir bedre beskyttelse mot avvasking ved opptak. En kan videre merke seg at det ofte var mere vegetasjon på steder med langsomtrennende vann og at dette kan ha en viss innvirkning på forskjell i fangstresultatene på grunn av at dyr som sitter inne i vegetasjonen ikke så lett vaskes av ved opptak. Nå ga både rammer og brett et større antall dyr pr. m^2 enn nettprøvene. Med et nett som samlet dyr som løsnet fra bunnen, skulle en tro en fikk med alle dyrene, da det under hele prøvetakingen ble passet på at apparatet stod helt nede i bunnmassen. Spørsmål en da kan stille seg blir: er det en større tetthet av dyr inne i rammer og brett enn på det omkringliggende felt? Hva er i så tilfelle grunnen? Jeg har ikke kunnet gå nærmere inn på dette problem, men tillater meg likevel å komme med et par betraktninger på grunnlag av de erfaringer jeg har hatt. Forskjellene mellom rammer, brett og nettprøver kan for en del skyldes at de faste apparatene (brett og rammer) gir bedre beskyttelse mot bortvasking og et bedre feste enn den naturlige bunn, slik at dyrene søker inn der. Under opptak ble det iakttatt vårfluepupper som satt festet til vegger og bunn i apparatene, noen ganger i stort antall. En ting til som jeg også vil peke på, er at når et brett eller en ramme graves ned så kan en forandre på den naturlige bunn i større eller mindre grad og dermed gjøre forholdene bedre eller dårligere for nykolonisering enn det omkringliggende felt, jeg skulle helst tro bedre, fordi en vil få større overflate i et nygravd område. Nå kunne forholdet være at variasjoner mellom resultater fra forskjellige metoder delvis skyldtes dyrenes ulike fordeling på bunnen, dette skulle her være unngått for en stor del ved at prøvene er tatt «vegg i vegg».

Av de fire metodene som er brukt gir antakelig «Surber sampler» de nøyaktigste resultater. Dette fordi prøvene blir tatt på uberørt bunn i motsetning til rammer og brett som graves ned og står fire uker for kolonisering. Dessuten samler nettet opp dyr som blir vasket vekk fra underlaget. De dyr som finnes drivende i vannet til enhver tid, og som avsiles i nettprøven, blir tatt hensyn til og trukket fra. «Surber sampler» er vanskelig å bruke der vannhastigheten blir svært stor, fordi nettet fanger for meget vann. På slike steder er det imidletrid ikke mulig å bruke rammer og brett heller, fordi de ved opptak har lett for å bli veltet av strømmen. Steinstørrelsen begrenser anvendeligheten av alle

metodene, hvilket ikke er aktuelt for Suldalslågen i det bunnen der hovedsakelig består av mindre steiner og alle metodene kan anvendes de fleste steder.

Summary

This work discusses various methods of investigating bottom fauna on the stony bed of the river Suldalslågen in West Norway. Different methods of collection were tried out and compared with each other in order to see if they yielded an equivalent result when placed close together under exactly the same conditions on the river bottom. Two different types of trough called «brett» (board) and «rammer» (frame) (fig. 2) were placed on the river bed where they remained for four weeks before being examined. Further, a somewhat improved «Surber sampler» was used, this being fixed to the river bottom by means of nails 15 cm long (fig. 3). Regard was paid to the net of the «Surber sampler» for catching larvae and nymphs which came drifting in the river water. A net sieve of the same size mesh was placed alongside the apparatus throughout the duration of the test, the results being checked.

A method termed «steinprøver» (stone tests) consisted of examining the fauna found adhering to stones lifted from a known area of the river bottom and studied on the bank.

1. Where the flow of water was slow, the catch result for «boards» and «frames» was somewhat more abundant than with the other methods, most animals, however, being on the «frames». In the majority of cases the difference was about 10 % (tab. 1).

2. The methods with «board», «frame» and stone tests were tried out at places where the flow of water was rapid; the difference between the two first-mentioned methods and the stone tests proved to be more than 50 % (tab. 1).

3. In an attempt to ascertain in the stone tests (fig. 6) how large the percentage was of animals swept away, it was seen that 18 % were lost in slow-flowing water against 40 % where the current was swift (tab. 2). This confirms that stone tests give a very incomplete picture of the fauna at places where the current is considerable.

4. It seems apparent from tab. 2 that the variation in the composition of the fauna was a contributory cause of the differences mentioned. Particularly large was the sweeping away of the may-fly *Baetis* sp. (90 %) and particularly small in the case of the stoneflies *Amphinemura sulcicollis* and *Nemura* sp. (10 %). There were no signs of *Polycentropus flavomaculatus* larvae, *R. nubilia* pupae and Perlodidae nymphs being washed away.

5. Observations during the testing of the methods, indicated that certain Trichopter pupae adhere to the «boards» and the «frames» and could therefore give a reason for the catch of a larger number of animals by the «boards» and «frames» than by using the «Surber sampler».

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Om *Helochares lividus* Forst. og *H. obscurus* Müll. (Col., Hydrophilidae)

Av Andreas Strand, Oslo

Som Sokolowski (1939, s. 19) gjør oppmerksom på, har oppfatningen flere ganger vekslet når det gjelder de to nevnte former.

Ganglbauer (1904, s. 249), Reitter (1909, s. 364), Everts (1922, s. 286), Victor Hansen (1931, s. 92) og Joy (1932, s. 284) regner alle med to særskilte arter, som skilles slik:

Avlang, forholdsvis flat, oversiden blank, fint og mindre tett punktert, fargen rødgul, på kjevepalpenes endeledd er bare den ytterste spissen mørk, brystskjoldet med rundete hjørner, dekkvingene med to tydelig fremtredende, uregelmessige lengderekker av grovere punkter ..... *lividus* Forst.

Lengre og flatere, oversiden mindre blank, meget kraftigere og meget tettere punktert, fargen mørkere, kjevepalpenes endeledd oftest mørkere i større utstrekning, brystskjoldets bakhjørner mer vinkelformet, dekkvingene oftest uten tydelige lengderekker av grovere punkter..... ..... *obscurus* Müll. (*punctatus* Sharp, *griseus* Fabr.).

Ganglbauer (l. c.) oppgir utbredelsen av dem slik:

lividus: M.-Europa og Middelhavsområdet, meget alminnelig i det vestlige M.-Europa og i S.-Europa,

obscurus: N.- og M.-Europa samt østlige Middelhavsområde.

Utbredelsen for *lividus* strekker seg således lengre mot vest og sør enn for *obscurus*, mens *obscurus* går betydelig lengre mot nord og øst enn *lividus*. Dette stemmer også med forholdet i de nordiske land (Danmark og Fennoskandia), hvor bare *obscurus* forekommer.

Nå har imidlertid de to *Hydrophilidae*-spesialister d'Orchymont (1943, s. 7) og Balfour-Browne (1958, s. 39) framholdt at de to er synonyme. Som begrunnelse for dette standpunkt sier d'Orchymont at selv om forskjellen mellom dem er ganske stor, er de forbundet med jevne overganger, og i aedeagus har han ikke

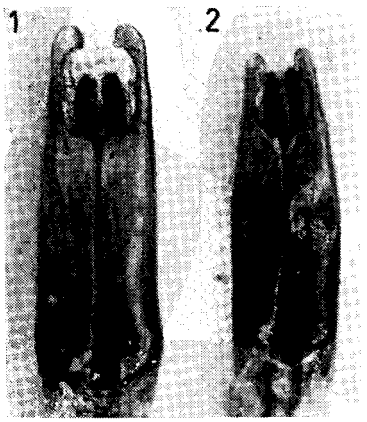

Fig. 1. Aedeagus av *Helochares lividus* Forst. Fig. 2. Aedeagus av *H. obscurus* Müll. Foto: E. Sundt.

kunnet finne noen forskjel. På s. 4 i sin artikkel har han for én og samme tegning oppgitt at den gjelder både *lividus* og *lividus obscurus*.

Fig. 1 viser aedeagus hos *lividus* etter et engelsk eksemplar og fig. 2 hos *obscurus* etter et norsk eksemplar. Som figurene viser, ender røret, som Balfour-Browne sier er beskrevet som de sammenvokste paramerer, i to armer, som hos *lividus* er betydelig lengre og spissen er bøyd sterkere innover mot midten enn hos *obscurus*. Selve organet er også tydelig større hos *lividus* enn hos *obscurus*.

Den utbredelse formene har taler imot at det bare er tale om individuelle variasjoner.

Balfour-Browne (l.c.) har gjort et forsøk på å finne ut om forskjellen er betinget av økologiske forhold, men han kom ikke til noe resultat.

Professor Fagel har nå vært så elskverdig å la meg få se noen av d'Orchymonts dyr, nemlig 2 eksemplarer av *lividus* og 4 eksemplarer av *obscurus*, hvorav et eksemplar av hver art med aedeagus preparet fram. Fagel sier at i d'Orchymonts samling er *lividus* og *obscurus* adskilte, og at det er mulig at han i den senere tid er kommet til det resultat at det allikevel dreier seg om to arter, men at han ikke har publisert noen retting.

Det kan neppe være tvil om at vi har med to arter å gjøre.

Auszug

Der Verfasser vertritt die Ansicht dass es sich bei *Helochares lividus* Forst. und *obscurus* Müll. um zwei gute Arten handelt.

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Koleopterologiske bidrag XI

Av Andreas Strand, Oslo

Cryptopleurum subtile Sharp. I Ent. Bl., 57, s. 180, nevner Lohse at han i 1959 av Kerstens fikk forelagt seg en rekke eksemplarer av en *Cryptopleurum*-art som viste seg å være *subtile*, som inntil da bare var kjent fra Japan. Også i det følgende år ble flere eksemplarer, liksom de tidligere, tatt på lys. Han har også hatt til påsyn 4 eksemplarer fra Sveits, og i 1960 ble den funnet i Hamburg. I 1962 har Victor Hansen tatt den i Danmark. Fra Sverige opplyser lektor Israelson at han har den fra Hässleholm-trakten fra 1953.

I min samling har jeg et eksemplar som jeg tok 20/7 1953 flygende over et område med bark- og vedavfall fra et sagbruk på AK: Røa like utenfor Oslo.

På AK: Brønnøya, ca. 10 km sør for Oslo, har jeg tatt et eksemplar, dessverre uten å ha notert datoen, men det er høyst sannsynlig tatt noen år tidligere enn det foran nevnte. I august 1958 har lektor Israelson tatt den i Ry: Stavanger.

Den 29/7 og 14/8 1963 tok jeg 6 flygende eksemplarer på samme sted som det først nevnte.

Det kan neppe være tvil om at arten nå har tatt varig opphold i Europa.

I tillegg til de kjennetegn som Lohse nevner (lys farge, upunktert scutellum og fin punktering på brystskjold og stripemellomrom på dekkvingene) kan nevnes at hodet og brystskjoldet har en mikroskulptur som består av langsgående striper. Det har hverken *minutum* eller *crenatum*.

Geodromicus nigrita Müll. Som bl. a. Palm har redegjort for i sin artikkel «Die schwedischen Arten der Gattung *Geodromicus* Redtb. mit Beschreibung einer neuen Art» i Opusc. ent., XXVI, s. 153, er *nigrita* Müll., som hittil har vært regnet som ab. til *plagiatus* F., nå blitt utskilt som egen art.

Plagiatus har dels en rød, avlang flekk på hver dekkvinge, og dels er dekkvingene helt sorte (ab. *subnigritus* Lohse), mens *nigrita* alltid har helt sorte dekkvinger. Etter ytre kjennetegn kan de to artene ikke sikkert holdes fra hverandre, men penis er spissere hos *plagiatus*, noe kortere enn paramerene og uten tydelig kjøl i midtlinjen, mens den hos *nigrita* har bredere spiss, er noe lengre enn paramerene og har en tydelig langsgående kjøl i midtlinjen.

Mens *plagiatus* har en vid utbredelse i Norge, helt nord til det nordligste Finnmark, har jeg i Oslomuseets og min egen samling funnet *nigrita* bare fra følgende lokaliteter:

HEs: Elverum (Munster), Os: Gjøvik (Warloe), On: Kirkestuen (A. Strand), Sørem (Munster, A. Strand), Lom (A. Strand) Lalm (Munster) Dombås (A. Strand) Jotunfjell (Munster), SFi: Frettheim i Sogn (A. Strand).

Tachyporus signifer Pand. I Ent. Bl., 52, s. 73—87, har Georg Kerstens publisert «Bestimmungstabelle der *Tachyporus*-Arten Deutschlands» og påvist at *signifer* Pand., som dels har vært regnet som synonym til *atriceps* Steph. og dels som ab. til denne art, i virkeligheten er en god art, som han skiller fra *atriceps* slik: Den er noe større (2,7—3,2 mm mot 2,5—2,8 for *atriceps*), dekkvingene er noe kortere, neppe så lange som brystskjoldet, sett ovenfra er den innerste tredjedel av deres bakkant rett eller svakt konkav, mens hele bakkanten er svakt konveks hos *atriceps*, hos ♂ er fortarsene sterkere utvidet enn hos *atriceps*, penis er større og bredere, og apex, som hos *atriceps* er spiss, er hos *signifer* bredt avstusset, i midten noe vinkelformet uttrukket, paramerene er også bredere, se fig. 1 og 2.

Kerstens har alltid tatt *signifer* på tørr sandbunn, siktet av mose som vokste under *Calluna* og ofte var gjennomtrengt av gress. Tre eksemplarer ble en gang siktet av våt *Sphagnum*, men like ved tok han arten på tørr sandbunn samme dag flere ganger.

I Catalogus Coleopterorum Daniae et Fennoscandiae av 1939 er *atriceps* Steph. a. *signifer* Pand. oppført fra en del områder i Sverige, men ikke fra de øvrige nordiske land. I 1960 utgaven av katalogen er *signifer* imidlertid utelatt.

I det norske materiale i Oslomuseets og min egen samling har jeg funnet *signifer* fra følgende lokaliteter.

Ø: Hoffsrød, Idd (Munster), Kirkøy, Hvaler (Munster), AK: Østensjøvann (Munster), Ullern (Munster), Røa (A. Strand), On: Bergset seter (Munster), Bø: Lyngdal (Munster), Ry: Jæren (Helliesen), STy: Vallersund (Hanssen), NTi: Stjørdal (Munster), Nnv: Melbu (Munster), TRy: Tromsø (Sparre Schneider), Fv: Hammerfest (Munster), Fi: Alta (Munster).

Eksemplarene fra Østensjøvann, Ullern, Fredrikstad, Lyngdal,

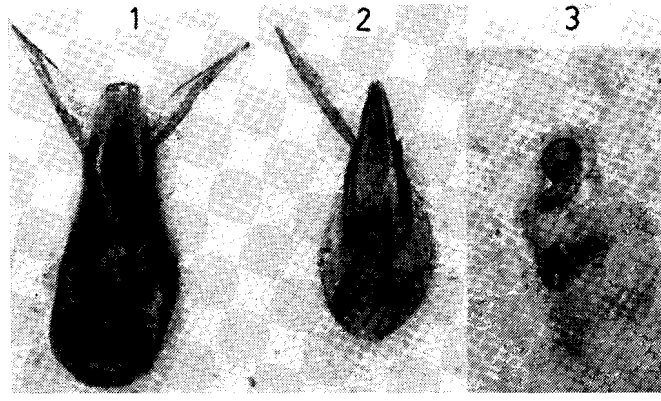

Fig. 1. Aedeagus av *Tachyporus signifer* Pand. Fig. 2. Aedeagus av *Tachyporus atriceps* Steph. Fig. 3. Spermatheca av *Ocyusa tullgreni* Palm (Foto: E. Sundt).

Melbu, Tromsø og Hammerfest er ♀♀, som imidlertid neppe alltid sikkert kan skjelnes fra *atriceps*.

Eksemplaret fra Røa er tatt i oppskyll fra elv og det fra Vallersund er tatt i tang.

Et eksemplar fra Alta har Kerstens kontrollert.

Ocyusa tullgreni Palm. I noe siktegods, vesentlig fra roten av trær, som jeg tok med på Røa i Oslo 7/5 1963, var et ♀-eksemplar av denne raritet, som ellers bare er kjent i to eksemplarer fra Uppland i Sverige. Palm har kontrollert bestemmelsen ved sammenlikning med typen, som er en ♂. Spermathecaen er som vist i fig. 3.

Scymnus limbatus Steph. og *testaceus* Motsch. Ifølge Catalogus Coleopterorum Fennoscandiae et Daniae av 1960 er *Scymnus limbatus* funnet i Sverige og på de Britiske øyer, mens *testaceus* er kjent fra Finland, Sverige og Danmark og er også funnet i N.-Tyskland og på de Britiske øyer.

Allen har imidlertid i brev meddelt meg at *testaceus* ikke er kjent fra de Britiske øyer.

Pope (Ent. Month. Mag., 89, s. 128) har undersøkt typen av *limbatus* og gitt en beskrivelse av arten, og Allen (Ent. Month. Mag., 89, s. 283) har i tilslutning til Popes artikkel gitt en supplerende beskrivelse og en utførlig redegjørelse for sine funn.

Sammenlikner en disse beskrivelser med beskrivelsene av *testaceus*, får en inntrykk av at de gjelder én og samme art, som altså går under to navn.

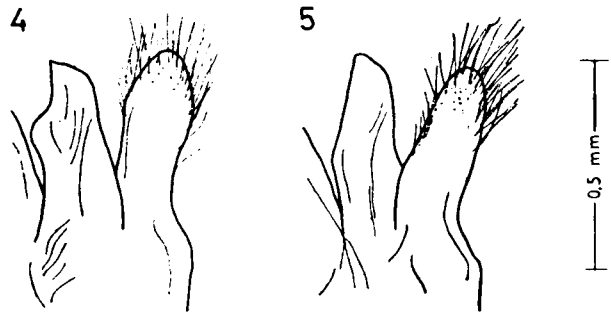

Fig. 4. Aedeagus av *Hyperaspis reppensis* Hbst. Fig. 5. Aedeagus av *Hyperaspis pseudopustulata* Muls. (Etter Günther).

Palm (Ent. tidskr., 77, s. 42) har av Allen fått et engelsk eksemplar av *limbatus*, som han holder for samme art som et svensk eksemplar han selv har tatt. Han nevner likevel at på det engelske eksemplaret er brystskjoldet svakt sjagrinert, mens det svenske eksemplaret har blank overside, men han formoder at det dreier seg om en variasjon.

I min samling har jeg et dansk eksemplar (leg. Victor Hansen) og et finsk (leg. E. Kangas) som jeg har fått som *testaceus*, samt et engelsk eksemplar (leg. Allen), som er bestemt som *limbatus*. Samtlige disse dyr har sjagrinering på brystskjoldet. Den varierer noe, men ellers kan jeg ikke finne noen forskjell.

Da det var høyst sannsynlig at også de dyr som utenfor Norden går som *testaceus*, er *limbatus*, sendte jeg to av mine eksemplarer til *Coccinellidae*-spesialisten dr. H. Fürsch i München, som har bekreftet at så er tilfelle og har opplyst at den virkelige *testaceus*, som bare er kjent fra Kaukasus, er en form av *limbatus*.

Hyperaspis pseudopustulata Muls. I Acta Soc. Ent. Cech., 56, s. 255—264 har Viktor Günther publisert en revisjon av de tsjekkoslovakiske arter av slekten *Hyperaspis* og bl. a. påvist at en del former som har vært regnet som tilhørende *reppensis* Hbst., i virkeligheten er gode arter.

I Oslomuseets og min egen samling er eksemplarer som har vært regnet som *reppensis* fra følgende lokaliteter:

AK: Drøbak (Warloe), Bø: Sansvær (Munster), Ringerike (Seip), AAy: Risør (Warloe) VAy: Lyngdal (Holmboe), HOy: Valen (A. Strand), Ånuglo (Munster) samt et eksemplar uten lokalitet, tatt av Esmark.

Av disse er ett eksemplar fra Risør og ett fra Valen ♂♂, resten er ♀♀.

Eksemplaret fra Valen ble bestemt til *pseudopustulata* og denne bestemmelse har Günther bekreftet.

De karakterer som skiller *reppensis* og *pseudopustulata* fra hverandre er etter Günthers tabell følgende:

Pannen flat, neppe merkbart hvelvet, dekkvingene tydelig riflet, ♂ med lyse ben og en strekformet eller trekantet humeralflekk på dekkvingene, ♀ alltid med lysere ben og lysebrune munndeler ..... *pseudopustulata* Muls.

Pannen tydelig hvelvet, dekkvingene bare utydelig riflet, mellom- og bakbenene også hos ♂ mørkfarget, dekkvingene hos ♂ alltid uten humeralflekk, ♀ med dypt mørke til svarte mellom- og bakben og svarte munndeler ..... *reppensis* Hbst.

Dertil kommer at aedeagus er forskjellig hos de to arter, som hosstående tegninger viser.

Det er neppe mulig helt sikkert å holde ♀♀ fra hverandre, men det sannsynligste er at også de norske ♀♀ er *pseudopustulata*.

Ceuthorrhynchus hampei Bris. På Hovedøya i Oslo fant jeg 9/8 1962 et eksemplar av denne arten, som var ny for Norge. På Bryn i Oslo fikk jeg 22/7 og 24/7 1963 en rekke eksemplarer og på Ekeberg i Oslo 28/7 1963 ett eksemplar, alle steder på *Berteroa incana*.

I Norsk ent. tidsskr., XI, s. 171, oppga jeg å ha funnet en del eksemplarer av *Ceuth. ignitus* Germ., som var ny for landet, også den på *Berteroa*. Senere har jeg funnet en lang rekke eksemplarer av denne arten på et par steder i Oslo, alle på *Berteroa*.

Forekomsten av disse artene hos oss er høyst påfallende. De er ikke kjente hverken fra Sverige eller Danmark, men begge er tatt på noen steder i S.-Finland, *hampei* også på et nordligere sted.

Om *Berteroas* forekomst i Tyskland sier dr. Frank (Ent. Bl. 32, s. 102) følgende:

«Berteroa incana ist eine östliche Pflanze, welche vor nicht gar so langer Zeit nach Deutschland eingewandert ist, wobei sie meist den Bahndämmen folgte. In Norddeutschland ist sie bestimmt bis Schonebeck an der Elbe und Hamburg vorgedrungen; vielleicht findet sie sich noch weiter westlich. Auf ihr leben zwei *Ceuthorrhynchus*-Arten, nämlich *C. Hampei* und *ignitus*, und zwar entwickelt sich die Larve von *Hampei* in den Früchten (Dr. Urban) und die von *ignitus* wohl im Stengel».

Ifølge Horion (Verzeichnis der Käfer Mitteleuropas, s. 492 og 498) er begge *Ceuthorrhynchus*-artene i Tyskland nådd så langt nord og vest som Hamburg, *hampei* er også tatt på Borkum.

Nordhagen (Våre ville planter, III, s. 191, 192) oppgir at *Berteroa* ble funnet i Sverige allerede i 1734, i Danmark i 1806, i Finland i 1870 og i Norge (Mandal) i 1826. Overalt har den senere spredd seg, i Oslo ble den første gang sett i 1847.

Nordhagen sier videre at i Tyskland skal *Berteroa* være spredd

med russisk rødkløverfrø. For *hampei* kan vel larver ha fulgt med frø, men er det så at *ignitus* gjennomgår sin utvikling i stengelen, kan den vanskelig tenkes innført på liknende måte. Under enhver omstendighet er det eiendommelig at begge artene mangler både i Danmark og i Sverige.

Pityophthorus pityographus Ratz. I Norsk ent. tidsskr., XI, s. 246, nevnte jeg at et eksemplar som jeg tok flygende ved AK: Røa måtte være *pityographus*. Eksemplaret skilte seg tydelig ut fra mine *micrographus* ved mindre størrelse og forholdsvis lengre brystskjold og dekkvinger, som *pityographus* skal ha. Bakke har imidlertid på grunnlag av et større materiale uttalt tvil om det kan være annet enn *micrographus*, og det har han nok rett i. Det er neppe mulig å holde artene fra hverandre på grunnlag av de nevnte karakterer. Derimot synes behåringen på pannen hos ♀ å være betydelig kraftigere og tettere hos *pityographus* enn hos *micrographus*.

Atheta (Hydrosmecta) tenella Mnh., en miskjent art (Col., Staphylinidae)

Av Andreas Strand, Oslo

Atheta tenella er beskrevet av Mannerheim i 1830. I sin Enumeratio Coleopterorum Brachelytrorum Fenniae, I. Staphylinidae, 1876, s. 101—102, har J. Sahlberg gitt en utførlig beskrivelse av arten og nevnt at foruten Mannerheims funn ved Villnäs i Åbotrakten, er arten kjent fra det karelske nes, hvor han selv har tatt flere eksemplarer blant fuktig sand ved stranden av Pyhäjärvi sjø.

I sin beskrivelse sier Sahlberg bl. a. at arten står nær *longula* Heer (dvs. *thinobioides* Kr.), men at den er tydelig mindre, følehornene er kortere og tykkere, og de nestsiste ledd er neppe lengre enn brede.

Hellén (Not. Ent., XIV, 1934, s. 81) gjør oppmerksom på at i Helsingforsmuseets materiale, som også omfatter typen, er nesten alle eksemplarer ♂♂, som han mener bare skiller seg fra *thinobioides* ved at størrelsen er mindre (1.5 mm). Under *thinobioides* derimot står nesten bare ♀♀ (1.8—2.0 mm). Når det gjelder lengdeforholdet for de nestsiste følehornsledd, kan han heller ikke finne nevneverdig forskjell. Han holder derfor *tenella* for å være synonym med *thinobioides*.

Scheerpeltz (Kol. Rundsch., 30, 1944, s. 18, 19, 25) har i sin tabell over de palearktiske *Hydrosmecta*-arter ført opp *tenella* som egen art, som han skiller fra *thinobioides* ved formen av følehornene (hos *thinobioides* er 4.—10. ledd meget tydelig lengre enn brede, hos *tenella* er de meget utydelig, så vidt merkbart, lengre enn brede).

Scheerpeltz er altså ikke enig med Hellén i at *tenella* er identisk med *thinobioides*. Han nevner at han i sin samling har et anselig materiale av *tenella* fra forskjellige lokaliteter i S.-, M- og N.-Finland samt Nordvest-Russland, og at han har sett mange eksemplarer fra forskjellige finske lokaliteter i Bernhauers samling. I alt dette materiale er den nevnte forskjellen i følehorns-

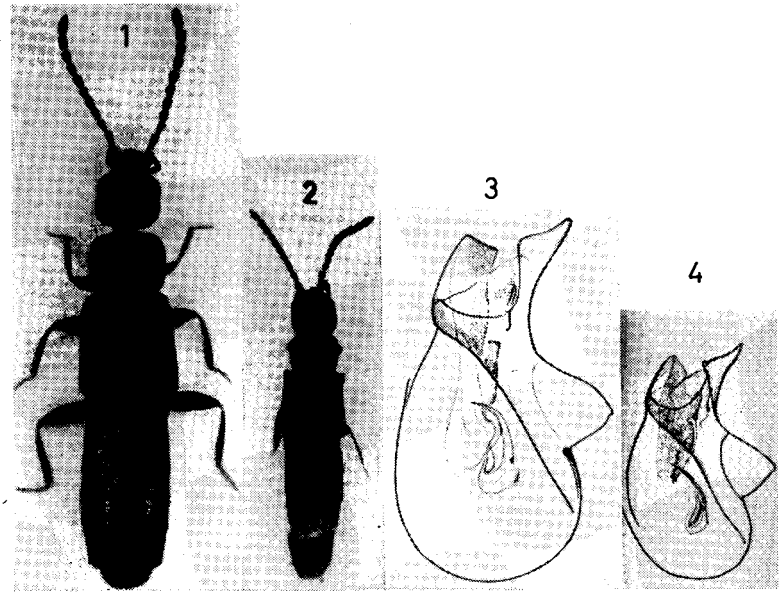

Fig. 1. *Atheta thinobioides* Kr. (Foto Sundt). Fig. 2. *Atheta tenella* Mnh. (Foto Sundt). Fig. 3. Penis av *Atheta thinobioides* Kr. (Brundin del.). Fig. 4. Penis av *Atheta tenella* Mnh. (Brundin del.).

bygningen konstant, og genitalorganet er også så forskjellig fra organet hos *thinobioides*, at han ubetinget holder *tenella* for en god art. Om det virkelig dreier seg om *tenella* eller en ubeskrevet art, lar han stå åpent.

Jeg har hatt anledning til å se 4 eksemplarer av *tenella*. Blant disse er ett som jeg har fått av Scheerpeltz og ett som jeg ved Helléns mellomkomst har fått låne fra Helsingforsmuseet, og som er tatt av J. Sahlberg ved Pyhäjärvi. Bestemmelsen til *tenella* av dette eksemplaret er bekreftet av Bernhauer. Alle disse eksemplarer stemmer med beskrivelsen og er tydelig forskjellige fra alt jeg har sett av *thinobioides*, se fig. 1 og 2. I fig. 3 og 4 har Brundin tegnet penis med den indre skulptur av begge arter.

Auszug

Der Verfasser schliesst sich der Auffassung von Professor Scheerpeltz an, dass es sich bei *Atheta tenella* Mnh. um eine von *thinobioides* Kr. verschiedene Art handelt.

Bumble bees from Austria (Hymenoptera, Apidae)

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During the XI International Congress of Entomology in Vienna 1960 and the alpine post-excursion, the author caught about 450 bumble bees, mainly *Bombus* spp. and a few *Psithyrus* spp. The main purpose of collecting the insects was to prepare a comparative study of alpine and Scandinavian forms of certain species. However, general information as to the species occurring in Austria is commonly wanted and may justify the present survey of all specimens recorded. Unfortunately, by joining common arrangements it was neither possible to select typical bumble bee biotopes nor to spend the time wanted in some fields of particular interest. The collected species may rather be due to chance than being representative of the fauna of the respective localities. Five specimens, kindly given me by another congress member, Ph. Coiffait, are included. With an exception of *B. gerstäkeri* Mor., *B. pomorum* (Panz.), *B. confusus* Schenck., B. m. *mendax* Gerst., and *Ps. maxilosus* (Klug.) the collected species also occur in Scandinavia.

Identification has been made with the aid of the Pittioni (1939) keys. The sketch map. fig. 1 indicates the localities visited.

B. gerstäckeri Mor. Only a single worker was recorded of this interesting species which was wanted for comparison with the closely-related *B. consobrinus* Dahlb. (Løken 1961). The individual visited *Aconitum lycoctonum* L. as well as *A. variegatum* L.

N. Österreich: Near Lunz, between Mittersee and Lunzersee, 1 ☿ 21. VIII.

B. h. hortorum (L.)

Steiermark: Hartberg, 1 ☿ 2. IX.; Präbichl, 1 ☿ 26. VIII.; Kärnten: Koschuta, 1 ☿ 31. VIII.; Burgenland, Geschriebenstein, 1 ☿ 3. IX.

Fig. 1. Localities visited in Austria.

B. pomorum (Panz.). Two specimens which both differ from the typical colour pattern in the following characters: 1) indication of yellow pronotum, disc of third tergite mainly black; 2) pronotum, scutellum, pleurae with a mixture of yellow and black hairs; first, tergite yellow, the remainder, ferrugineus.

Burgenland: Gross Petersdorf, 2 ♀♀ 2. IX.

B. agrorum (Fabr.). The specimens are on an average more pale than the northern forms and the southern *pascuorum* form. Tripuscoide individuals, which commonly occurred together with forms not tripuscoide, were collected as far south as in Koschuta.

O. Österreich: Hallstadt, 1 ♀ 28. VIII.; Obertraun, 1 ♀ 28. VIII.; Schönbergalps, 3 ♀♀ 1 ♂ 27. VIII.; N. Österreich: Near Lunz at Lunzersee 6 ♀♀ and at Mittersee 2 ♀♀ 2 ♂♂ 21. VIII.; Pfalzau, 18 ♀♀ 2 ♂♂ 23. VIII.; Scheibbs, 1 ♀ 20. VIII.; Semmering, 4 ♂♂ 26. VIII.; Steiermark: Altaussee, 1 ♀ 1 ♂ 27. VIII.; Johnsbach, 5 ♀♀ 26. VIII.; Pack 11 ♀♀ 1. X.; Präbichl, 5 ♀♀ 3 ♂♂ 26. VIII.; Pürghofsmoor, 10 ♀♀ 27. VIII.; Kärnten: Koschuta, 24 ♀♀ 1 ♂ 31. VIII.; Burgenland: Geschriebenstein, 11 ♀♀ 9 ♂♂ 3. IX.; Gross Petersdorf, 5 ♂♂ 2. IX.; Rechnitz, 5 ♀♀ 1 ♂ 3. IX.

B. humilis Ill. Pale greyish- yellow specimens with a variable amount of black hairs on the disc of thorax, occurred together

with typical melanotes. A single worker, collected in Pürghofsmoor, has a pale yellow-brown appearance.

N. Österreich: Pfalzau, 2 ☿☿ 23. VIII.; Steiermark: Altaussee, 2 ☿☿ 27. VIII.; Hartberg, 9 ☿☿ 4 ♂♂ 2. IX.; Pürghofsmoor, 3 ☿☿ 27. VIII.; Kärnten: Koschuta, 1 ☿ 31. VIII.

B. sylvarum (L.). No melanotes were observed.

Steiermark: Altaussee, 1 ☿ 27. VIII.; Hartberg, 4 ☿☿ 7 ♂♂ 2. IX.; Burgenland: Gross Petersdorf, 1 ☿ 2. IX.; Rechnitz, 1 ☿ 3. IX. Kärnten: Gross Petersdorf, 1 ☿ 2. IX; Rechnitz, 1 ☿ 3. IX.

B. soroeensis (Fabr.). The specimens have the colour pattern typical of the central European subspecies *proteus* Gerst. A few specimens have an admixture of yellow hairs in the black thoracic collar; in a worker from Koschuta, they compose a narrow yellow band. An exception is a worker, also from Koschuta, with a colour pattern like that of *B. s. soroeensis* which is all black with a white tail.

O. Österreich: Schönbergalps, 1 ☿ 3 ♂♂ 27. VIII.; N. Österreich: Near Lunz at Lunzersee, 1 ☿ and at Mittersee 1 ♀ 21. VIII.; Raxalps, 1 ☿ 20. VIII. (Coiffait leg.); Steiermark: Präbichl, 2 ☿☿ 26. VIII.; Pürghofsmoor, 1 ☿ VIII.; Kärnten: Hochtor, 1 ☿ 29. VIII.; Koschuta, 12 ☿☿ 7 ♂♂ 31. VIII.

B. t. terrestris (L.). In one of the specimens the yellow thoracic collar is rather narrow.

Burgenland: Rechnitz, 4 ☿☿ 3. IX.

B. l. lucorum (L.). Slight variations as usual in the typical form.

O. Österreich: Obertraun, 1 ♂ 28. VIII.; Schönbergalps, 1 ♂ 27. VIII.; N. Österreich: Near Lunz at Obersee, 1 ☿ 20. VIII.; Pfalzau, 4 ☿☿ 1 ♂ 23. VIII.; Raxalps, 1 ☿ 20. VIII. (Coiffait leg.); Semmering, 3 ♂♂ 26. VIII.; Steiermark: Hartberg, 1 ☿ 1 ♂ 2. IX.; Johnsbach, 1 ☿ 4 ♂♂ 26. VIII.; Pack, 1 ☿ 1. IX.; Präbichl, 6 ☿☿ 2 ♂♂ 26. VIII.; Pürghofsmoor, 4 ☿☿ 7. VIII.; Kärnten: Koschuta, 11 ☿☿ 7 ♂♂ 31. VIII.; Burgenland: Gross Petersdorf, 1 ♂ 2. IX.; Geschriebenstein, 3 ☿☿ (inclusive 1 ☿ Coiffait leg.) 3. IX.

B. alpinus (L.). A specimen has a few yellow hairs mixed with the black hairs of pronotum.

Kärnten: Gamsgrube, 2 ☿☿ 29. VIII.

B. l. lapidarius (L.)

N. Österreich: Pfalzau, 1 ☿ 23. VIII.; Semmering, 1 ☿ 26. VIII.; W. Neustadt, 1 ♀ (newly emerged) 23. VIII.; Salzburg: Schmitterhöhe, 1 ☿ 28. VIII.; Steiermark: Hartberg, 4 ☿☿ 6 ♂♂ 2. IX.; Pürghofsmoor, 5 ☿☿ 27. VIII.; Burgenland: Geschriebenstein, 2 ☿☿ 1 ♂ (inclusive 1 ☿ Coiffait leg.) 3. IX.; Gross Petersdorf, 17 ☿☿ 10 ♂♂ 2. IX.; Rechnitz 1 ☿ 3. IX.

B. jonellus (Kirb.).

O. Österreich: Schönbergalps, 1 ♂ 27. VIII.; Kärnten: Glocknerhaus, 1 ☿ 30. VIII.; Koschuta, 1 ♂ 31. VIII.

B. pratorum (L.). Slight variations as usual in the typical form.

O. Österreich: Schönbergalps, 2 ☿☿ 2 ♂♂ 27. VIII.; N. Österreich: Near Lunz at Obersee, 9 ☿☿ 7 ♂♂ 21. VIII.; Kärnten: Koschuta, 1 ☿ 5 ♂♂ 31. VIII.

B. hypnorum (L.).

N. Österreich: Semmering, 1 ☿ 26. VIII.; Kärnten: Koschuta, 1 ♂ 31. VIII.

B. lapponicus (Fabr.). Only two old, worn specimens, which both have the appearance typical of ssp. *hypsophilus* Skor., known to occur in the Alps.

Kärnten: Gamsgrube, 1 ♀ 29. VIII.; Koschuta, 1 ♀ 31. VIII.

B. m. mastrucatus Gerst. Females with an indication of yellow thoracic collar may occur more commonly in the Alps than in Scandinavia, yet the typical dark form is abundant. The males have an appearance similar to the Scandinavian specimens; the yellow pattern is perhaps somewhat more pronounced.

Salzburg: Schmitterhöhe, 3 ☿☿ 28. VIII.; O. Österreich: Hallstadt, 2 ☿☿ 28. VIII.; Steiermark: Johnsbach, 2 ☿☿ 26. VIII.; Präbichl, 3 ☿☿ 26. VIII.; Pürghofsmoor, 2 ☿☿ 27. VIII.; Kärnten: Glocknerhaus, 17 ☿☿ 30. VIII.; south of Hochtor tunnel 2 ☿☿ 29. VIII.; Koschuta, 52 ☿☿ 6 ♂♂ 31. VIII.

B. confusus Schenck.

Steiermark: Hartberg, 6 ♂♂ 2. IX.; Pürghofsmoor, 4 ☿☿ 27. VIII.; Burgenland: Gross Petersdorf, 1 ☿ 2. IX.

B. m. mendax Gerst.

Kärnten: Gamsgrube, 9 ☿☿ 1 ♂ 29. VIII.; Glocknerhaus, 1 ☿ 30. VIII.

Ps. bohemicus (Seidl.).

N. Österreich: Near Lunz at Obersee, 2 ♂♂ 20. and 21. VIII.; Semmering, 1 ♂ 26. VIII.; Steiermark: Johnsbach, 1 ♂ 26. VIII.

Ps. rupestris (Fabr.).

Burgenland: Gross Petersdorf, 1 ♂ 2. IX.

Ps. campestris (Panz).

N. Österreich: Semmering, 1 ♂ 26. VIII.; Steiermark: Johnsbach, 1 ♂ 26. VIII.; Präbichl, 1 ♂ 26. VIII.; Burgenland: Geschriebenstein, 2 ♂♂ 3. IX. (inclusive 1 ♂ Coiffait leg.); Gross Petersdorf, 1 ♂ 2. IX.

Ps. maxillosus (Klug.).

N. Österreich: Pfalzau, 1 ♀ 23. VIII.; Burgenland: Gross Petersdorf, 2 ♂♂ 2. IX.

Ps. sylvestris Lep.

Kärnten: Koschuta, 1 ♂ 31. VIII.; Burgenland: Geschriebenstein, 1 ♂ 3. IX.

I am indebted to Dr. Fr. Schremmer and Dr. O. F. Guglia who have kindly verified or corrected the identification of 22 bumble bees. My thanks are further due to Miss S. Dommersnes, the preparator, for technical assistance, including the drawing of the sketch map. The visit to Austria was financially supported by "Premieobligasjonsfondet".

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A Gynandromorph of the Milkweed Bug, *Oncopeltus fasciatus* (Dallas) (Hemiptera, Heteroptera)

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During some work on the milkweed bug, *Oncopeltus fasciatus* (Dallas), a gynandromorph was discovered in our laboratory colony kept at 30° C. The insect was a specimen in the last (fifth) nymphal stage. Eight days after its discovery, the nymph completed with some difficulty its imaginal moult. A week later the animal was evidently dying and was therefore sacrified: dissected in Ringer's solution and fixed in Bouin's solution. As several structures show more or less pronounced sexual dimorphism in *Oncopeltus*, it proved possible to analyse the specimen in some detail.

Fifth instar nymph

The sex of the last instar nymph is easily identified by a median black spot on the seventh sternum of the female (fig 1.). This spot is lacking in the male. Differences are also present in the genital area. The gynandromorph was discovered by the fact that only the right half of the seventh segment carried the black marking. It was therefore assumed that the right half of the seventh sternum was of female sex and the left half of male sex. The genital area could not be adequately studied. It appeared predominately male-like, but with some disturbances of the bilateral symmetry.

The adult

The pregenital segments of the abdomen (figs. 2 & 3). Sexual dimorphic structures present in some parts of the abdomen of *Oncopeltus* are described by Bonhag and Wick (1953). A pair of lobe like folds near the posterior corners of the fifth tergum are large and black in the female, but much less conspicuous in the male (fig. 2). The fourth abdominal sternum carries in the female a median process on its posterior edge

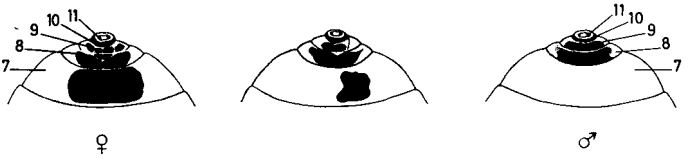

Fig. 1. Ventral view of the posterior end of the gynandromorph and of normal fifth instar nymphs. 7—11 : 7th—11th abdominal segment.

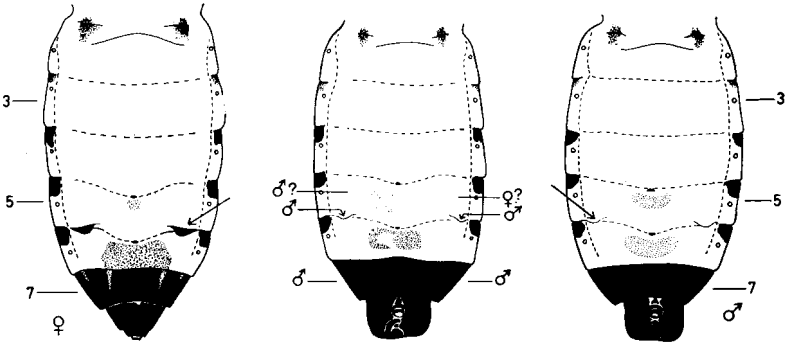

Fig. 2. Dorsal view of abdomen of the gynandromorph and of normal individuals. The arrows point to the lateral lobes which are large and black only in female individuals.

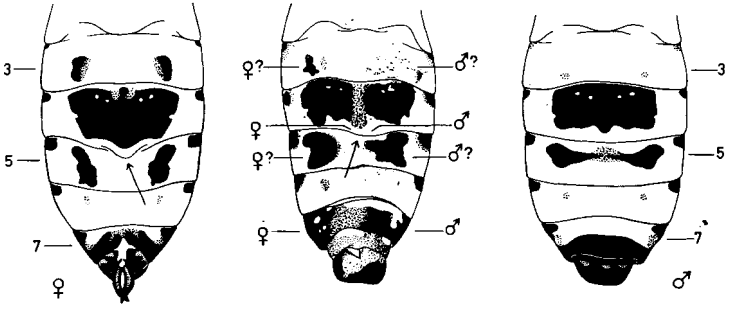

Fig. 3. Ventral view of abdomen of the gynandromorph and of ordinary individuals. The arrows point to the median process present only in female individuals.

(fig. 3). In the male this process is absent. Although there are considerable individual variations in the black markings on the abdomen, these markings may indicate the sex of the individual. Thus the females from our laboratory cultures generally had a less developed medium marking on the fifth tergum than did the males (fig. 2). Most individuals of both sexes carried a median marking on the sixth tergum, but the shape of the spot was often found to be different in the two sexes. In the female the markings on the fifth sternum often appeared as two widely spaced large black dots, whereas in the male they formed one solid bar (fig. 3., cfr. Mullen, 1959). In addition an examination of adult individuals from our cultures showed that the black dots on the third sternum were usually better developed in the females than in the males. For the seventh sternum, the morphology of the segment is a much more distinct character than is the colour pattern.

Based on the abovementioned criteria the sexual identity of the pregenital segments of the gynandromorph was analysed to be as indicated in figures 2 and 3. The only reliable clues to identify the sex showed male characters developed at the posterior borders of the fifth tergum and what appears to be a normal male-like seventh tergum. The asymmetrical arrangement of the faint markings on the fifth and sixth tergum may perhaps be explained by assuming some female influence on the right part of these segments.

In the ventral part of the abdomen the right half was predominantly female-like. This was indicated in the morphology of the fourth and seventh sternum, and to a less certain degree in the black pattern of the third and fifth segments. The left half of the abdomen was correspondingly male-like.

The ventral muscles of the pregenital segments (fig. 4) show some variations which seem to be associated with the sex of the specimen. The paired ventral abdominal muscles in the fourth segment are always present in the female, whereas they are absent or only slightly developed in the male. In the third segment the ventral abdominal muscles are found only as remnants in both sexes. In the seventh segment the ventral muscles are present in the female whereas in the male the two longitudinal ventral muscles appear as a fused median band of fibres. They originate on the anterior mesal projection of the seventh sternum, together with the two sternal rotators which extend dorsoposterad. No such median projection is found in the seventh sternum of the female.

Based on these observations the left part of the fourth segment of the gynandromorph was considered female-like, the

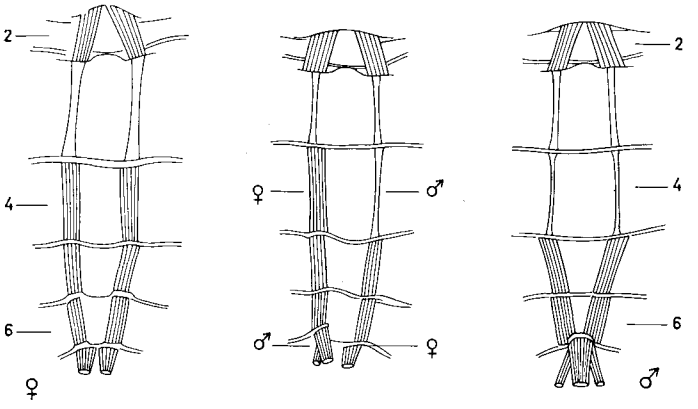

Fig. 4. Ventral abdominal muscles of the gynandromorph and of normal individuals. 2—6 : 2nd—6th abdominal segment.

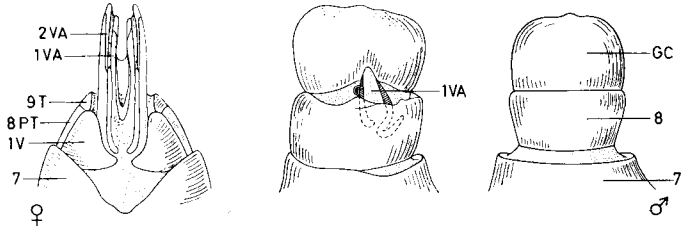

Fig. 5. Ventral view of the genital segments of the gynandromorph and of normal individuals. GC: genital capsule; IV: first valvifer; 1VA—2VA: first—second valvula; 7—8: 7th—8th abdominal segment; 8PT: 8th paratergite; 9T: 9th tergum.

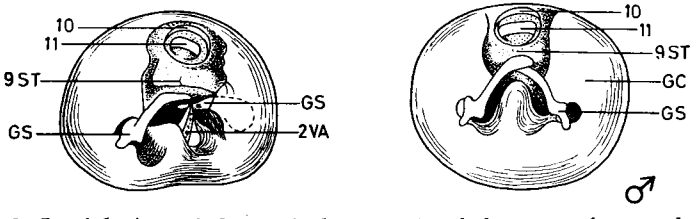

Fig. 6. Caudal view of the genital segments of the gynandromorph and of a normal male. GC: genital capsule; GS: gonostylus; 2VA: second valvula; 9ST: 9th sternum; 10—11: 10th—11th abdominal segment.

right part male-like. In the seventh segment not only the muscles, but also the median projection showed the left part to be male-like whereas the right half was female-like.

The genital segments (figs. 5 & 6). In the female the ovipositor is formed by the valvifers and the valvulae, both modified appendages of the eight and ninth genital segments. In the male the lateral and ventral walls of the genital capsule, according to Bonhag and Wick (1953), are formed from the fused gonocoxopodites. Other parts are shown in figures 5 and 6.

The genital segments of the gynandromorph were dominated by male characters, but irregularities were found in several segments. The genital capsule was somewhat asymmetrical. The left gonostylus was present and had a normal position, whereas the right gonostylus was present, but partly hidden inside the genital capsule. The eight segment showed some irregularities, but remnants of the first valvifers could not be identified. A structure which was probably a subnormally developed first valvula was on the other hand observed in the right part of the intersegmental membrane between the seventh and eight segment. Remnants of what was assumed to be the right second valvula were found posteriorly in the genital capsule. Thus, although dominantly male-like, female-like structures occurred in the right part of the genital segments of the gynandromorph.

The genital organs (fig. 7). Each ovary is composed of seven ovarioles. The lateral oviduct of each side unites in the median oviduct. In the male each testis is composed of seven testicular tubules. The mesadenia are glands wrapped around the distal parts of the vasa deferentia. The anterior portion of the ejaculatory duct is enlarged and forms the erection fluid reservoir. The reservoir surrounds the accessory gland. In both sexes several types of accessory glands, not mentioned here, are connected with the genital organs.

In the gynandromorph the left gonad appeared to be completely male-like, whereas the right gonad consisted of one ovariole and several testicular tubules. The shape of the single ovariole appeared normal, whereas the shape of the testicular tubules was abnormal. The number of testicular tubules could not be determined with certainty. The testicular tubules were functional and fully developed sperms were found. Yolk filled oocytes were observed in the ovariole. Fully developed eggs were not found, however, and the oocytes degenerated in the distal part of the ovariole.

The posterior parts of the genital organs of the gynandromorph appeared to be male-like, and the mesadenia and the erection

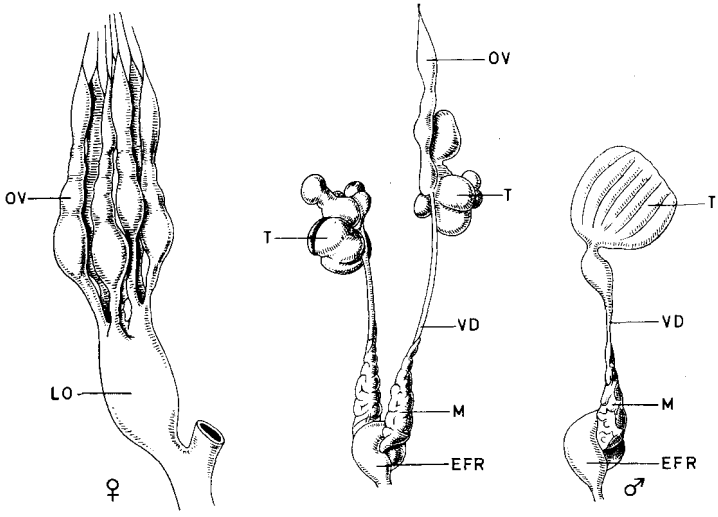

Fig. 7. Genital organs of the gynandromorph and of a normal female (left half only) and a normal male (right half only). EFR: erection fluid reservoir; LO: lateral oviduct; M: mesadenes; OV: ovariole; T: testis; VD: vas deferens.

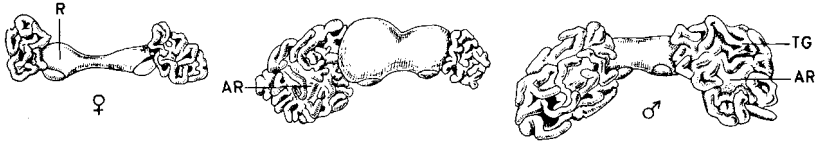

Fig. 8. Dorsal view of the scent gland of the gynandromorph and of normal individuals (about 1 week old). AR: accessory reservoir; R: reservoir; TG: tubular gland.

fluid reservoir contained secretory products. The accessory gland functioned.

The scent gland (fig. 8). In sexually mature individuals the metathoracic scent gland shows sexual dimorphism, the glands being larger in the males than in the females, especially because the accessory gland reservoirs are filled with secretion (Johansson, 1957). The left half of the metathoracic scent gland of the gynandromorph was much larger than the right half. It was therefore thought highly probable that the left side was male-like whereas the right side was of female sex.

The corpus allatum of sexually mature females is much larger than that of males (Johansson, 1958). The volume of the corpus allatum of the gynandromorph was calculated by planimetry in the same way as in previous studies, and was found to be typical of a normal male of about seven days of adult age.

Discussion

Whereas teratological conditions have been repeatedly described from heteropterans (e. g. Balazuc, 1951), gynandromorphs seem to be extremely rare. No references have been found to gynandromorphs in Heteroptera in the «Zoological Record» from 1920 to 1960, and the present specimen is the only one found by the author during 15 years of work on *Oncopeltus*. Also in other orders of insects gynandromorphs are very rare. Thus Rings (1946) reports only 4 gynandromorphs among a collection of 1,644,050 mosquitoes, and Rubtsov (1958) found 10 gynandromorphs out of 100,000 individuals of black flies.

It was therefore found to be of some interest to present a description of the present specimen. Furthermore, only in a few cases has it previously been possible to study the gonads of gynandromorphs (e.g. Ghelelovitch, 1957, Willis and Roth, 1959) and to trace the sexual identity to so many of the internal organs as has been the case with the present gynandromorph of *Oncopeltus*.

The present analysis shows that the gynandromorph is mainly a male-like individual. This is obvious from the appearance of gonads as well as the genital segments. The female-like influence is present in some parts of the right half of the abdomen. This shows up in the gonads, in the genital and pregenital segments, and even in the scent gland. Unexplained and somewhat confusing is the appearance of the ventral abdominal muscles, which in the left half of the fourth segment appear female-like.

Judging from the appearance of the last instar nymph, one would perhaps have expected a stronger demonstration of the female structures in the right half of the seventh segment of the adult. The female indications which are obvious in the right half of this segment in the external morphology (fig. 3) as well as in the muscles (fig. 4) are even here influenced by the overall male-like appearance of the gynandromorph. The male identity of the individual is also confirmed by the volume of the corpus allatum. If the individual had been primarily a female the corpus allatum ought to have been hypertrophied, as the individual should then have been considered an almost completely castrated female.

Summary

A gynandromorph *Oncopeltus* was found as a fifth instar nymph. The gynandromorphic condition was evident in the adult in several internal as well as external characters.

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Aphids Recorded on Cultivated Plants in Norway 1946—1962

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Introduction

In a previous paper (Fjelddalen 1963) the author has given an account of insect species recorded as new pests on cultivated plants in Norway 1946—1962, exclusive of *Aphidoidea*.

The present paper deals with this superfamily and is based on our collection at The Norwegian Plant Protection Institute, Division of Entomology. The review given for each species also includes the records from the literature concerning aphids in Norway.

The present author has collected aphids and also attacked plant material since 1946 in order to obtain information on the species occurring on cultivated plants.

A list of the known distribution and notes on the life history, symptoms of attack and injury are given for each species. The host plant, location and date are given for each find. Locations are arranged according to Strand (1943) and the abbreviations for Norwegian county names (fylker) are those used in his lists, see map (Fig. 13).

Almost all finds have been collected by the author in the period 1946—1962. The list of distribution contains finds of the aphids as alate viviparous female(s) (= al.), apterous viviparous female(s) (= apt.) and specimens in immature stages (= juv.). When the species concerned gives characteristic symptoms, finds of attacked plant material (= apm.) heavily infested with aphids have also been included (specimens not preserved). Some finds, especially attacked plant material, have been collected in the period 1891—1955 by the late government entomologists W. M. Schøyen and T. H. Schøyen and in the period 1956—1962 by the following members of the staff: T. Edland, T. Rygg, J. Røyrvik, Chr. Stenseth and G. Taksdal.

Some of the finds have been identified by Chr. Stenseth, Vollebekk, F. Ossiannilsson, Uppsala, Sweden and the author,

but most of them by Helene Tambs-Lyche, Bergen, and Osmo Heikinheimo, Dickursby, Finland. I take this opportunity to express my sincere gratitude for all the help and assistance I have received. Special acknowledgement is due to Mrs. Tambs-Lyche. All finds of attacked plant material have been identified or checked by the author.

The scientific names of the species are used in accordance with «Contributions to the Knowledge of Swedish Aphids» published by Ossiannilsson (1959). The most common synonyms are mentioned for some of the species. In the use of names of the host plants I mainly follow Krüssmann (1960/62) and Lid (1963).

APHIDOIDEA

Fam. Callaphididae

Phyllaphis fagi (L.)

Fagus silvatica: AK: Oslo 13. VII. 1909 and 6. VIII. 1910. VAy: Flekkefjord 12. VI. 1954.

Fagus s. atropunicea: AK: Ski 17. VII. 1948; Oslo 26. VI. 1950. SFy: Jølster 10. VII. 1960. SFi Balestrand 13. VIII. 1961.

All finds by the author have been collected and identified in connection with heavily infested leaves (specimens not preserved).

The beech aphid has previously been recorded by Siebke (1874) from AK: Oslo. In the annual report on agricultural entomology by the government entomologist (Schøyen 1920—1939) it is mentioned once in 1920/21 as troublesome in parks and gardens in south-eastern Norway. In the annual reports on forest entomology (Schøyen 1913—1919[2] and 1920—1947) it is reported as a pest from AK: Oslo in 1913, 1920, 1924 and 1926, from Ø: Jeløy in 1930 and from VE: Larvik in 1913 and 1915.

The leaves of purple beech are highly susceptible to infestation with these yellow-green aphids, covered with bluish-white cotton wax. They feed on the underside of both young and old leaves, particularly along the midvein, and on the terminal growth. The leaves are covered with honeydew where sooty mould grows. When heavy outbreaks occur, they roll and shrivel. Since 1945 this woolly species has occasionally occurred as a pest locally in the south-eastern and western parts of Norway.

Eucallipterus tiliae (L.)

Tilia cordata: AK: Ås 10. VII. 1959 (al., juv.); Oslo 11. IX. 1959 (apm.).

The species has previously been recorded by Siebke (1874) from AK: Oslo and Asker. In the annual report on forest ento-

mology by the government entomologist (Schøyen 1913—1919[2] and 1920—1947) it is mentioned as a pest from AK: Oslo in 1914 and 1926, Ås in 1914, Fet in 1927; Ø: Halden in 1914 and NTi: Levanger in 1919. Ossiannilsson (1962) has collected it from Bø: Drammen 23. VII. 1960.

The aphids, which are easily identified by their clouded wings, live on the underside of the leaves. Apart from the harm they do by sucking the sap, they excrete lavish amounts of honeydew which may block the stomata, run down the foliage and give rise to attacks of sooty mould. The species is not an important pest in our country, but an attack can be very annoying, e. g. benches and tables under linden trees in parks or gardens can often be quite sticky with honeydew.

Fam. Aphididae

Hyalopterus pruni (Geoffr.)

Prunus domestica: AAy: Froland 17. VII. 1961. VAy: Lyngdal 18. VII. 1961. Ry: Strand 16. VII. 1959. HOy: Fana 16. VIII. 1961.

All finds have been collected and identified by the author in connection with heavily infested leaves.

In the annual report by the government entomologist (Schøyen 1913—1919[1] and 1920—1939) the species is mentioned from HOi: Ullensvang in 1916 and, as quite common in the eastern parts of Norway in 1921, 1922, 1923 and 1926. The samples of infested leaves sent to the institute from fruit growers and gardeners in the period 1945—1962, were all from the eastern parts of the country.

Fig. 1. Young colony of *Hyalopterus pruni* (Geoffr.). (After Smith).

The first signs of attack by the mealy plum aphid appear in the middle of July. Leaves of infested trees become sticky with honeydew, where moulds soon develop. The underside of the leaves are densely populated with pale green aphids, liberally coated with a white powdery substance. Mealy plum aphid does not cause leafcurl except on the very young leaves. According to several authors migration of alatae to various water grasses and reeds may occur. Some years heavy attacks occur late in the season, which results in premature yellowing and defoliation. The mealy plum aphid does not cause so much harm to the trees as *Brachycaudus* spp. (see p. 270—271).

Rhopalosiphum padi (L.)

(Syn. *Aphis avenae* Kalt.)

Avena sativa: Ø: Degernes 14. VI. 1956 (al.). AK: Ås 14. VII. 1962 (al.). HEn: Stor-Elvdal 10. VII. 1958 (al.). VE: Skoger 3. VII. 1961 (al., juv.). Ry: Klepp 16. VII. 1959 (apt.). Attacked plant material: Ø: Råde 20. VI. 1950. Os: Fluberg 7. VII. 1899; Ø. Toten 2. VIII. 1910. Bv: Flå 5. VIII. 1892. *Triticum aestivum:* Ø: Skjeberg 4. VIII. 1958 (juv.). VE: Brunlanes 19. VII. 1962 (al.). TEy: Solum 4. VII. 1959 (apt., juv.). *Hordeum polystichum:* Ø: Rakkestad 19. VI. 1962 (al.). AK: Ullensaker 19. VI. 1961 (al.). TEy: Solum 4. VII. 1959 (apt., juv.). *Prunus padus:* AK: Ås 6. VI. 1961 (al., apt., juv.). HEs: Stange 12. VI. 1961 (al.). Os: Ø. Toten 2. VI. 1961 (al., juv.). Nsy: Bodin 15. VII. 1957 (juv.). Nnv: Hadsel 16. VII. 1957 (apt.). Attacked plant material: AK: Oslo VI. 1937. HEs: Trysil 29. VII. 1954 (col. 540 m above sea level). Os: Ø. Toten 2. VI. 1961. Bø: Lier VI. 1937. TEi: Tinn 16. VIII. 1962. AAy: Herefoss 17. VII. 1961. VAy: Kristiansand 19. VII. 1961. STi: Oppdal 18. VI. 1961. Nnv: Hadsel 16. VII. 1957. Fø: Sør-Varanger 25. VII. 1957. *Prunus virginiana:* AK: Ås 16. VI. 1962 (al.). HEs: Ringsaker 29. VIII. 1962 (apm.).

The species has previously been recorded by Siebke (1874) from AK: Oslo and Asker on *P. padus*. On the same host Leatherdale (1959) reports finds from SFy: Hyllestad 16. VII. 1929 and AK: Oslo and STi: Trondheim VII. 1923. Migrated specimens, mainly as alatae, were recorded by Tambs-Lyche (1957 and 1961) on potato in North-Norway (ST, NT, N and TR) and on *P. padus* from various localities in South-Norway. Ossiannilsson (1962) has recorded it from VE: Strømm (Berger) 23. VII. 1960 on *Elymus arenarius*.

According to the annual report by the government entomologists periodical attacks on oats have been recorded in almost every district of Norway in the period 1904—1939. Samples of attacked plant material (oats) have been received from all counties in the period 1946—1962.

The primary host is bird cherry (*Prunus padus*) where the fundatrices and fundatrigeniae distort the foliage and cause the

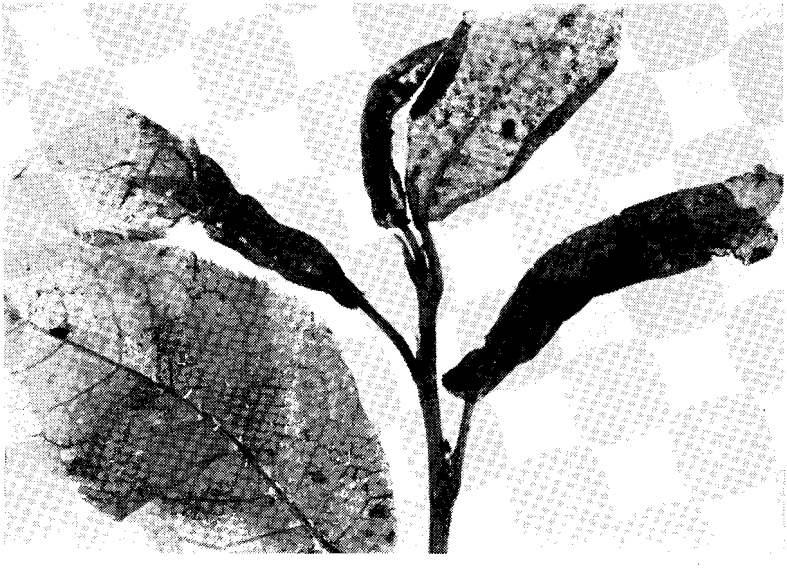

Fig. 2. The terminal growth of *Prunus padus* severely injured by *Rhopalosiphum padi* (L.)

leaves to fold down towards the midribs. Honeydew is excreted in large quantities.

Migration takes place in the last part of June, mainly to cereals and grasses where asexual generations are produced. Feeding on the leaves leads to discolouration and reduced growth and yield. Early attacks in dry periods cause the plants to wither. In September winged aphids return to the winter hosts, where eggs are produced.

The species, usually called bird-cherry aphid, occasionally causes severe damage to spring cereals in Norway, especially to oats and barley. The latest heavy outbreaks observed occurred in 1952 and 1961. The attacks are most serious at high temperature in connection with dry weather in the spring. Bird-cherry aphid is considered a serious pest in Norway and the most important aphid species on cereals.

Rhopalosiphum insertum (Walk.)

(Syn. *Rh. oxyacanthae* Schrk., *Aphis crataegella* Theob.)

Pyrus com. sativa: Ry: Stavanger 29. VII. 1952 (al.). *Malus pumila* (= *domestica*): HOi: Ullensvang 24. VII. 1962 (al.). SFi: Stryn 20. VI. 1952 (juv.).

The species is recorded for the first time from Norway.

This species (apple-grass aphid) is probably far more common in Norwegian apple orchards than previously realized. Hatching (from eggs laid on the spurs or branches) starts very early and is completed at the green cluster stage (Dicker 1953). The aphids first live clustering around the tips of the buds and later among the blossom buds or on the rosette leaves, which may become slightly curled. Normally, after two generations on apple, winged aphids migrate around petal-fall to grasses. There is a return migration to apple from September onwards (Schneider et al. 1957).

Early attacks on apple, previously ascribed to green apple aphid, *Aphis pomi* De Geer (see p. 266), may be due to apple-grass aphid, especially on older trees. Wingless green apple aphid is uniformly green with black siphunculi and cauda, while wingless apple-grass aphid is yellowish green with darker green stripes down the centre and at each side of the back, and with short and pale green siphunculi. Apple-grass aphid is for the present still considered a less important pest in Norway compared to green apple aphid.

Schizaphis borealis Tambs-Lyche

Phleum pratense: Ø. Degernes 14. VI. 1956 (al., juv.). AK: Enebakk 5. VI. 1956 (al., juv.). Attacked plant material: Ø: Spydeberg 31. V. 1956; Rakkestad and Sarpsborg 4. VI. 1956. AK: Enebakk 5. VI. 1956.

All finds have been collected by the author. The species was described as new to science by Helene Tambs-Lyche (1959).

A severe outbreak of this species was recorded on timothy in the first week of June 1956 (Fjelddalen 1958). The leaves became yellow, and, in heavily infested patches, the plants died. This resulted in areas up to half a hectare with dead plants, especially in 4—5 years old grassland.

Aphis fabae Scop.

Vicia faba: AAy: Fjære 14. VII. 1959 (al., apt.). *Beta vulgaris rubra:* VE: Våle 29. IX. 1962 (al., apt.). HEs: Ringsaker 29. VIII. 1961 (apt., juv.). *Beta vulgaris rapa:* AK: Ås 25. VII. 1962 (al., apt.). Ry: Sola 16. VII. 1959 (apt.). *Dahlia x cultorum:* AK: Oslo 21. VIII. 1953 (apt.); Ås 13. VIII. 1946 (apt., juv.). HEs: Ringsaker 18. VIII. 1953 (al., apt.). *Spinacia oleracea:* AAy: Fjære 14. VII. 1959 (apm.). *Chenopodium album:* VE: Sem 6. IX. 1962 (al., apt.). *Euonymus europeus:* VE: Stokke 25. VI. 1954 (al., apt.). TEy: Holla 7. VII. 1954 (apm.). AAy: Fjære 14. VII. 1959 (apm.). *Solanum tuberosum:* AK: Ås 25. VII. 1962 (al.).

The species, which was recorded from AK: Oslo on *Euonymus europeus* by Siebke (1874), has been collected from several localities in Norway and has a wide range of host plants, including weeds (Tambs-Lyche 1950, 1957 and 1961; Ossiannilsson 1962).

In the annual report by the government entomologist (Schøyen 1920—1939), attacks of black bean aphids are mentioned on *Vicia faba* in 1927 from AK: Asker and 1931 on beet from AAy: Grimstad. An outbreak along the southern and western coast line is reported in 1937.

The normal life-cycle is spent partly upon ligneous and partly upon herbaceous plants. The aphid overwinters in the egg stage mainly on spindle (*Euonymus europeus*), and migrates to the various summer hosts in June. In warm summers severe and widespread attacks may occur occasionally along the southern coast line and in Rogaland. Considerable damage was last observed on beet seed and root crops and on beans in 1959. The infestation develops rapidly in hot, dry weather. Attacks on root crops of beet cause the leaves to pucker and curl downwards at the margins. On seed crops the aphids infest the foliage, stems and shoots on which they cluster in vast numbers, leading to a marked reduction in yield. Grave secondary injury on the plants derives from the copious excretion of honeydew which covers the plants with a sticky coating, scorching the leaves and encouraging the growth of fungi.

Aphis grossulariae Kalt.

Ribes nigrum: SFy: Gloppen 27. VI. 1952 (al.). *Ribes uva-crispa:* AK: Oslo 1907 (apm.). Bø: Drammen 26. VI. 1911 (apm.).

Siebke (1874) has recorded the species on red currant from AK: Oslo, but this record may be *A. schneideri* (see p. 267). In the annual reports by the government entomologists attacks on gooseberry are mentioned in 1907, 1908, 1911, 1917, 1919, 1920—21, 1923 1926 and 1928—29. Vannes (1959/60) reports the species on gooseberry from AK: Ås.

Gooseberry aphid, which has a deep green or greyish green colour, lives in dense colonies at the tips of the shoots. It causes characteristic symptoms of curled leaves, shortened internodes and twisted stems. The terminal leaves are bent downwards and form a tuft or a tightly-crumped mass which effectively protects the insects. Attacks are usually found on gooseberry, to a lesser extent on currants. According to Heikinheimo (1951) the species migrates to *Epilobium* spp. Overwintering occurs in the egg stage, usually on gooseberry. The species is of slight economic importance as a pest.

Aphis idaei v. d. Goot

Rubus idaeus: HOy: Fana 11. VII. 1956 (al.).

Tambs-Lyche (1950) has recorded the species on potato in 1945.

Raspberry aphid, which is a small powdery grey-green aphid, lives in colonies on the fruiting laterals and at the tips of the new canes, forming a densely packed mass, especially along the blossom stalks. The leaves become curled. The species is of minor importance as a pest in Norway.

Aphis pomi De Geer

Malus pumila: Bø: Lier 11. VII. 1951 (al.). SFy: Gloppen 27. VI. 1952 (apt.) and 27. VI. 1952 (al., apt., juv.). Attacked plant material: AK: Ås 13. IX. 1961. AAy: Fjære 15. VII. 1961. Ri: Årdal 16. VII. 1959. SFy: Gloppen 12. VII. 1961. *Cotoneaster bullatus:* VAy: Lyngdal 18. VII. 1961.

The green apple aphid has previously been recorded from AK: Oslo by Siebke (1874). Since 1891 it has been reported as a pest almost every year from various parts of the country, according to the annual report by the government entomologists and the samples sent to the Norwegian Plant Protection Institute.

Green apple aphid is undoubtedly present wherever apples grow in Norway, and often inflicts considerable injury on commercial apple orchards and gardens. Control measures are required almost every season. The aphids infest the tender terminal growth, causing leaf curl (but no obvious distortion) and stunting the growing shoots. The highest and most persistent populations

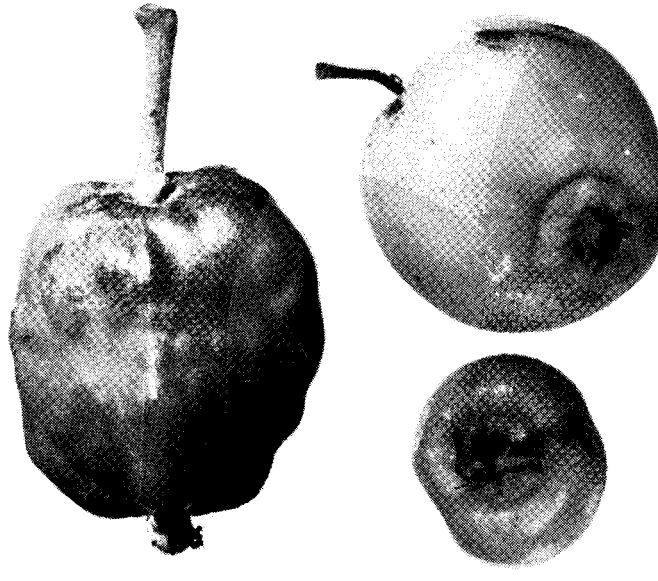

Fig. 3. Apples injured by *Aphis pomi* De Geer (left) and by *Dysaphis plantaginea* (Pass.) (right).

occur on young trees and on nursery stocks. Occasionally attacks on the fruit itself have been observed by the author. It then resulted in red spots on the skin or partly rugged surface.

The shiny black eggs are laid, often in great numbers, on last year's shoots, especially on water sprouts. The entire year is spent on apples, although in the summer many of the winged aphids disperse and produce colonies on other apple trees and certain other *Rosaceae*.

Green apple aphid is considered an important pest in nurseries and on young apple trees; under conditions favourable to the aphid also on older vigorous apple trees.

Aphis schneideri Börner

Ribes silvestre (red currant): Bø: Hurum 16. VI. 1953 (al., apt., juv.). *Ribes nigrum:* Bø: Modum 15. IX. 1953 (apt., juv.).

These finds by the author are the first specimens of this species collected in Norway. Vannes (1959/60) has recorded the species from AK: Ås on red and white currant and *R. alpinum* (det. D. Hille Ris Lambers).

The species (called "permanent currant aphid" because it is present on currant throughout the year) distorts the young growth and leaves in the same way on red and black currant as the gooseberry aphid, *A. grossulariae* Kalt. does on gooseberry (see p. 265). It can be distinguished from the latter by its blue-green colour, the thin coating of wax, and the antennal hairs. The species is of minor importance.

Dysaphis plantaginea (Pass.)

(Syn. *Sappaphis mali* (Ferr.), *S. plantaginea* (Pass.), *Anuraphis roseus* Baker, *Yezabura malifolii* Fitch.)

Malus pumila: Bø: Lier 16. VII. 1951 (apt., juv.). TEy: Holla 7. VII. 1952 (apt., juv.) and 7. VII. 1954 (apt.). AAy: Grimstad 18. VII. 1961 (al.). AAi: Bykle 17. VII. 1961 (al.). HOi: Ullensvang 22. VI. and 23. VI. 1952 (apt., juv.). SFy: Eid 1. VII. 1952 (al., apt., juv.). SFi: Stryn 20. VI. 1952 (apt., juv.). Attacked plant material: TEy: Holla 7. VII. 1954. AAy: Fjære 14. VII. 1959 and 15. VII. 1961. VAy: Kvinesdal 12. VI. 1954. SFi: Sogndal 26. VI. 1952; Leikanger 26. VI. 1952; Innvik 12. VII. 1960.

In the annual report by the government entomologists the species (rosy apple aphid) is never mentioned. Attacks, however, are reported of *Aphis sorbi* (= *Dysaphis sorbi* Kalt.) on apple in 1916 (AK: Oslo) and 1928 (HOi: Ullensvang). According to Stroyan (1957) this name was erroneously applied to the rosy apple aphid from 1915, and, considering that *D. sorbi* cannot live on apple, I believe the government entomologist was dealing

with rosy apple aphid. The author published the occurrence of rosy apple aphid for the first time in Norway in a textbook for fruit-growers by Schøyen et. al. (1956).

Rosy apple aphid has been the most important aphid species on apple in Norway since the last world war; in the first years, mainly along the southern coast line. At present it is generally distributed throughout South Norway, varying widely in annual abundance.

The overwintering eggs are laid in the crevices of rough bark on the spurs and smaller branches and at the bases of the buds. The aphids especially infest the foliage surrounding the blossom or fruit clusters and cause the leaves to curl very badly, first the rosette leaves and later the leaves on the young shoots. The shoots themselves become short and twisted. A considerable amount of honeydew is also produced, which drips on to the foliage and fruit. Curled leaves inhabited by rosy apple aphids are of a yellow or yellowish green colour, but never red, as is the case with leaves attacked by rosy leaf curling aphid, (see *D. anthrisci*).

The aphids, when abundant, also infest the fruit stalks and newly-set fruit. Fruit from infested trusses often fail to thin out, remain small, and become distorted and characteristically puckered around the calyx end ("aphid apples"). Such attacks occur mainly on the lower and inner parts of the tree and the attacked apples ripen prematurely and hang on the tree in clusters, even after the normal fruit is ripe.

Winged aphids migrate in July to plantains (*Plantago* species) but some colonies of wingless aphids continue breeding on apple. The fundatrigeniae on apple are pink to slate-blue or greyish and covered with a waxy powder.

Rosy apple aphid attacks only apple and is a serious pest on older trees.

Dysaphis sorbi (Kalt.)

Sorbus aucuparia: Bø: Lier 4. VI. 1953 (juv.).

Siebke (1874) has previously recorded the species on the same host plant in AK: Oslo. In the annual report by the government entomologist (Schøyen 1920—1939) it is mentioned once from mountain ash in 1928/29 from Nsy: Rødøy and Nnv: Andenes. The other records are from apple, however, and can probably be ascribed to *D. plantaginea* (Pass.), see the preceding species. In the annual report on forest entomology (Schøyen 1920—1947) *D. sorbi* is reported as a pest on *S. aucuparia* from the eastern and southern parts of the country in 1920, from On in 1923 and from AK and HEs in 1925; an outbreak is reported from N and TR in 1922.

The mountain ash aphid causes the formation of crumpled pseudo-galls by the incurling of the midrib and leaflets of the pinnate leaves to form tight bunches. The discoloration is confined to a slight paling or yellowing of the normal leaf colour. According to Stroyan (1957) the secondary host is *Campanula.*

Dysaphis anthrisci (Börner)

Malus pumila: AK: Oslo 28. V. 1960 (al.). Bø: Norderhov 3. VI. 1954 (juv.). HOi: Ullensvang 23. VI. 1952 (al., juv.). Attacked plant material Ø: Jeløy 9. VI. 1962 AK: Oslo 1. VI. 1895 and 1907; Bærum 25. V. 1955; Asker 28. V. 1960. HEs: Nes 28. VI. 1960; Grue 28. VII. 1954. Os: Jevnaker 9. IX. 1891. Bø: Norderhov 3. VI. 1953; Lier 16. VI. 1960. Bv: Flå 2. IX. 1954 (on the varieties Sävstaholm, Åkerö, Haugmann, Charlamovsky and Gravenstein); 7. VII. 1960. TEi: Bø 8. VII. 1954. AAy: Holt 28. VI. 1957; Fjære 15. VII. 1961. HOi: Ullensvang V. 1910. SFy: Gloppen 29. VI. 1952 and 11. VII. 1960. SFi: Sogndal 23. VI. 1896; Leikanger 9. VII. 1960; Balestrand 13. VIII. 1961; Luster 25. VI. 1952; Innvik 11. VII. 1960; Hafslo 24. IX. 1954. MRi: Norddal 2. VII. 1952.

Report on the occurrence of this species is published by the author for the first time in Norway in the textbook by Schøyen et al. (1956).

Fig. 4. Apple leaves showing yellow areas and leaf roll caused by *Dysaphis anthrisci* (Börner).

In the annual report by the government entomologist (Schøyen 1913—1919[1] and 1920—1939) records on apple of *Aphis crataegi* Kalt. are given in 1915, 1916, 1919, 1926 and 1928. *A. crataegi* Kalt. is partly a synonym of *Dysaphis crataegi* (Kalt.) and partly of *D. devecta* (Walk.). The first species, hawthorn aphid, was erroneously believed to attack both apple and hawthorn, and the latter species (*D. devecta*) has never been recorded in Norway, neither in Sweden nor Finland. The old records may, therefore, be ascribed to *D. anthrisci*. According to Stroyan (1963) the galls on apple caused by *D. anthrisci* are indistinguishable from those by *D. devecta*. The biology, however, is widely different. The latter lives on apple throughout the summer while *D. anthrisci* migrates to *Anthriscus sylvestris*. Finds on this host plant have been recorded both in Sweden (Ossiannilsson 1959) and in Finland (Heikinheimo 1963).

Attacks of rosy leaf-curling aphid, which are restricted to apple, have been observed all over South Norway, especially on older trees of the variety Gravenstein. The damage consists of severe leaf curl with conspicuous yellow, red and bright red areas.

The species must be considered a rather important pest on older and regrafted Gravenstein trees.

Dysaphis crataegi (Kalt.)

(Syn. *Aphis crataegi* Kalt., *Yezabura crataegi* Kalt.)

Crataegus monogyna: SFi: Stryn 30. VI. 1952 (juv., apm.). *Crataegus* sp.: AK: Asker 28. V. 1961 (fundatrices).

All records of *Aphis crataegi* Kalt. in the annual report by the government entomologists apply to apple, see the preceding species.

The symptoms of attack on hawthorn are quite similar to those caused by *D. anthrisci* on apple. The summer forms live on the roots of carrot according to Stroyan (1963). He also divides the species into 3 subspecies and states that records based on *Crataegus*-material must be treated with reserve unless data about the secondary host is available.

Brachycaudus cardui (L.)

Prunus domestica: VE: Nøtterøy 18. VI. 1954 (al., apt.). Attacked plant material has been collected by the author from TEy: Solum 3. VII. 1960, Ry: Stavanger 14. IX. 1951, HOy: Fana 16. VIII. 1961, SFi: Leikanger 9. VII. 1960, MRi: Norddal 22. VI. 1960 and NTi: Stjørdal 20. 1961, but the species concerned may be somewhat uncertain.

Siebke (1874) has previously recorded the species on *Senecio vulgaris* and *Carduus crispus* in AK: Oslo and Ossiannilsson

(1962) on *Artemisia vulgaris* and *Matricaria inodora* from Bø: Drammen 22. and 23. VII 1960.

In the annual report by the government entomologists, attacks on plums caused by *Aphis pruni* are mentioned in 1901, 1903, 1914, 1915, 1916, 1918, 1921, 1924, 1926 and 1928. All these records are caused by a leaf curling plum aphid, probably *Brachycaudus* spp., possibly *Phorodon humuli* (Schrnk.).

The leaf curling starts on the spurs and later extends to young shoots. Severe attacks occur in the spring and first part of the summer; the leaves are killed, the new growth is checked and the fruit is undersized and may fall off before it is ripe.

Winged aphids migrate to various herbaceous plants in the summer. The eggs are laid in the fall on plums, on the twigs and at the base of the buds.

Leaf curling plum aphid is frequently quite injurious to plums, both in orchards and nurseries, in South Norway, especially along the coast-line.

Brachycaudus helichrysi (Kalt.)

Chrysanthemum morifolium (in greenhouse): Ry: Stavanger 9. VII. 1953 (al.). Ø: Moss 10. VI. 1962 (al.). AK: Ås 29. X. 1954 (al., apt., juv.), 12. XI. 1960 (al., apt.); Asker 1. VII. 1962 (al.). Os: Gjøvik 30. VIII. 1962 (al., apt.). AAy: Fjære 17. VII. 1961 (al.). *Senecio cruentus* (in greenhouse): Ø: Moss 10. V. 1962 (al.). *Gerbera* sp. (in greenhouse): Ry: Hetland 12. IX. 1962 (al.). *Prunus domestica:* HEs: Ringsaker 29. VIII. 1962 (al., apt.).

The species has previously been recorded by Siebke (1874) on *Achillea ptarmica* and *Balsamita vulgare* = *Chrysanthemum balsamita* in AK: Oslo; by Tambs-Lyche (1961) on various compositae plants in Ø: Hvaler; VE: Tjøme; HOy: Fana and by Ossiannilsson (1962) on *Matricaria discoidea* (= *M. matricarioides*), *Plantago major* and *Rumex acetosella* (Bø: Drammen 22. and 23. VII. 1960).

The species is a pest especially on *Chrysanthemum* grown in greenhouses in Norway. The aphids infest leaves, flowers and shoots and growth is vastly distorted. The find on plum is the first record on this host in Norway but the species is probably common.

Brachycaudus napelli (Schrnk.)

Aconitum napellus: HEs: Grue 28. VII. 1954 (al.).

The find by the author is the first record of this species in Norway (Tambs-Lyche 1961). When found it was clustering on the growing points and terminal leaves.

Brachycaudus spiraeae (Oestl.)

Spiraea x vanhouttei: AAy: Herefoss 17. VII. 1961 (apt., juv.).

The species is here reported for the first time from Norway. Tambs-Lyche has previously found it on *Spiraea salicifolia* from Ø: Hvaler 8. VII. 1945 and in colour traps (Personal communication 1964).

The aphids were found clustering on the growing points and terminal leaves causing severe leaf-curl.

Brevicoryne brassicae (L.)

Brassica napus rapifera: AK: Ås VII. 1948 (al., juv.). *Brassica oleracea capitata:* AK: Ås 21. VI. 1961 (al.). AAy: Fjære 3. VIII. 1946 (al., juv.). Ø: Øymark VIII. 1945 (apm.). Bø: Modum IX. 1945 (apm.). *Brassica o. acephala:* Bø: Modum IX. 1945 (apm.).

Attacks are mentioned in the annual report by the government entomologist (Schøyen 1913—1919[1] and 1920—1939) in 1914, 1915 and 1923. Cabbage aphid is widely distributed all through Norway and is a well-known pest. It feeds primarily on cabbage, cauliflower and swede and on flower heads of cruciferous seed crops.

Small black eggs are laid in the fall on the stems and leaves where they overwinter. The bluish-grey mealy aphids are usually found only in small colonies on the underside of the leaves in the early summer, but in connection with warm, dry weather, which favours a rapid population growth, quite heavy attacks may occur in the late summer and fall. The leaves become yellow, curled and distorted with pale blister-like galls. The plants lose vigour and the yield is reduced.

The species is considered a pest in warm, dry summers.

Cavariella aegopodii (Scop.)

Daucus carota sativus: AAy: Landvik 17. VIII. 1954 (al., apt.), 24. VIII. 1956 (apt.). Ry: Ogna 5. IX. 1962 (al., apt., juv.). TRi: Lyngen 3. VIII. 1961 (apt., juv.). *Anethum graveolens:* TEy: Holla 8. VII. 1954 (al.). AAy: Landvik 8. VII. 1957 (apt.). *Petroselinum hort. fol. crispum:* (in greenhouse): Os: Lillehammer 13. IV. 1953 (al., apt., juv.).

Tambs-Lyche (1957) has recorded the species in TR on carrot, parsnip and celeriac and in N and TR as single finds on potato. The same author (1961) also reports finds in VE and HOy on *Salix* and various umbelliferous plants. Finds on *Aegopodium podagraria* (Bø: Drammen), *Myrrhis* and *Salix alba* (AK: Oslo) have been published by Ossiannilsson (1962).

The species (often called the willow-carrot aphid), migrates from *Salix* to various umbelliferous plants. Heavy infestations have been observed from the last part of June, especially on

carrot in AA, VA, ST, NT and TR. The feeding on the leaves leads to leaf-curling and reduced growth and yield and young plants may wither. The pest can be serious to carrot in warm, dry weather.

Phorodon humuli (Schrnk.)

Prunus domestica: HEs: Vinger 28. VII. 1954 (apt., juv.). AK: Vestby 25. IX. 1962 (al.). NTi: Stjørdal 22. VII. 1961 (al., juv.).

Siebke (1874) has previously recorded the species on *Humulus lupulus* in AK: Oslo but it has never been mentioned in our literature concerning pests. The above records on plum were found in connection with quite severe leaf-curling.

Rhopalomyzus lonicerae (Sieb.)

Lonicera korolkowii: AK: Ås 16. VI. 1962 (al.). *Lonicera x bella 'Candida'*: AK: Ås 16. VI. 1962 (al.). *Lonicera tatarica:* AK: Oslo VII. 1937 (apm.); Bærum 18. V. 1960 (apm.); Ås 26. V. 1962 (apm.). TEy: Holla 7. VII. 1954 and 21. VII. 1961 (apm.).

Fig. 5. The terminal growth of *Lonicera tatarica* severely injured by *Rhopalomyzus lonicerae* (Sieb.). Fig. 6. Red spots and leaf roll on *Lonicera alpigena* caused by *Rhopalomyzus poae* (Gill.).

The species has not been mentioned previously in Norwegian literature and must be regarded as new to our fauna.

The aphids feed on the underside of young leaves, causing small yellow and yellow-green spots which give the leaves a mottled appearance. Some of the terminal leaves curl and roll. In connection with heavy attacks all the leaves on the terminal growth become more or less curled and yellow; later they turn brown and wither. Attacks have been observed locally almost every year in gardens and parks.

According to Hille Ris Lambers (1953) the species migrates to *Phalaris arundinacea.*

Rhopalomyzus poae (Gill.)

(Syn. *Rh. alpigenae* Börner)

Lonicera alpigena: AK: Ås VI. 1948, 31. V. 1954 and 26. V 1962 (apm.) and 16. VI. 1962 (al.).

The species has not been mentioned previously in Norwegian literature and is considered new to our fauna.

The aphids cause conspicuous red spots on the upper surface of the leaves and the edges are rolled downwards forming a leaf roll. The symptoms of attack, therefore, differ entirely from the symptoms caused by the preceding species. Since 1948 heavy attacks have been observed by the author every year at Ås.

According to Hille Ris Lambers (1953) and Stroyan (1955) the species migrates to gramineous plants, especially *Poa* spp.

Myzus cerasi (F.)

Prunus cerasus: TEi: Sauherad 9. VII. 1954 (al., apt.); Mo 21. VII. 1961 (al., apt.). *Prunus avium:* Ø. Tune 1. VI. 1961 (apt.). AK: Nesodden 16. VI. 1950 (apm.); Frogn 1. VII. 1962 (apm.).

Cherry aphid was recorded for the first time in Norway by Siebke (1874) on *P. cerasus* from AK: Oslo. In the annual report by the government entomologists it is mentioned as a pest since 1891 from the south-eastern and western parts of Norway. Tambs-Lyche (1961) has recorded it from Ø, VE, HO and R, and Ossiannilsson (1962) from Bø: Drammen 22.—24. VII. 1960 on flowers of *Plantago major.*

The shiny brownish-black aphid lives on the underside of the terminal leaves of the young shoots. It causes the leaves to curl extensively, stunting the young shoots and producing quantities of honeydew. On badly infested trees the honeydew makes the leaves and fruits sticky — the result being small and poor fruit. Winged aphids migrate to the summer hosts (bedstraws and others) but at the same time colonies may persist on cherry. This

is of particular importance in nurseries. Considerable dispersal of aphids from one cherry tree to another to feed and reproduce may occur. The species overwinter in the egg stage on cherry.

Cherry aphid is considered important as a pest on cultivated, ornamental and wild cherries.

Myzus ascalonicus Doncaster

Allium cepa (in store-house): VE: Stokke 21. IV. 1960 (al., apt., juv.). *Allium a. porrum* (in greenhouse): NTi: Stjørdal 27. VI. 1962 (apt., juv.). *Anemone* sp. (in greenhouse): Ry: Stavanger 5. III. 1956 (apt.). *Chrysanthemum morifolium* (in greenhouse): Ø: Råde 5. V. 1961 (al.); Moss 10. V. 1962 (al.).

The shallot aphid, which was described as new to science in England in 1946, is now recorded in most countries in Europe (Ossiannilsson 1959) and in Canada (MacGillivray 1954).

Tambs-Lyche (1961) has recorded it in a store-house in HOy: Fana in 1952 on potato-sprouts and leek, and also outdoors, where it is, according to Stroyan (1950), very polyphagous.

The damage done by this anholocyclic species is most apparent in the late winter and spring months when it is concentrated on bulbs etc. in store-houses and greenhouses. In the case of the above record on onion, quite heavy infestation occurred with a maximum population in the middle of April. Numerous winged forms were produced that sought the windows of the store room.

Myzus persicae (Sulzer)

Dianthus cariophyllus: Ø. Fredrikstad 10. IV. and 4. V. 1953 (apt.). AK: Oslo 10. V. 1953 (al., apt.). Os: Lillehammer 13. IV. (apt., apm.) and 18. VIII. 1953 (apt.) and 29. VIII. 1962 (al., apt., juv.). VAy: Kristiansand 5. II. 1953 (al.). Ry: Madla 14. IX. 1953 (al., apt.); Hetland 12. IX. 1962 (al., apt.). HOy: Fana 10. IX. 1962 (al., apt.). STi: Trondheim 22. I. 1953 (apt., juv., apm.). *Asparagus plumosus:* HOy: Fana 10. IX. 1962 (apt.). *Chrysanthemum morifolium:* AK: Ås 8. VI. 1961 (al.). VE: Sandefjord 24. V. 1962 (al.). HOy: Bergen 11. IX. 1962 (al.). *Fragaria x cultorum:* AK: Ås 8. X. 1962 (al., apt.). *Freesia* sp. Ry: Madla 15. IX. 1953 (apt.). *Gerbera* sp. Ry: Hetland 12. IX. 1962 (al.). *Hibiscus rosa-sinensis:* AK: Oslo 10. IV. 1954 (juv.); Bærum 24. VIII. 1961 (apt.); Ås 12. X. 1962 (apm.). HOy: Bergen 11. IX. 1962 (al., apt.). *Kalanchoë blossfeldiana:* VE: Sande 10. VII. 1962 (apt.). *Daucus carota sativus:* AAy: Landvik 17. VIII. 1956 (apt.). *Solanum tuberosum:* AK: Ås VII. 1948 (apt., juv.) and 25. VII. 1962 (al.)

All finds have been collected in greenhouses, except the two last ones (on carrot and potato).

Tambs-Lyche (1950 and 1957) has published comprehensive reports concerning *Myzus persicae* on potato foliage in Norway. The report in 1950 also gives records on various host plants in greenhouses (in Ø, AK, Bø and HO). Ossiannilsson (1962) reports

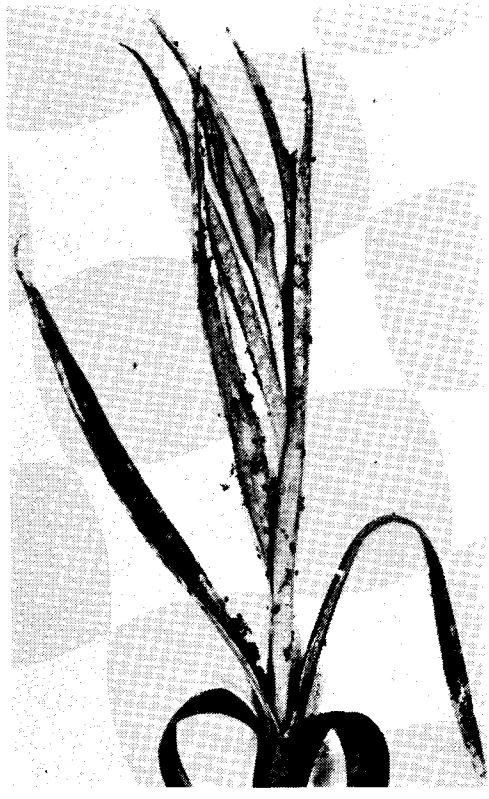

Fig. 7. Carnation in greenhouse infested with *Myzus persicae* (Sulzer).

it from Bø: Drammen on *Rumex domesticus* (= *R. longifolius*) and on flowers of *Plantago major*.

M. persicae is a cosmopolitan, feeding and breeding upon an enormous variety of plants. In addition to its being directly harmful by feeding on cultivated plants, this aphid is capable of transmitting a number of destructive plant virus diseases. It is rarely present in sufficient numbers to cause direct feeding damage in the field but is important as a vector of virus A, Y and leafroll on potato in Norway (Ramsfjell, Fjelddalen and Bjørnstad 1962). (According to the same authors *Aphis nasturtii* Kalt., *Aulacorthum solani* (Kalt.) and *Macrosiphum euphorbiae* (Thos.) are more important than *M. persicae* as virus vectors on potato in Norway).

In greenhouses, on the other hand, it causes direct damage to various plants. Growth is checked and infested leaves may be

variegated or mottled. Hibernation outdoors is not known in Norway yet, only overwintering of parthenogenetic forms in greenhouses.

Cryptomyzus ribis (L.)

Ribes silvestre (red currant): Ø: Rygge 14. VI. 1952; Onsøy 25. V. 1959; Skjeberg 14. VI. 1956. AK: Bærum VI. 1905 and 13. VII. 1960. HEs: Vinger 28. VII. 1954. Os: Lillehammer 9. VI. 1948. Bv: Flå 2. IX. 1954. AAy: Fjære 14. VII. 1959. Ri: Hjelmeland 16. VII. 1959. HOi: Strandebarm 17. VII. 1960. SFi: Luster 25. VI. 1952. MRy: Molde 8. VIII. 1956. NTi: Verdal 31. VII. 1961. Nsy: Bodin 11. IX. 1911. TRy: Kvæfjord 26. VII. 1961. Fn: Tana 22. VII. 1957. *Ribes silvestre* (white currant): HEs: Grue 28. VII. 1954. AAy: Fjære 14. VII. 1959 and 15. VII. 1961. SFi: Sogndal 28. VII. 1957.

The finds are attacked plant material infested with aphids and with characteristic symptoms. The red currant blister aphid has been recorded from all counties (fylker) in Norway.

The first record in Norway was published by Siebke (1874). He found it on red and black currant in AK: Oslo. In the annual

Fig. 8. Leaf of red currant damaged by *Cryptomyzus ribis* (L.)

report by the government entomologists attacks are mentioned very frequently in the period 1891—1939. According to Leatherdale (1959) it is recorded on red currant from HOi: Strandebarm 28. V. 1926; Anderson (1958) on *R. spicatum* from Nsi: Saltdal 27. VI. 1956 and Nnø: Hamarøy 18. VI. 1956; Tambs-Lyche (1950) on red currant from Os: Fluberg 2. VIII. 1945 and TEi: Sauherad 17. VIII. 1945; Vannes (1959/60) on red currant from AK: Ås (det. Hille Ris Lambers) and Ossiannilsson (1962) on *Galeopsis speciosa* from Bø: Drammen 23. VII. 1960.

In spring and early summer the aphids cause striking red blisters on the upper leaf surfaces. The pale yellowish-green aphids live beneath the blistered areas. Almost every leaf on a shrub can be infested when heavy attacks occur. In addition the upper leaf surfaces and the fruit may become sticky with honeydew excreted by the aphids. Migration to *Stachys* and *Galeopsis* takes place.

Red currant blister aphid is considered important as a pest on red and white currant.

C. galeopsidis (Kalt.) recorded on its summer hosts by Tambs-Lyche (1957), Vannes (1959/60) and Ossiannilsson (1962), may live on *Ribes* spp. also in Norway, but this species does not blister the leaves; in fact, it causes no damage.

Nasonovia ribis-nigri (Mosley)

Ribes uva-crispa: SFy: Eid 1. VII. 1952 (al., apt., juv.). *Lactuca sativa:* AK: Ås 10. VII. 1959 (al.).

Tambs-Lyche (1961) has recorded the species on *Veronica* (AK, HOy), various *Compositae* (TEi, Ry, HOy) and *Ribes uva-crispa* (HOy) and Ossiannilsson (1962) on *Lapsana communis* (Bø: Drammen 23. VII. 1960).

The shiny green aphid ("lettuce aphid") with cylindrical siphunculi lives on the underside of young leaves of gooseberry but rarely causes any damage, only slight leaf curl. The summer generations, however, may cause serious damage to lettuce both in greenhouses and in the field. When heavily infested the lettuce-leaves become curled and blistered and the plants stunted. Winged aphids return to the winter host plants, chiefly gooseberry, where eggs are laid on the twigs.

Hyperomyzus lactucae (L.)

(Syn. *Amphorophora cosmopolitanus* Mason, *Rhopalosiphum ribis* Buckt.)

Ribes nigrum: SFy: Gloppen 27. VI. 1952 (apt.). AK: Bærum 15. VI. 1960. NTi: Verdal 31. VII. 1961 (al., apt.). Attacked plant material: Ø: Rygge 14. VI. 1952. AK: Sørum 10. VII. 1955. Os: Gjøvik 8. VIII. 1955. TEi: Bø 8. VII. 1954. VAy: Søgne 15. VII. 1959 and 19. VII. 1961.

HOy: Os 17. VIII. 1957; Fana 16. VIII. 1961. SFy: Gloppen 12. VIII. 1961. SFi: Årdal 16. VII. 1959; Innvik 11. VII. 1960; Leikanger 9. VII. 1960. MRy: Hareid 5. VIII. 1951. *Sonchus arvensis:* AK: Ås 12. IX. 1955 (al.).

All finds have been collected by the author.

The species ("currant-sowthistle aphid") was first recorded in Norway by Siebke (1874) on *Sonchus arvensis* from AK: Oslo. In the annual report by the government entomologists it is mentioned as a pest on red and black currant almost every year in the period 1912—1923, but the records must be considered very doubtful. Tambs-Lyche (1950) has recorded it as single finds on potato from Bø: Øvre Eiker and (1957) from NTi: Skogn, and Vannes (1959/60) on *Ribes nigrum* and *Sonchus asper* (det. Hille Ris Lambers).

After hatching from eggs laid in the axils of the buds the aphids move to the tips of the young shoots where they feed on the young growth causing curling and yellow mottling of the leaves. Severe infestations have occurred locally and resulted in a checked growth.

The aphids are green in colour with siphunculi markedly swollen. Winged aphids migrate to the summer host plants (sowthistles) where they can be found infesting the flower heads.

Currant-sowthistle aphid is the largest and the most common aphid on currant, especially black currant. According to Heikinheimo (1951) red currant is highly unsuitable as host plant.

Hyperomyzus rhinanthi (Schout.)

(Syn. *Hyperomycella erratica* Koch.)

Ribes silvestre (white currant): TEy: Holla 8. VII. 1954 (al.). SFi: Luster. 25. VI. 1953 (al.).

These finds by the author are the first specimens of this species collected in Norway. It has been recorded by Vannes (1959/60) on red currant from AK: Ås.

According to Hille Ris Lambers (1949) and Heikinheimo (1951) the species migrates between *Ribes* and *Rhinanthus*, especially *R. cv.* and *Rh. major* (= *Rh. serotinus*). The symptoms of attack on *Ribes* are curled and partly rolled leaves without any discolouration.

Aulacorthum circumflexum (Buckt.)

(Syn. *Neomyzus circumflexus* Buckt.)

Dahlia x cultorum: Os: Gjøvik 12. IV. 1953 (apt.). *x Fatshedera lizei:* VE: Stokke 26. VI. 1954 (apt.). *Freesia* sp.: Os: Ø. Toten 7. VI. 1955 (apt.). *Hydrangia opuloides:* Os: Ø. Toten 7. VI. 1955 (apt.).

All finds have been collected in greenhouses by the author. The species has never been mentioned in the annual report by the government entomologists. Tambs-Lyche (1950) reports a number of finds on 14 different species of flower plants in greenhouses in AK, Bø and HO.

This aphid is quite common in greenhouses, and at times very injurious. Wingless females usually occur in colonies. They are bright shining yellowish-green, and usually with a distinct dark U-shaped sclerotic area or mark on the dorsal side of the abdomen.

It is a most polyphagous greenhouse aphid breeding parthenogenetically throughout the year.

Aulacorthum solani (Kalt.)

(Syn. *A. pseudosolani* Theob.; *Dysaulacorthum pseudosolani* Theob.; *Aphis solani* Kalt.)

Solanum lycopersicum: Ry: Stavanger 12. IX. 1953 (apt.); Sjernarøy 1. IX. 1962 (apm.). AK: Ås 9. X. 1962 (apt.). Os: Fåberg 20. VIII. 1962 (apm.). *Solanum tuberosum:* AK: Ås 10. VIII. 1945 (apt.), VII. 1948 (al., apt., juv.). *Cucumis melo:* Ry: Stavanger 10. VI. 1953 (apt.). *Lactuca sativa:* AK: Oslo VI. 1960 (al., apt.). *Petroselinum hort. fol. crispum:* Os: Lillehammer 13. IV 1953 (al.). *Pelargonium peltatum:* Ø: Fredrikstad 15. IV. 1953 (al., apt.); Moss 10. V. 1962 (al., apt.). *Begonia hiemalis:* Ry: Stavanger 27. IX. 1953 (al., apt.). *Gerbera* sp.: Ry: Hetland 12. IX. 1962 (al., apt.). *Asparagus* sp.: Os: Ø. Toten 7. VI. 1955 (apt., juv.). *Calceolaria* sp.: Ry: Stavanger 28. IX. 1953 (apt., apm.). *Chrysanthemum morifolium:* AK: Ås 12. XI. 1960 (juv.).

All finds, except on potato (*Solanum tuberosum*), have been collected in greenhouses.

In the annual report by the government entomologists the species is mentioned on potato from TEy: Stathelle in 1892 and Bø: Tyristrand in 1915. Tambs-Lyche (1950 and 1957) has published comprehensive reports on the occurrence on potato foliage in Norway. She reports it as a quite common species on potato, and as the most common in North Norway. The report in 1950 also gives records from greenhouses in Ø, AK, Bø and HOi. It was found on 7 different host plants but not very commonly. Ossiannilsson (1962) recorded it on *Matricaria discoidea* (= *M. matricarioides*) from Bø: Drammen.

This potato aphid is a most polyphagous species attacking a great number of plants out- and indoors. Wingless females are pale green with a dark green spot at the base of each siphunculus. The hibernation mainly takes place in greenhouses and other indoor places where the aphid reproduces parthenogenetically all round the year.

The aphids crowd upon tender growing points and terminal leaves of the host causing severe curling and distortion. Colonies

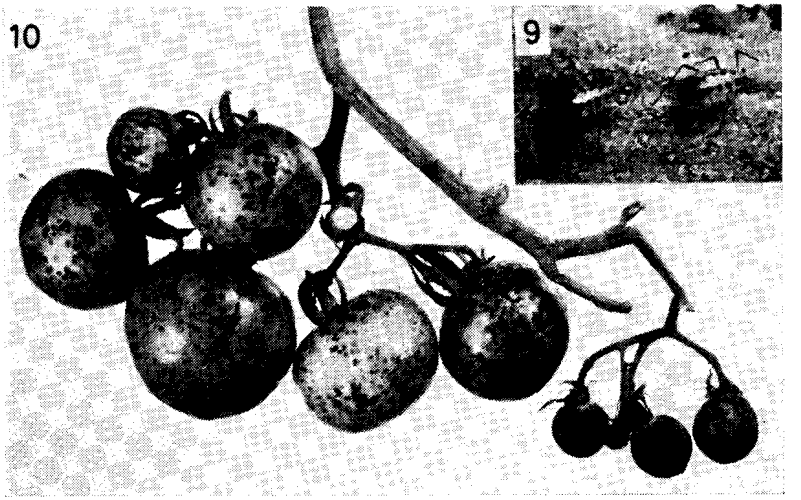

Fig. 9. *Aulacorthum circumflexum* (Buckt.) enlarged to show abdominal markings (After Miles). Fig. 10. Attack of *Aulacorthum solani* (Kalt.) on tomato grown in unheated greenhouse. The fruit becomes undersized with numerous dark green spots on the skin.

may also establish themselves on the immature fruits of tomato, as was observed for the first time in Norway in 1962. The infested fruits of tomato grown in unheated greenhouses became undersized with numerous dark green spots on the skin.

According to Ramsfjell, Fjelddalen and Bjørnstad (1962) the species may transmit the potato virus diseases G, K, Y and leaf roll and mosaic on beet, cauliflower and peas.

Acyrthosiphon caraganae (Chol.)

Caragana arborescens: AK: Ås 10. VII. 1960 (al., apt., juv.).

The species has also been recorded by Ossiannilsson (1962) on *Caragana* from Bø: Drammen 23. VII. 1960. It is not mentioned in the annual report by the government entomologists, but attacks of aphids on *Caragana* are reported in 1918 from AK: Oslo and 1919 from Os: Ø. Toten (Schøyen 1913—1919[1]). The records of *A. pisum* on *Caragana* in 1928/29 from VE: Tønsberg and Bø: Røyken (Schøyen 1920—1939) are probably due to *A. caraganae.*

The life span of this species is spent entirely on *Caragana* and possibly on some other ligneous leguminous host plants. In spring and summer the aphids live on the underside of the leaves

and on the petioles. When the honeydew excreted by the aphids dries, the leaves acquire a white-spotted appearance.

The species is of minor importance as a pest.

Acyrthosiphon ignotus Mordv.

Spiraea x vanhouttei: AAy: Herefoss 17. VII. 1961 (apt.). SFi: Balestrand 13. VIII. 1961 (apm.).

The species has previously been recorded by Ossiannilsson (1962) on *Spiraea* sp. from Bø: Drammen 22. VII. 1960.

The aphids were found clustering on the growing points and terminal leaves causing severe leaf-curl.

Acyrthosiphon malvae (Mosl.)

(Syn. *Aulacorthum pelargonii* Kalt.)

Pelargonium domesticum: Ø: Fredrikstad 4. V. 1953 (apt.).

Tambs-Lyche (1961) reports the author's find as the first in Norway, but Siebke (1874) published a find on *Pelargonium* from AK: Oslo under the name *Aphis pelargonii* Kaltb., which is considered a synonym by Hille Ris Lambers (1947). The species has also been recorded on *Dryas* sp. from AK: Oslo by Ossiannilsson (1962).

Hille Ris Lambers (1947) has divided the species into 4 subspecies. According to this the name of the recorded species should be *A. malvae malvae* (Mosl.) = Pelargonium aphid.

The aphids were found on the underside of the leaves where they fed along the midrib and the other large veins. They also clustered on the petioles and on the stems of new growth.

Acyrthosiphon pisum (Harr.)

(Syn. *A. onobrychis* B. d. F., *Macrosiphum pisi* Kalt.)

Pisum s. sacharatum: AAy: Øyestad 5. VIII. 1945 (apt.); Landvik 8. VII. 1957 (apt.).

Siebke (1874) reports a find on *Spiraea ulmaria* (= *Filipendula ulmaria*) from AK: Oslo, Tambs-Lyche (1961) on various leguminous plants from O, Bø, Ry and HOy and Ossiannilsson (1962) on *Lathyrus pratensis* from Bø.

In the annual report by the government entomologists outbreaks of the pea aphid on sugar-peas were reported in 1900 from Ø: Rygge and Tune (Schøyen 1891—1912); in 1926 from Ø: Mysen, Jeløy and Onsøy and AK: Ås and in 1928 from AK: Oslo (Schøyen 1920—1939) The records given on *Caragana* sp.. in 1928/29 probably relate to the species *A. caraganae* (Chol.) (see p. 281).

The life of this species is spent mostly upon plants of the order *Leguminosae*. The winter is passed in the egg stage on perennials. A certain degree of migratory movement takes place among the leguminous plants. Attacks on cultivated peas, both edible and ornamental, usually start during blossoming, and large colonies may be formed on shoots, flowers, pods and leaves. Heavy infestations produce stunting of the plant and yellowing and malformations of the leaves and pods.

Pea aphid occurs only occasionally as a pest in Norway, and then mainly on canning peas grown along the eastern and southern coast-line. In warm, moist weather it can be very abundant, especially on broadcast low varieties. Compared with elsewhere in the world the species is of far less economic importance in our country.

The question of occurrence of the different forms and colour of pea aphid (Müller 1962) has not been investigated in Norway. Only the green form on peas is known as yet. In Finland the red form has only been found on red clover (Markkula 1963).

Metopolophium dirhodum (Walk.)

Rosa sp.: Nnv: Hadsel 16. VII. 1957 (al.). VE: Sem 6. IX. 1962 (al.). *Rosa rugosa:* VE: Borre 1. IX. 1962 (al.).

Tambs-Lyche (1957 and 1961) reports one single find on potato from Nsy: Tjøtta (10. VIII. 1950) and on gramineous plants from Ry, HO and Nsy. Ossiannilsson (1962) has recorded it on *Elymus arenarius* from VE: Strømm and on *Agropyron repens* (= *Elytrigia repens*) from Bø: Drammen (23. VII. 1960).

The species (often called the rose-grain aphid) migrates between *Rosa* spp. and gramineous plants. On wild and cultivated roses the aphids, which are light green with a darker green stripe down the back, live on the terminal growth and on the underside of the young leaves during spring and early summer. The species is of little importance as a pest.

Macrosiphum euphorbiae (Thos.)

(Syn. *M. solanifolii* Ashm., *M. solani* Kittel.)

Solanum tuberosum: AK: Ås VII. 1948 (al., apt.). Ry: Hetland 22. VIII. 1956 (al.). *Senecio cruentus* (in greenhouse): AK: Ås III. 1948 (apt., juv.). HEs: Furnes 3. IV. 1952 (apm.).

The species has not been mentioned in the annual report by the government entomologists. Tambs-Lyche (1950 and 1957) has published reports on the occurrence on potato foliage in Norway. The frequency and distribution are quite similar to those of *Aulacorthum solani* (Kalt.) (see p. 280). The report in 1950

also gives records from greenhouses in AK, Bø, and HO where it was collected quite commonly on 11 different host plants.

This aphid is considered a widespread pest in greenhouses in Norway, especially on the pot plant cineraria (*Senecio cruentus*). The aphids crowd upon the tender growing points, the terminal leaves and the flowers of the host inducing severe injury (leaf-curl). During the winter months large colonies may be found on the underside of the leaves or on the flowers. In greenhouses it reproduces all round the year parthenogenetically.

Its major significance outdoors lies in the fact that it is a vector of the potato virus diseases A, K, Y and leaf roll and mosaic on beets, cauliflower, beans and peas (Ramsfjell, Fjelddalen and Bjørnstad 1962). It causes small direct damage to the plant foliage. Hibernation outdoors is not known as yet.

Macrosiphum rosae (L.)

Rosa rugosa: VE: Stokke 26. VI. 1954 (apt.). Os. Fåberg 29. VIII. 1962 (al., apt.). HEs: Nes 28. VI. 1960 (al., apt., juv.). *Rosa* sp.: AK: Ås 6. VII. 1961 (al., apt.). VE: Sem 6. IX. 1962 (al., apt.). VAy: Kristiansand 26. VI. 1945 (al.); Kvinesdal 29. VI. 1945 (apt., juv.). NTi: Stjørdal 1. VII. 1961 (al.). *Rosa* sp. (in greenhouse): AK: Bærum 15. V. 1962 (al., apt.). *Pyrus com. sativa:* AAy: Fjære 29. VI. 1945 (al., apt., juv.). HEs: Grue 28. VII. 1954 (apt.). TEy: Holla 9. VII. 1954 (al., apt.). SFy: Gloppen 27. VI. 1952 (apt.); 11. VII. 1960 (apt., juv.). *Potentilla fruticosa:* AAy: Herefoss 17. VII. 1961 (apt., juv.).

Rose aphid was first recorded by Siebke (1874) on 3 species of *Rosa* and *Scabiosa*, on *Sanguisorba officinalis, Valeriana officinalis, Oenothera grandiflora* and *Dipsacus gmelini* from AK: Oslo. Tambs-Lyche (1961) reports it from several localities in South Norway and from Nsy: Tjøtta, and Ossiannilsson (1962) on *Chamaenerion angustifolium* and *Scabiosa arvensis* (= *Knautia arvensis*) from Bø: Drammen.

In the annual report by the government entomologists it has been mentioned as a pest almost every year in the period 1891—1929. Records are given from Ø, AK, B, TE, AA, R, HO and MR.

Rose aphid is a common pest on wild and cultivated roses outdoors and sometimes also on roses in greenhouses. It is a large aphid showing considerable colour variation. It exists both as red and green forms, the latter being the most common. Its entirely black siphunculi distinguishes it from related species.

The winter is spent in the egg stage on roses. A partial migration to various summer host plants may take place.

In June—July it frequently becomes very numerous on young leaves of garden roses and clusters thickly on the buds and tender shoots. It multiplies so rapidly that infested flower buds and stalks may become covered with aphids. The growth of new shoots and flowers is retarded. All records given from pears

were collected by the author in nurseries, and the symptoms and injury observed are similar to those on roses.

Macrosiphum avenae (F.) s. H. R. L.

(Syn. *Aphis cerealis* Kalt.; *A. avenae* F.; *A. granaria* Kir.; *Sitobium granarium* Kir.)

Avena sativa: Ry: Klepp 29. VII. 1955 (al., apt.). Nsy: Bodin 18. VIII. 1960 (al.). Attacked plant material: AK: Blaker 29. VII. 1960. Bø: Norderhov 30. VII. 1946. *Hordeum polystichum:* TEy: Solum 4. VII. 1959 (apt.). *Triticum aestivum:* TEy: Solum 8. VI. 1959 (apt.). *Festuca rubra:* TEy: Solum 17. VIII. 1962 (al., juv.).

The English grain aphid was first recorded by Siebke (1874) on oats from AK: Oslo and of Tambs-Lyche (1957) on potato (single finds) from NTi: Stjørdal, Nsy: Tjøtta and Bodin and on *Elytrigia repens* from two of these localities. The same author (1961) reports it also from Ø, AK, Bø, HO, Nsy and TRi. Ossiannilsson (1962) has recorded it on *Capsella* from Bø: Drammen 23. VII. 1960.

In annual reports by the government entomologists grain aphid has been mentioned as a pest quite frequently in the period 1892—1939. Records are given from all counties, except TR and F.

Grain aphid, which is a large green or reddish species, lives on grasses, cereals and other monocotyledons. It can occasionally cause considerable damage to spring cereals, particularly to oats and barley. The last outbreak observed occurred in 1959—60.

The black eggs are laid on grasses in the fall. In June—July winged females develop and fly to cereal crops where asexual generations live on the upper part of the plants. The aphids suck on the upper leaves and especially on the ears as the crop matures. According to our observations the aphids usually become abundant in the last days of July or the first of August. At this time they may be clustering thickly on the spikelets, e. g. on oats. When the attack occurs rather late little injury is caused.

The grain aphid must be considered a periodical pest on cereals in Norway, but compared to *Rhopalosiphum padi* (L.) of far less importance.

Macrosiphoniella sanborni (Gill.)

(Syn. *Pyrethromyzus sanborni* Gill.)

Chrysanthemum morifolium: Os: Gjøvik 24. VIII. 1960; Lillehammer 29. VIII. 1962. Ry: Stavanger 28. IX. 1953. Fi: Alta 20. VII. 1957.

All finds are attacked plant material collected in greenhouses. No specimens have been preserved. Tambs-Lyche (1950) has recorded it on chrysanthemum in greenhouses from AK: Asker and HOy: Fana.

Although other species on chrysanthemum may be more common in greenhouses in Norway (*Myzus persicae, Brachycaudus helichrysi*) this species (chrysanthemum aphid) is quite frequently encountered. It is distinguishable from the others by its dark brown colour and by its habit of clustering on the tender terminal shoots on growing plants. As a result of the continuous draining of the plant juices, the tender growth becomes stunted, the leaves slightly curled and the buds and flowers distorted. The aphids are most numerous and cause most injury in the fall months.

Chrysanthemum aphid lives the whole year on cultivated chrysanthemum in greenhouse, without producing sexual forms.

Dactynotus solidaginis (F.)

Solidago virgaurea: Nnv: Hadsel 15. VII. 1957 (al.).

The species was first recorded by Siebke (1874) from AK: Oslo and Asker. Tambs-Lyche (1961) reports it from HOy: Fana and Lindås, Nnv: Hadsel and TRi: Målselv, and Ossiannilsson (1962) from Bø: Drammen. All finds have been collected on *Solidago virgaurea.*

The aphid lives on this host the whole year, usually on the flower stalks (Hille Ris Lambers 1939). It is of no economic importance.

Amphorophora rubi (Kalt.)

(Syn. *Nectarosiphon idaei* Börner)

Rubus idaeus: AAy: Landvik 7. VIII. 1953 (apt., juv.). HOy: Fana 9. VII. 1954 (apt.). *Rubus chamaemorus:* AK: Ås 31. VIII. 1961 (ovip. ♀ + ♂♂).

A record is given by Ossiannilsson (1962) from Bø: Drammen 22. VII. 1960. In the annual report by the government entomologist (Schøyen 1920—1939) the species is mentioned as the possible cause of an attack on raspberry in AK: Oslo in 1927.

This species (rubus aphid) is a large, long-legged, pale green aphid living solitarily on the underside of the leaves, causing slight leaf curl. The eggs are deposited at random on the canes.

It is without importance as a pest. Direct aphid injury to raspberry in Norway is only caused by raspberry aphid *Aphis idaei* v. d. Goot.

Delphinobium junackianum (Karsch)

(Syn. *D. aconiti* v. d. Goot)

Aconitum napellus: Ry: Stavanger 16. VII. 1959 (al., apm.).

The find by the author is the first record of this species in Norway (Tambs-Lyche 1961).

The species is also known in our neighbouring countries Sweden, (Ossiannilsson 1959) and Denmark (Heie 1961) and in England, the Netherlands, Germany and Soviet (Hille Ris Lambers 1947).

The aphids (monkshood aphid) were found clustering on the, stems of the inflorescence and between the flowers in vast numbers.

Fam. Pemphigidae

Schizoneura ulmi (L.)

(Syn. *Eriosoma ulmi* L.)

Ulmus glabra: TEy: Gjerpen 7. VII. 1954 (al.). AK: Oslo VII. 1909, VII. 1930, 27. VI. 1936; Ås VII. 1937. HEs: Ringsaker 29. VIII. 1962. Os: Fåberg 12. VII. 1960. Bø: Hole 9. VI. 1954; Modum 15. VIII. 1962. VAy: Kristiansand 19. VII. 1961. MRy: Molde 18. VIII. 1959; Skodje 18. VIII. 1959. Nsy: Bodø 14. VII. 1957. *Ribes silvestre* (red currant): HEs: Ringsaker 29. VIII. 1962. VAy: Søgne 19. VII. 1961. SFi: Innvik 12. VIII. 1961. *Ribes nigrum:* HEs: Ringsaker 29. VIII. 1962.

All finds, except the first one, are attacked plant material.

The species was first recorded by Siebke (1874) on *Ulmus campestris* from AK: Oslo, and Tambs-Lyche (1961) has found it on the same host plant from NTi: Skogn and in colour traps in AK: Ås and HOy: Fana.

In the annual report by the government entomologists it is mentioned as a pest on red currant quite frequently in the period 1910—1933 from Ø, AK, HEs, Os, Ry, MRy and NTi, in 1910—11 on black currant from MRy and Ø and in 1895 on *Ulmus* sp. from Ø: Mysen. In the reports on forest entomology attacks on *Ulmus* sp. are mentioned in 1914 and 1916 from HO, in 1926 from NTi and in 1929 from VE.

The species (currant root aphid) hibernates in the egg stage on elm trees. The fundatrices and fundatrigeniae infest the leaves, stimulating the growth of yellow rolled-up areas on one side of the leaf, in which the spring colonies develop. Colonies on currant, especially red currant, are started by migrants from the elm trees from the middle of June.

The attack on currants may be identified by a soft wolly and bluish substance on the roots, since this greyish species is a large producer of wool. The feeding on the roots causes a serious setback to infested young bushes. The attacks may also be indicated by brown, dry edges on the leaves.

Serious infestation has been observed locally quite often in the last 15 years, particularly on red currant in nurseries in South Norway.

Eriosoma lanigerum (Hausm.)

(Syn. *Schizoneura lanigera* Hausm.)

Malus pumila: MRy: Hareid 23. VIII. 1950. Ry: Sandnes 12. IX. 1951.

The finds have been collected by the author in nurseries as attacked plant material heavily infested with aphids (no specimens preserved). These first finds of woolly apple aphid in Norway were published by the author in a textbook by Schøyen et al. (1956).

An attack of this species mentioned in the annual reports by the government entomologist (Schøyen 1891—1912) in 1895 on apple trees is highly questionable.

The woolly apple aphid is a world-known pest of major importance and the records in 1950—51 were considered very alarming by our agricultural authorities. It was proved in both cases that the aphids had been introduced by importation in 1949 of infested stocks from Southern Europe.

The entire life cycle is passed on the host tree. The young stages overwintered in sheltered positions, in cracks or under loose bark, especially around the graft. They were devoid of wool and therefore almost imperceptible. Activity began in April the next year. This means that woolly apple aphid is able to overwinter as far north as 62,3° N. latitude and 6,1° E. longitude (Hareid near Ålesund).

Throughout the summer wingless aphids predominated in the colonies. The aphids themselves were of brown or greyish-purple colour. They produced large amounts of white wool which made them highly conspicuous during the summer months. In both nurseries the colonies were mainly found around the graft of 2 year old trees, but some also lived on the bark of the branches, especially where the bark was cracked, and on the young growth.

The infestation was eradicated partly by burning the trees and partly by spraying with tar oil and phosphorous compounds. The characteristic damage on trunks and branches with formations of galls was not observed.

As a result of the eradication programme Norway is free of woolly apple aphid. Leatherdale (1959) erroneously stated that woolly apple aphid is a Norwegian horticultural pest. Strict legislation and rules for inspection of important nursery stocks etc. have been established to prevent new introduction.

Tetraneura ulmi (L.)

(Syn. *Byrsocrypta ulmi* L.)

Ulmus glabra: AK: Bærum 1890; Oslo 29. VIII. 1909; Asker 20. VI. 1960. Bø: Røyken VI. 1915. TEi: Bø 8. VII. 1954; Kviteseid 21. VII. 1961 *Ulmus g. 'Exoniensis':* TEy: Gjerpen 7. VII. 1954.

All finds are attacked plant material. The first record af this species is on *U. campestris* from AK: Oslo (Siebke 1874). According to Leatherdale (1959) Trotter recorded it on *U. glabra* from AK: Oslo and STi: Trondheim VII. 1923.

In the annual report by the government entomologists it is mentioned in 1895 and 1929 from Ø and in 1897 from HOi; in the report on forest entomology in 1913 from AK, and in 1920 it is recorded as common in the eastern and southern parts of Norway.

The species causes the growth of dark galls on the midrib and any part of the upper surface of the elm leaves. The galls are solitary, glabrous, perpendicular and pedunculated. They have little effect on the growth of the host plant. The species migrates to various gramineous plants (Zwölfer 1957).

Asiphum tremulae (L.)

(Syn. *Schizoneura tremulae* Kalt., *Asiphon tremulae* L.)

Populus tremula: AK: Oslo VIII. 1921. Bø: Modum 1887 and 1895. The finds are heavily infested plant material.

In the annual report on forest entomology by the government entomologist (Schøyen 1913—1919[2]) and 1920—1947) outbreaks of this species are mentioned in 1915 from AK, O and HE and in 1923 from O.

The species feeds on young shoots and leaf-stalks, which makes the leaf-stalks bend. The leaves thereby come to hang vertically with the surface parallel to the shoots.

Thecabius affinis (Kalt.)

Populus x berolinensis: Ø: Fredrikstad 29. VI. 1961 (al.) AK: Oslo 4. X. 1956. HEs: Nord-Odal 3. X. 1950. Os: Østre Toten 12. VII. 1960 and 30. VIII. 1962. Bø: Drammen 23. VIII. 1954. Bv: Flå 2. IX. 1954 and 7. VII. 1960. VE: Lardal 3. VII. 1959. *Populus nigra 'Italica':* VE: Sem 3. VII. 1959. MRy: Molde 17. VIII. 1959.

All finds, except the first one, are attacked plant material.

The species has been recorded previously by Siebke (1874) on *Ranunculus repens* from AK: Oslo (under the name *Pemphigus ranunculi* (Kalt.)

As soon as the eggs hatch on poplar the fundatrices start sucking sap near the edges from the underside of the leaves. As a result, part of the edges turn downwards and cover the stem mother.

In this pocket or gall, which becomes yellow and slightly red, the fundatrigeniae are produced. They leave the pocket and move towards the midrib of the young terminal leaves.

Because of their feeding the leaves fold along the midrib and form gall-like pouches which become yellow and sometimes bright red in colour. Winged females develop in the gall, and then migrate to *Ranunculus* spp. (Tullgren 1909, Zwölfer 1957).

Quite heavy attacks with considerable malformation of the leaves have been observed in Norway, especially on poplar hedges of *P. x berolinensis* in gardens and in nurseries.

Pemphigus bursarius (L.)

Populus x berolinensis: Ø: Råde 29. VI. 1961 (al., juv.); Fredrikstad 29. VI. 1961 (juv.). Attacked plant material: HEs: Romedal VII. 1948; Vang 3. VI. 1960; Nes 29. VI. 1959. Bv: Flå 2. IX. 1954. TEi: Bø 8. VII. 1954; Heddal 18. VII. 1959. *Populus nigra 'Italica':* AK: Asker 10. VIII. 1915 (apm.); Nes 20. VII. 1960 (apm.).

The species was first recorded by Siebke (1874) on *P. pyramidalis* (= *P. nigra 'Italica'*) from AK: Oslo.

In the annual report by the government entomologists it is mentioned in 1911 (Schøyen 1891—1912) on lettuce from Bø: Drammen and in 1928/29 (Schøyen 1920—1939) on *P. n. 'Italica'* from AK: Oslo.

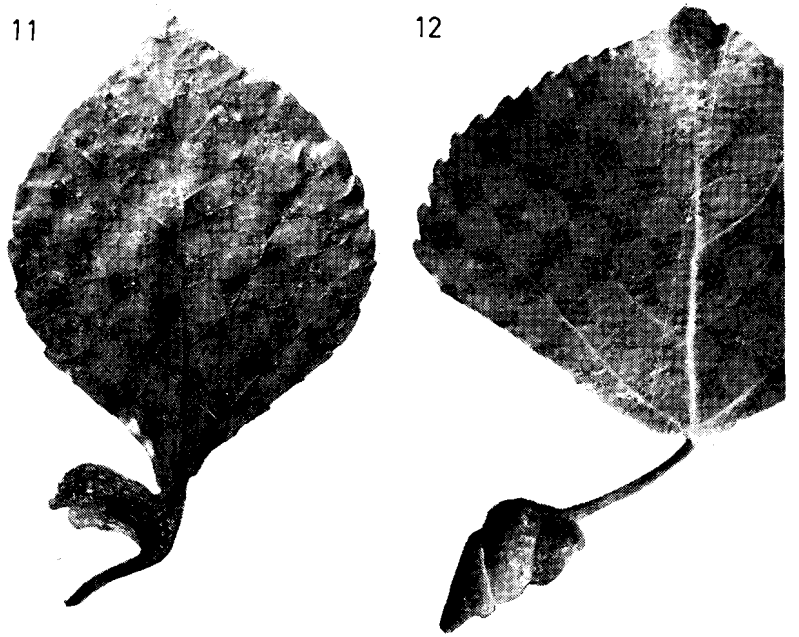

Fig. 11. Gall on the leaf stalk of poplar caused by *Pemphigus bursarius* (L.).
Fig. 12. Spiral-shaped gall on the leaf stalk of poplar caused by *Pemphigus spirothecae* Pass.

The lettuce root aphid is a pest mainly on lettuce grown in the field and in frames, especially in connection with poor crop rotation in nurseries.

After wintering in the egg stage on poplar the aphid causes the formation of hollow, pear-shaped or purse-like galls on the petioles. During June winged migrants develop in the galls. When the galls dry and split the migrants escape and several generations of wingless aphids follow on the summer hosts (lettuce and several other compositae plants according to Zwölfer (1957)).

On lettuce the aphids live on the roots and cause appreciable loss of plants in dry summers. The infested roots and surrounding soil particles present a very characteristic bluish-white, mealy appearance from a coating of the cotton wool-like wax secreted by the aphids. Affected plants may be stunted and show yellowing foliage but wilting is generally the first sign of attack. In all observed cases poplars have been growing close to the lettuce field or in the vicinity.

In the fall winged aphids fly back to poplar where their progeny produces the overwintering eggs. A few wingless aphids remain in the soil, however, enough to infest subsequent crops of lettuce planted on the same land the following spring. This has been observed in several cases along the south-eastern coastline during the last few years.

Lettuce root aphid must be considered an important local pest on lettuce in Norway.

Pemphigus spirothecae Pass.

Populus nigra 'Italica': Bø: Hønefoss 19. X. 1902. AK: Oslo X. 1929 and 4. IX. 1958; Nesodden 18. IX. 1958. *Populus x berolinensis:* Ø: Råde 29. VI. 1961 (fundatrices). TEy: Lunde 2. IX. 1958. *Populus trichocarpa:* TEi: Bø 8. VII. 1954.

All finds, except one, are attacked plant material.

The species is mentioned once in the annual report by the government entomologist (Schøyen 1920—1939) (in 1928/29 on *P. n. 'Italica'* from AK: Oslo).

The species, which causes the formation of spiral-shaped galls on the petioles, is of minor importance as a pest. As far as is known it has no alternate host (Lampel 1960/61).

Summary

The present paper includes a total of 52 aphid species recorded on cultivated plants in Norway. It represents 2 species of Callaphididae, 43 of Aphididae and 7 of Pemphigidae.

For each species is given a list of distribution, followed by notes on the life history, symptoms of attack, and injury. The literature concerning aphids in Norway is briefly reviewed.

The following 7 species have been found by the author for the first time from Norway: *Schizaphis borealis* Tambs-Lyche, *Aphis schneideri* Börner, *Dysaphis antrisci* (Börner), *Brachycaudus napelli* (Schrnk.), *Hyperomyzus rhinanthi* (Schout.) *Delphinobium junackianum* (Karsch.) and *Eriosoma lanigerum* (Hausm.).

The following 4 species are also published for the first time from Norway: *Rhopalosiphum insertum* (Walk.), *Brachycaudus spiraeae* (Oestl.), *Rhopalomyzus lonicerae* (Sieb.) and *Rhopalomyzus poae* (Gill.)

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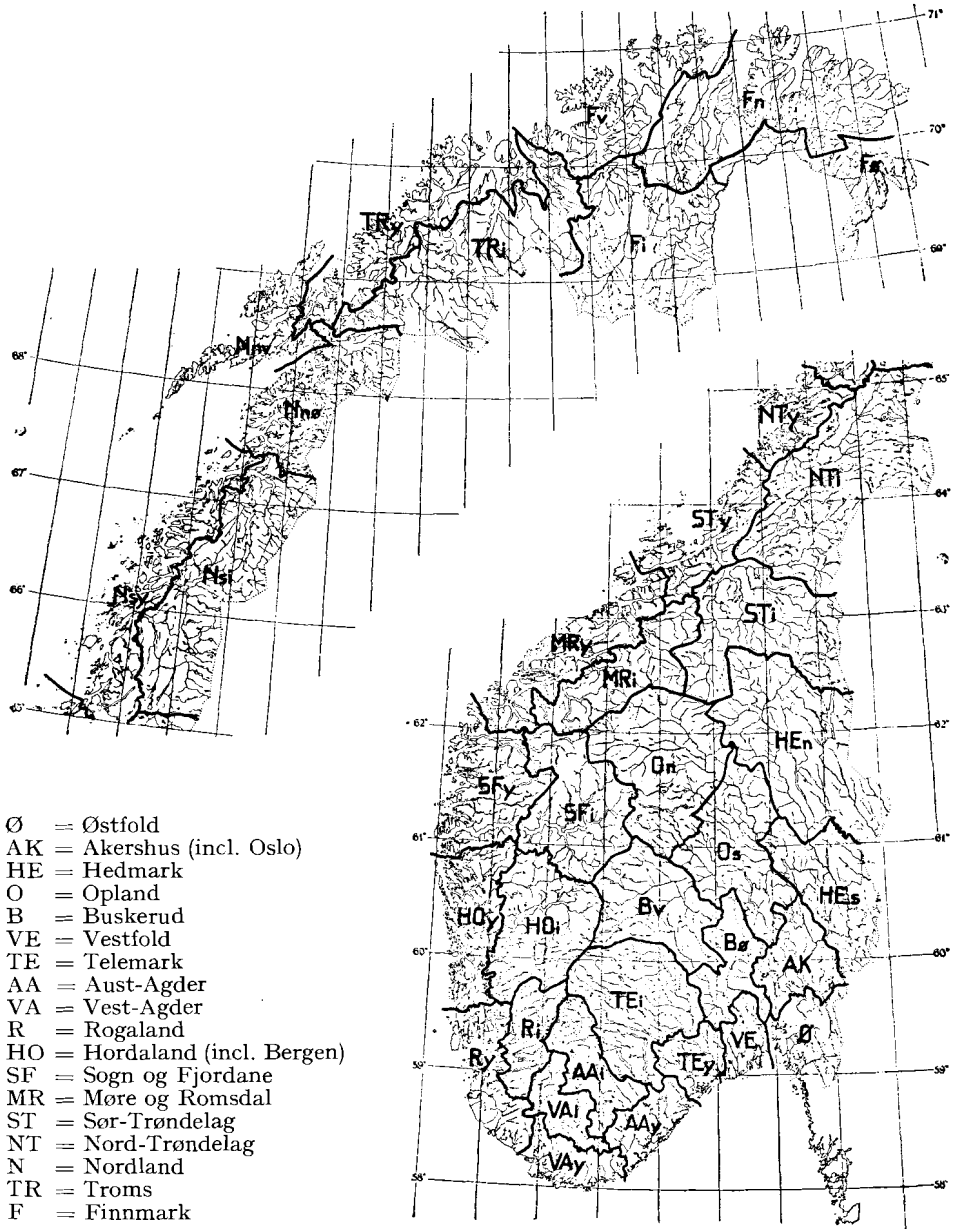

Ø = Østfold
AK = Akershus (incl. Oslo)
HE = Hedmark
O = Opland
B = Buskerud
VE = Vestfold
TE = Telemark
AA = Aust-Agder
VA = Vest-Agder
R = Rogaland
HO = Hordaland (incl. Bergen)
SF = Sogn og Fjordane
MR = Møre og Romsdal
ST = Sør-Trøndelag
NT = Nord-Trøndelag
N = Nordland
TR = Troms
F = Finnmark

Fig. 13. Map showing the districts of Norway with explanation of the abbreviations used in the paper. The districts are subdivided in zones; i (inner), y (outer), n (northern), s (southern), v (western) and ø (eastern). See Strand (1943).

The genus *Acleris* Hübner, 1825
Notes on the Norwegian Tortricidae II
(Lepidoptera)

By M. Opheim, Oslo

In Norway the species of the genus *Acleris* Hb. (*Acalla* Hb., *Peronea* Curt.) makes up the main part of the tribus Tortricini, which is characterized by the atrofied uncus in the male genitalia. In *Acleris* Hb. vein 7 in the fore-wing goes to costa, therefore Obraztov (1956) removes *A. holmiana* (L.) to *Croesia* Hb. in which vein 7 ends at apex or termen. Otherwise, there is no change from Haanshus's list (1933).

Several of the *Acleris* species vary considerably in colour and pattern, by which they might become superficially similar; this increases greatly the difficulty of identification. Proof of this are the many mistakes made by earlier determinators regarding this genus.

Of more important papers on the genus, may be mentioned those of Sheldon (1930, 1931) and Filipjev (1931) for palearctic species, and those of McDunnough (1934) and Obraztsov (1963) concerning the nearctic fauna. The Swedish, Danish and Central European *Acleris* species have been properly dealt with in the monographs on Tortricidae by, respectively, Benander (1950), v. Deurs (1956) and Hannemann (1961).

In this paper I have followed the nomenclature of Obraztsov (l.c.) and Hannemann (l.c.). As there might be some confusion concerning the new names, I have made below a list of the recent changes, in particular due to the investigations of Sheldon (l.c.):

schalleriana auct. is replaced by *latifasciana* Haw.

logiana Fab.	—	*schalleriana* L.
niveana Fab.	—	*logiana* Cl.
ferrugana Tr.	—	*tripunctana* Hb.
lithargyrana H. S.	—	*ferrugana* Schiff.
rufana Schiff.	—	*apiciana* Hb.
sponsana Fab.	—	*sparsana* Schiff.
reticulata Strøm	—	*rhombana* Schiff.

Through the courtesy of the officials mentioned below, I have been able to examine the *Acleris* species in the collections of the Zoological Museums at Bergen, Oslo and Tromsø, and in the Norwegian Institutes of Plant Protection (Division of Entomology) and of Forest Research, both at Vollebekk. To Mr. A. Bakke, Vollebekk, Mr. B. Christiansen, Tromsø, Mr. T. Edland, Ullensvang, Mr. J. Fjelddalen, Vollebekk, Miss A. Løken, Bergen, Mr. N. Knaben, Oslo, Dr. L. R. Natvig, Oslo, and Mr. T. Soot-Ryen, Oslo, my thanks are due for giving me permission to examine and also dissect any specimen needed for my work.

Information about *Acleris* Hb. was kindly given me by Mr. A. Nielsen, Dale, Mr. I. Svensson, Österslöv, Sweden and Mr. N. L. Wolff, Hellerup, Denmark. I am indebted to Dr. T. N. Freeman, Ottawa, Canada, for sending for my consideration Canadian specimens of *A. tripunctana* (Hb.) including slides of same. I owe my thanks to Mr. N. Knaben for the photographs.

For the gift of specimens I am greatly indebted to Mr. A. Fjeldså, Bodø, Mr. S. N. A. Jacobs, Bromley, England and Mr. C. F. Lühr, Lom.

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A. latifasciana (Haworth, 1811) (= *schalleriana* auct.)

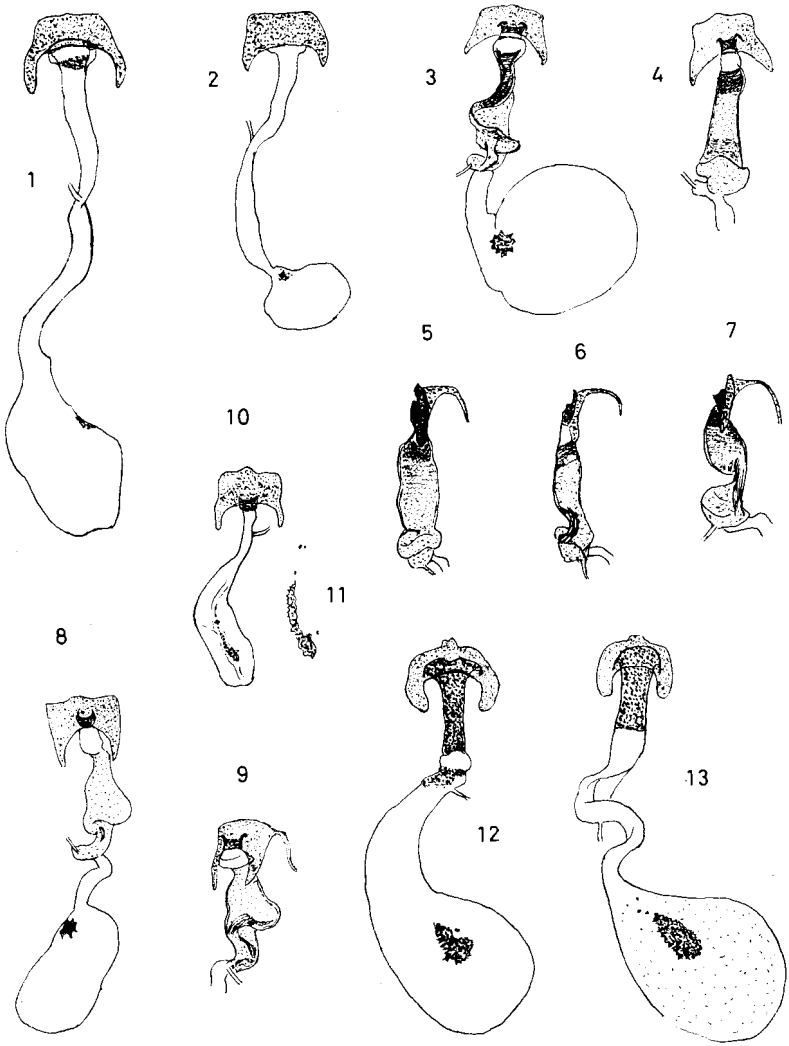
The species is commonly distributed in the lowlands of Southern Norway, flying mainly in August and September. Only once has it been captured after hibernation (in April) and twice in the middle of summer (July 8th and 21st). The larva feeds on *Salix*, *Populus*, *Vaccinium* etc. The female genitalia (fig. 1) are similar to those of the next species, *A. comariana* (Zell.), but ductus bursa is longer and has a sclerotized spot near ostium.

It is not easy to separate small specimens of *latifasciana* from those of *comariana;* the hind-wing, though, is usually darker in the latter species.

The common forms in Norway are *labeculana* Frr. and *comparana* Hb., while the typical form, *latifasciana* Haw. has been found only once (at Bergen).

Distribution:

Ø: Moss 4 specimens August 8th to 16th 1910, Dilling St. August 15th 1910, Sarpsborg 8 specimens September 5th 1920, August 1st to 7th 1921, Ørje (Barca). AK: Oslo (Siebke, W. M. Schøyen), April 4th 1922 (T. H. Schøyen), Ellingsrud August 9th 1846 (Siebke), Oscarshall 3 specimens September 25th 1851, Frognerelv 3 specimens August 11th, 26th 1848 (Esmark), Holmenkollen August 28th 1919 (Rygge), Skullerud July 21st 1910, Sandvika 3 specimens August 10th to 15th 1934 (Barca), Spro September 2nd 1923, August 16th 1924, 24th 1925 and 26th 1926 (Haanshus), Blindern 1958 (Gusgard), Kolsås September 6th 1964



Figs. 1—13. Female genitalia of some *Acleris* species.
1. *A. latifasciana* (Haw.), Odalen. 2. *A. comariana* (Zell.), V. Aker V. 1946. 3—7. *A. tripunctana* (Hb.), 3. Tøyen VI. 1885, 4. Alta; 5—7. lateral view, 5. Voss IX. 1924, 6 Alta, 7. Tøyen VI. 1885. 8—9. *A. ferrumixtana* (Ben.), 8. Odalen VI. 1882, 9. lateral view, Odalen VI. 1881. 10—11. *A. schalleriana* (L.), Winchester, England X. 1925; 11. signum. 12. *A. lipsiana* (Schiff.), Laksevåg V. 1947. 13. *A. apiciana* (Hb.), Stettin Germany. x 18, fig. 11 x 36.

(Knaben). HEs: Odalen September 1883 (Schøyen). Bø: Åros in Røyken September 29th 1962 (Opheim). VE: Tjøme, Budal August 26th and 28th 1963 (Opheim). TEy: Tåtøy at Kragerø September 22nd 1963 and August 29th 1964 (Opheim). Ri: Suldal 30 specimens August to September 1901 (Strand). HOy: Bergen October 1st 1910 (Barca), Bellevue August 31st 1937, typical form (Knaben). HOi: Voss July 8th 1915, Ullensvang July 1908 (Grønlien), many specimens September 1962 (Edland). MRy: Molde August 1912 (Rygge). STi: Trondheim (Esmark), August 25th 1879 (Schøyen).

A. comariana (Zeller, 1846)

In Norway it was first recorded by T. H. Schøyen (1924) as a pest on *Fragaria* at VE: Stokke in 1923. Later, it was also reported from AK: Asker in 1925 and 1928, AAy: Arendal in 1926, Bø: Norderhov in 1930, Os: Reinsvoll in 1931 and from HEs: Hamar in 1933 (Schøyen 1924, 1926, 1928, 1930, 1934). As there were no specimens present from the localities mentioned above in any of the Norwegian collections, and as, further, *A. aspersana* (Hb.) lives on *Fragaria*, we cannot be sure whether the determinations have been correct or not. It was therefore not a surprise to find that in the collection of Z. M., Oslo, there was no specimen at all under the *"comariana"* label.

When checking up on the *"latifasciana"* material, I had the good fortune to discover a small ♂ of *A. comariana*, captured at HEs: Odalen in September 1883 by W. M. Schøyen (det. as *"comparana* Hb."). Further, a ♂ from Oslo, Nordstrandshøgda, taken on August 3rd 1924 by E. Barca, by dissection was found to belong to the same species. It was called *"A. comariana* f. *protebana"* in his handwritten list. But Barca also collected another ♂ which he took at Ø: Sarpsborg, on August 15th 1921. It was in the collection of Statens Plantevern, erroneously determined as *A. aspersana*. Furthermore, in the same collection I found 2 ♀♀ of *A. comariana* from V. Aker in Oslo (det. as *"schalleriana"*), reared from larvae (on *Rosa*) on May 4th 1946 by Ø. Husås, and one ♀ from Ø: Rygge, on June 9th 1961 found as larva on *Fragaria* by G. Taksdal, and 4 specimens from the same plant, emerging on June 13th 1962, found near Ø: Fredrikstad, by S. Stenseth. The last 4 were correctly determined.

At present, only the following records are considered reliable, viz, Ø: Sarpsborg, Fredrikstad, Rygge, AK: Nordstrandshøgda, V. Aker, HEs: Sør-Odal.

The female genitalia are without sclerotization on ductus bursa which is shorter than that of *A. latifasciana* (fig. 2).

The larva seems to feed mainly on Rosaceae, besides *Fragaria* and *Rosa* also found on *Potentilla* and *Comarum*.

The species occurs in North America, found on imported *Azalea*.

A. sparsana (Schiffermüller & Denis,1775)(= *sponsana* Fabricius)
(Plate I, figs. 1, 2)

The majority of the specimens captured in Norway belong to an ash-grey form (Plate I, fig. 2) with faint markings and a sprinkling of rust-red scales on the fore-wing. Only two specimens differ from this pattern, one from AK: V. Aker has a rust-red triangular costal spot, while the other (from Tøyen) has a light-grey ground colour with a red-brown belt across the wing. A more contrasting form (♀) from Germany with whitish grey ground colour and rust brown triangular spot is shown on fig. 1. It had been determined as *A. schalleriana* L. (= *logiana* Fab.), but was identified as *A. sparsana* by dissection.

In Norway, the species has been observed in 3 districts only, south of 61°, from August to October. The larva lives on different trees like *Fagus, Acer, Sorbus, Quercus* etc.

Distribution:

AK: Oslo, V. Aker ♀ August 30th 1876 (Sparre Schneider), Tøyen ♂ August 22nd, ♀ September 1st 1885, 2 specimens without dates (A. Moe), Spro 4 specimens September 14th to 24th 1923, ♂ September 6th 1924 (Haanshus), Nordstrand ♀ October 1924 (Barca). Ry: Stavanger ♀ Autumn 1901 (Strand), Hetland ♂, ♀ September 24th 1956 (T. & A. Nielsen). HOy: Bergen, Bellevue ♂ August 20th, ♀ August 24th 1937 (Knaben), Kalfaret ♀ August 1st 1963 (Opheim).

A. roscidana (Hübner, 1822)
(Plate I, fig. 3)

The species is the largest of the genus, and a rare insect too, resting high up on the trunks of *Populus, Betula* and *Fagus*, on which the larva is supposed to live. The first Norwegian record of *A. roscidana* is that from AAy: Nes Verk, where a ♂ was found in the autumn of 1875 by O. Halvorsen (Sparre Schneider 1882). It took 50 years until the next capture of the species, when a ♂ and a ♀ were collected in the same district, this time at Laget, about 10 km north-east of Nes Verk, by J. & N. Knaben on April 20th 1925.

Regarding the distribution in the Scandinavian countries, there is an old record from Sweden without locality (Benander 1946), but lately I. Svensson (Not. Ent. 1959, p. 82) has captured the species in Östergötland, and it is also known from Småland and Uppland (Svensson in litt.) In Finland it is found in Lemland in the south-west. From Denmark there is no report about any capture.

A. rhombana (Schiffermüller & Denis, 1775) (= *reticulata* Strøm)

This rather common species is on the wing from late July to the middle of October. In eastern Norway it occurs mainly at

the coast, seemingly avoiding the inland districts, while in western Norway the species is found in the interior only, and not at the coast except in the district of Jæren. It has not been captured north of 63°. The larva feeds on *Prunus, Pyrus, Malus, Sorbus* etc.

Distribution:

Ø: Jeløy 2 specimens August 1st, 2nd 1910, Sarpsborg 2 specimens September 5th 1920, August 25th 1921, Rauer August 15th 1920 (Barca). AK: Oslo 3 specimens, V. Aker, Wratz Løkke 2 specimens August 31st 1845, Frogner 8 specimens August 26th to September 12th 1848, Oscarshall 4 specimens September 23rd to 25th 1851 (Esmark), Tøyen 4 specimens September 9th to 23rd 1885 (A. Moe), August 20th 1848 (Siebke), Holmenkollen August 28th 1919 (Rygge), Sandvika 3 specimens August 15th 1934, Nordstrandshøgda 4 specimens August 2nd to 27th 1923 (Barca), Bygdøy September 30th 1921 (Munster), Blindern several specimens August 21st to October 7th 1958 (Gusgard), Ås August 25th 1959 (T. Rygg), Årungen ex larva September 20th 1960 (Edland), Spro 12 specimens September 12th 1919, September 24th to October 7th 1923, September 19th, October 4th 1924, September 4th, 13th 1925, August 30th, September 14th 1926 (Haanshus). TEy: Jomfruland September 20th 1963 (Opheim). AAy: Risør July 1919 (Rygge). VAy: Gjemlestad October 13th 1945 (A. Ro). Ry: Stavanger autumn 1901 (Strand). Ri: Suldal 5 specimens autumn 1901 (Strand). HOi: Stalheim October 12th 1920, Voss September 8th 1920 (Grønlien), Ullensvang (Edland). MR: Sunnmøre 18th century (H. Strøm).

A. aspersana (Hübner, (1814—1817))

The species has a fairly large distribution in Norway, extending almost to 69°, but, strangely, there are no records in the extreme southern part of the country. In a few cases *A. aspersana* has been confused with *A. tripunctana* Hb. (= *ferrugana* auct.) and vice versa. The female should be easy to separate from other species as it is smaller than the male. Aedoeagus usually has 4 cornuti, but in two ♂♂, one from Bø: Ål and the other from SFi: Lærdal, 6 cornuti were present. The larva has been found on *Filipendula, Sanguisorba, Comarum, Fragaria* etc. In Norway, the species has been captured from July 6th to September 10th.

Distribution:

Ø: Rauer August 15th 1920, Sarpsborg ♂ August 5th 1921 as "*ferrugana v. selasana*", 3 specimens August 15th 1921 (Barca). AK: Oslo, Fjeldstuen 2 specimens August 4th 1844, Thoresens Løkke July 29th 1846, Frogner August 26th 1848, Rosersberg July 1845 (Esmark), Tøyen 5 specimens July 29th 1846 (Siebke), Abildsømyr 2 ♂♂ September 3rd 1885 (Moe), Nordstrandshøgda August 27th 1923, Sandvika ♀ August 1932, ♂ July 30th, 4 ♀♀ August 25th, ♂, ♀ September 10th 1934 (partly as "*ferrugana*") (Barca), Blindern several specimens from August 17th to September 6th 1958 (Gusgard). HEs: Helgøen (Esmark). Os: Fron July 22nd 1850 (Siebke), Gausdal July 29th 1846 (Siebke, Schøyen in litt.), S. Aurdal

(Sandberg, Schøyen in litt.). On: Lom ♂ August 26th 1957 (Lühr). Bø: Modum September 1880 (Schøyen). Bv: Ål 2 ♂♂, ♀ (one ♂ as *"ferrugana"*) September 1900 (Strand 1901). Ri: Suldal 2 specimens autumn 1901 (Strand 1902). HOy: Bergen 2 specimens August 1900 (Strand 1901), Skjold July 29th 1936 (Knaben). HOi: Granvin August 2nd 1916 (Grønlien), Ullensvang many specimens August 6th to September 6th 1962 (Edland). SFi: Lærdal ♂ autumn 1900 (Strand 1901), Høglii at Målset ♂ July 6th 1940 (Knaben). MRy: Molde August 1912 as *"schalleriana"* (Rygge). STi: Rise ♂ August 4th 1878 (Schøyen). NTi: Inderøy August 2nd 1884 (Schøyen in litt.), Overhalla August 1903 (Strand 1919). TRy: Trondenes ♂ August 14th 1879 as *"ferrugana"* (Sparre Schneider 1900), Kvefjord ♂ July 20th 1959 ex larva on *Fragaria* (Taksdal).

The record from HEs: Odalen is deleted as the specimen (♀) captured on September 10th 1883 by Schøyen, by dissection proved to be the following species, *A. tripunctana* (Hb.).

A. tripunctana (Hübner (1796—1799)) (= *ferrugana* auct.)
(Plate I, figs. 4—7)

The species shows great variation, so it was no surprise that of the examined specimens under the *"ferrugana"* label, one half was found to belong to other species, in particular to *A. aspersana* (Hb.). On the other hand, several specimens of *tripunctana* had erroneously been determined as *A. latifasciana* (Haw.), *A. aspersana* (Hb.) and *A. lipsiana* (Schiff.).

In Norway *A. tripunctana* (Hb.) has been collected at lower altitudes only. The record from Fokstua in the Dovre Mountains by Wocke (1862), who bred some larvae from *Betula nana*, might refer to *A. ferrumixtana* (Ben.) (vide Benander 1934 and Kennel Pl. V, fig. 41), and that of Strand from HEs: Elverum May 4th 1903 might also be doubtful (Strand 1919). Barca's (1923) *"ferrugana* v. *selasana"* (♂) from Sarpsborg August 5th 1921, Strand's 1901) *"ferrugana"* (♂) from Ål September 1900, and the specimen (♂) from Trondenes August 14th 1879 (Sparre Schneider 1914) are all *A. aspersana.*

The female genitalia vary somewhat. Ductus bursa is usually fairly straight, but can also be considerably twisted and ventrally deeply indented (figs. 3—7). Fig. 7 shows an extreme example (Oslo, Tøyen).

A distinct character is the strongly corrugated inner wall of ductus bursa. I have not seen it in any of the other European *Acleris* species.

After hibernation *A. tripunctana* has been captured from April 3rd to June 6th, the summer generation on July 14th and 16th only, and in late summer from August 17th to October 2nd. The larva lives on *Betula.*

From Dr. T. N. Freeman, Ottawa, I received a ♂ and a ♀, with slides of their genitalia, of supposed *A. tripunctana* (Hb.).

The male, from Meach Lake, Quebec (Pl. I, fig. 6) is very similar in appearance to a Norwegian ♀ from Tøyen (Pl. I, fig. 7). The genitalia of both the male and the female (from Salt River, N. W. T.) do not differ from those of *A. tripunctana* (L.). McDunnough (1934) and Obraztsov (1963) have arrived at the same conclusions.

Distribution:

Ø: Hvaler one specimen without abdomen May 1902, as *"schalleriana"* (Strand). AK: Oslo, Rosersberg ♂ April 3rd 1848 (Esmark), V. Aker ♂ May 5th 1880, as *"lipsiana"* (Schøyen), Tøyen ♀ June 6th 1885, as *"schalleriana"* (A. Moe), Sandvika ♂ July 16th 1934, as *"schalleriana"* (Barca), Asker 2 ♂♂ May 12th 1959 (Lühr). HEs: Odalen ♀ September 10th 1883, as *"aspersana"*, ♂ September 18th 1883, as *"schalleriana"* (Schøyen). Os: S. Land ♂ August 17th 1881 (Schøyen). On: Lom ♂ April 28th 1957, ♀ October 2nd 1958 (Lühr). Bø: Vikersund ♂ April 1901 (Strand). Ri: Suldal ♀ Autumn 1901, as *"aspersana"* (Strand). HOi: Voss ♂ July 14th 1915, as *"maccana"*?, ♂ September 5th, 2 ♀♀ September 6th and 9th 1924 (Grønlien). Nsy: Bodøsjøen ♂ April 18th, ♂ ♀ May 3rd 1964 (A. Fjeldså). Nsi: Storjord ♂ May 17th 1897 (Sparre Schneider). Fi: Alta ♂ ♀ (Staudinger).

A. ferrumixtana (Benander, 1934)
(Plate I, figs. 8, 9)

Mr. Ingvar Svensson, Österslöv, Sweden, has informed me that the *"ferrugana"* ♀ he bred from larva found at Vågå in 1953 (Opheim 1959), by dissection was found to belong to *A. ferrumixtana* (Ben.) which is very closely related to the previous species, *A. tripunctana* (Hb.). I am inclined to ascribe two ♀♀ from HEs: Odalen in the Z. M., Oslo collection also to *A. ferrumixtana*. They were captured in June 1881 and on June 1st 1882 respectively, by W. M. Schøyen, and determined as *"maccana"*. Both were of a mousegrey ground colour with the triangular spot dark grey, which in one of them was divided, forming two short bands.

A very dark ♂ with indistinct pattern on the fore-wing was captured at On: Soleggen in Lom (altitude 1200 m) on April 18th 1957 by C. F. Lühr. The locality is about 30 km west of Vågåmo, where I. Svensson found the larva of the same species.

The female genitalia of the two Odalen specimens differ from those of *A. tripunctana* (Hb.) in the shape of the genital plate where the lobes are tapered and not widely apart. Ductus bursa is broadly widened, and the corrugation of its inner wall is very poorly developed (figs. 8, 9). As mentioned under *A. tripunctana*, Kennel's figure 41 on Pl. V. is certainly *A. ferrumixtana*. Benander writes that the larva feeds on *Betula nana* and *Salix*. In Odalen there are extensive moors with plenty of *Betula nana*.

It is premature to discuss the distribution in Scandinavia as we know so few localities. As a guess, however, I assume the distribution is probably similar to that of *Pyrgus centaureae* (Ramb.). In Norway we might without erring greatly consider Wocke's (1862) record from On: Fokstua as referring to *A. ferrumixtana.*

A. ferrugana (Schiffermüller & Denis, 1775) (= *lithargyrana* H. S.)
(Plate I, fig. 10)

The species has to a great extent been confused with *A. tripunctana* (Hb.), and there has also been a certain confusion regarding the nomenclature of the two species. In Norway *A. ferrugana* (Schiff. & Denis) seems to be a rare species, being confined to the west coast only. In Denmark it is more abundant and can often be collected in great numbers (v. Deurs 1956). In the Z. M., Oslo, collections I discovered only one ♂ of *A. ferrugana.* It was captured at HOy: Minde on April 5th 1910 by Barca who mistook it for *A. tripunctana* (Hb.). This is the first record of the species in Norway. Recently A. Nielsen has taken the species at Ry: Gausel on April 25th 1956 and May 4th 1958, at Dale 6 specimens on September 7th 1957, April 24th and May 4th 1961, June 10th 1962, and at Bråstein on April 26th 1958 (Nielsen in litt.). The genitalia are easily distinguished from those of *A. tripunctana,* this being especially the case with the female. The larva lives on different trees like *Quercus, Fagus, Betula, Populus.*

A. schalleriana (Linnaeus, 1761) (= *logiana* Fab.)
(Plate I, fig. 14)

A. schalleriana (L.) is one of our "species dubia" which has turned up in Scandinavian literature for more than 100 years. It was first recorded by Zetterstedt (1840) as captured in the Dovre district by Boheman. It figures as Norwegian in Enumeratio (Sparre Schneider 1876) and in the list of Wallengren (1888). Schøyen puts an interrogation mark for the species (1893), Haanshus omits it (1933), but it is found again as Norwegian in Benander's catalogue (1946). The larva lives on *Viburnum opulus* which is a lowland species and not found in the Dovre district.

The *logiana* of Zetterstedt (l.c., p. 989) is certainly *logiana* (Cl.) (= *niveana* Fab.). Linné's No. 1336 in Fauna Suec. (1761) and No. 106 of Fabricius in Syst. Ent. emend. III, 2, which Zetterstedt places as synonyms, are in the opinion of Sheldon this particular species (Sheldon 1930, p. 196 and 1931, p. 101).

Zetterstedt's records from Lapponia and Dovre would then fit in nicely with the known distribution of this species. In Sweden, namely, *A. logiana* (Cl.) is found as far north as Nordbotten (Benander 1946), and in Norway recently collected at Lom, 40 km only to the south-west of the Dovre mountains. From the southern mountains we have a record from Hardangervidda.

With regard to Sweden, Benander mentions a specimen of *A. schalleriana* (L.) from Vestergötland. From Denmark there is no record. I have not seen any specimens of the typical form with the white ground colour (some light forms of *A. sparsana* (Schiff.) might be confused with *A. schalleriana* (L.)), but only the dull f. *plumbosana* Haw. and f. *germarana* Froel. (Pl. I, fig. 14). In order to check Pierce's figure of the female genitalia, Mr. S. N. A. Jacobs, Bromley, England, very kindly at my request, sent two ♀♀ from Winchester, captured October 2nd 1925. My dissections confirm that Pierce's figure corresponds with mine with the exception that signum in the two ♀♀ is not pear-shaped but linear (figs. 10, 11). McDunnough's figure 9on page 329 shows that, too (McDunnough 1934).

This summer (1964) on July 21st I had the good fortune to find a live pupa of *A. schalleriana* (L.) in a web on *Viburnum opulus* at TEi: Lårdal. The locality was a steep, southerly exposed slope at Lake Bandak (altitude 80 m). On August 12th a large male emerged, measuring 22 mm in expanse. The ground colour of the fore-wings was greyish with the triangular spot darker brown (f. *plumbosana* Haw.). The species is holarctic.

A. variegana (Schiffermüller & Denis, 1775)

The species is distributed as far north as to 68° and captured from August 5th to September 23th; only once has it been found after hibernation (on May 20th at HOy: Solsvik). Of the many trees which the larva feeds on, we may mention *Prunus, Pyrus, Malus, Crataegus*. The species is holarctic.

Distribution:

Ø: Sarpsborg August 5th 1921, Jeløy August 20th 1910 (Barca). AK: Oslo, Oscarshall 2 specimens September 23rd 1851, Frogner 1878 (Esmark), Tøyen (Moe), Spro 7 specimens August 21st 1920, August 24th to September 9th 1923, August 27th and September 8th 1924 (Haanshus). HEs: Odalen (Schøyen). Os: S. Aurdal 1885 (Sandberg), Bjørnstad in Feiring 2 specimens ex larva on *Rosa canina* July 21st and 24th 1963 (Taksdal). TEy: Kragerø (Ullman). AAy: Nes Verk August 1876 (Sparre Schneider). HO: Solsvik May 20th 1910 (Barca). HOi: Voss 2 specimens September 2nd 1924 (Grønlien), Viveli 1909 (Barca), Ullensvang (Edland). SFy: Lavik 2 specimens August 1900 (Strand). MRy: Ålesund September 5th 1913 (Barca), Vevang at Molde ex larva on *Malus* March 1st 1955 (Fjelddalen). Nnø: Fagernes in Ofoten August 20th 1879 (Sparre Schneider).

A. logiana (Clerck, 1759) (= *niveana* Fab.)

The species goes as far north as to the Dovre mountains, and, apparently, it does not frequent the humid west coast, but appears further inland at Voss and Suldal. Dates of capture are from April 20th to June 6th and from August 26th to October 5th. A summer generation in July is reported from Voss and Hardangervidda. The larva lives on *Betula*. The species is holarctic.

Distribution:

Ø: Sarpsborg October 5th 1920 (Barca). AK: Oslo, Tøyen 6 specimens September 2nd 1847 and May 2nd 1849 (Siebke), June 6th 1885 (A. Moe), September 25th 1879 (Schøyen), Slemdal September 7th 1912 (Rygge), Spro 4 specimens August 26th, September 11th 1924, April 27th 1926 and 28th 1928 (Haanshus). HEs: Ødalen 9 specimens June 2nd to 4th 1881, September 17th 1883 (Schøyen). Os: Land autumn 1901 (Strand). On: Lom ♂ May 1st 1961 (Lühr). TEy: Kragerø (Ullmann). AAy: Laget 2 specimens April 20th and 21st 1925 (J. & N. Knaben). Ri: Suldal 3 specimens autumn 1901 (Strand). HOi: Voss July 20th 1915, Hardangervidda July (Grønlien), Granvin May 15th 1910 (Barca).

A. umbrana (Hübner, 1796—1799)

A worn ♀ from Os: Land (possibly taken at Odnes 1901), labelled *Acalla* sp. by E. Strand, was found to belong to this rare species. It is new to Norway. Very likely it has a wide distribution in Scandinavia, as it has been reported besides from Scania, also from the northern parts of Sweden, viz, Vesterbotten, Nordbotten and Lycksele Lappmark (Benander 1946, 1953). In fresh condition, *A. umbrana* (Hb.) is easily distinguished by the longitudinal lines on the fore-wings. When worn, it might be confused with *A. hastiana* (L.) in appearance, but its larger size would indicate *A. umbrana*. The larva has been found on different trees, like *Prunus*, *Sorbus*, *Alnus*, *Salix*.

A. hastiana (Linnaeus, 1758)

This very variable species had not in Norway been recorded north of 61°, until last year (1963) when A. Fjeldså captured 4 specimens 6° farther north at Bodø. In Sweden, it is reported up to Lycksele Lappmark, farther south. *A. hastiana* has been confused with other species, in particular with *A. maccana* (Tr.). The larva has been found on *Salix* and *Populus*.

A. hastiana has mainly been captured in the spring, from March 30th to early June. We have only three records of the autumn generation. The species is holarctic.

Distribution:

Ø: Hvaler 2 ♀♀ May—June 1902 (Strand), Sarpsborg ♂ April 10th 1920, ♀ May 5th 1920, as "*maccana*" (Barca 1923). AK: Oslo (Kristiania) April 17th 1873 (Sparre Schneider), Grefsenås May 25th 1850 (Siebke), Sandvika (Barca), Spro May 2nd 1919, April 3rd 1920, April 4th 1926 (Haanshus), Oppegård March 30th 1888 (J. S. Young), Nes in Romerike October 1876 (Schøyen). HEs: Odalen June 1881 (Schøyen). On: Lom ♀ May 13th, ♀ October 13th 1961 (Lühr). Bø: Vikersund 4 specimens late April 1901, as "*maccana*" (Strand). Ry: Sola 2 ♂♂ 1949 (F. Jensen). Ri: Suldal ♂ autumn 1901 (Strand). HOi: Voss one ab. *psorana* Froel. (Grønlien 1925). Nsy: Bodøsjøen 2 ♂♂, ♀ May 9th 1963, Bodø ♂ April 15th 1964 (A. Fjeldså). Records from the following localities may not be reliable: Os: S. Aurdal ab. *divisana* (Sandberg), TEy: Kragerø (Ullmann), AAy: Nes Verk v. *aquilana* (Sparre Schneider), Laget (Grønlien), HOy: Bergen (Sparre Schneider 1901).

A. cristana (Schiffermüller & Denis 1775)

This rare species has been little observed in Norway, only 4 specimens have so far been collected throughout more than 100 years. *A. cristana* was first discovered at Kværner (Oslo) on June 1st 1851 by Siebke, and years later was identified by Schøyen (1881). The specimen, a male, was considerably worn, but the distinct tuft of raised scales on the fore-wing was intact. The next capture was at AAy: Laget, where J. & N. Knaben on September 24th 1931 found a ♀ of the beautiful form *cristalana* Don. I was very lucky to knock down a male and a female of the same form from a spruce on the small island of Tåtøy, close to TEy: Kragerø on September 22nd 1963 and August 29th 1964, respectively.

The species is also very rare in Sweden, and from Finland there are no records. The larva lives on different trees and bushes like *Ulmus, Prunus, Crataegus, Rosa.*

A. mixtana (Hübner, 1811—1813)

In Norway, the species was only known from the islands of Hvaler (Ø), where E. Strand (1904) in May 1902 collected a series of which 5 ♂♂ and 9 ♀♀ are at present in the Z. M. Oslo collections. It was therefore a real surprise when I found a ♂ of *A. mixtana* in the Z. M. Bergen collections. The specimen was captured on April 4th 1937 by N. Knaben on the small island of Herdla (HOy) on the west coast of Norway. The species is confined to heather, the larva feeding on *Calluna* and *Erica.*

A. fimbriana (Thunberg, 1791)

The species is not included in Haanshus's list (1933), although it has earlier been reported twice from Norway, first by Sparre

Schneider (1913) who wrote that Bang Haas found the larva in 1881 in the Dovre Mountains. The exact locality is not mentioned, but most probably it is STi: Kongsvoll. A few years later E. Strand (1919) too, recorded the species as new to Norway. Two specimens were taken by him at HEn: Tynset on September 4th 1903. I have not seen any of the above-mentioned specimens, but I am positive the determination must be correct, as *A. fimbriana* is easily identified by the rounded hind-wings.

Grønlien, who bred a "*maccana*" in September 1908, taken at HOi: Granvin, probably as a larva evidently had not been aware of this characteristic. The specimen, a male, which was found in the Z. M. Bergen collections, had a dark ground colour with a sprinkling of white scales near costa on the fore-wing. Dissection proved it to be *A. fimbriana*. A similar coloured ♂ was collected at On: Soleggen in Lom on April 18th 1957 by C. F. Lühr.

A. fimbriana seems to be a rare insect in Norway, but the area of distribution is probably large. In Sweden, it has been found as far north as Torne Lappmark. The larva lives on *Vaccinium*.

A lipsiana (Schiffermüller & Denis, 1775)
(Plate I, fig. 15)

In the Z. M. Oslo collections, 15 specimens were present under the "*lipsiana*" label, but only 3 of these were correctly determined, viz, two ♀♀ from HEs: Odalen, captured respectively on May 30th and in June 1881 by Schøyen, and one ♀ from Bø: Kongsberg on May 20th 1899 by Strand. In undetermined tortricid material collected by A. Bakke, I discovered one ♂ of *A. lipsiana*, which was taken at AK: Ås on April 16th 1959. The species also occurs on the west coast of Norway, as I found one ♀ from HOy: Kanadaskogen in Laksevåg, captured by A. Tjønneland on May 11th 1947 (Z. M. Bergen coll.).

Pierce's figure on Pl. IX of the female genitalia is not correct as it bears a certain likeness to that of *A. latifasciana* (Haw.). The genitalia of *A. lipsiana* are quite similar to those of the next species, *A. apiciana* (Hb.) (= *rufana* Schiff.), except that the lobes of the genital plate are curved inward; the sclerotized part of ductus bursa is longer than in *A. apiciana*, and there is a sclerotized spot near ductus seminalis (fig. 12).

In Denmark, *A. lipsiana* has only been found in the autumn (v. Deurs 1956), in Norway, only in the spring. The larva feeds on *Vaccinium, Myrica, Betula* etc. The species is holarctic.

A. lipsiana has been falsely reported from Ø: Sarpsborg (Barca 1923), AK: Lysaker, Bø: Modum (Schøyen 1881) and Bv: Ål (Strand 1899). The records refer to *A. apiciana*.

A. apiciana (Hübner, 1793) (= *rufana* Schiff.) (Plate I, fig. 11)

In the Z. M. Oslo collections only one specimen (♀) was present under the *"rufana"* label, which is the same as Sparre Schneider published new for Norway in 1881. It was captured at Østensjø (Oslo) on September 24th 1876. As observed by Wolff (1942) the grey, dull form of *A. apiciana* can easily be confused with *A. lipsiana*, it was therefore no surprise to find five specimens (4 ♂♂ and 1 ♀) of the former among the *A. lipsiana* material, as mentioned above. Furthermore, 3 more were discovered among the *A. hastiana, A. maccana* and *A. tripunctana.*

A. apiciana is, for the present, only found in a smaller area in eastern Norway, from Sarpsborg in the south-east to Ål in the north-west.

The species has been observed both in the spring and the autumn.

The female genitalia (fig. 13) are, as mentioned above, closely related to *A. lipsiana*, but ductus bursa is twisted and there is no sclerotized spot near ductus seminalis.

The larva has been found on *Rubus, Salix* and *Populus.*

Distribution:

Ø: Sarpsborg ♂ April 1920, as *"lipsiana"* (Barca 1923). AK: Oslo, Østensjø ♀ September 24th 1876 (Sparre Schneider), Lysaker ♂, ♀ May 2nd 1880, as *"lipsiana"* (Schøyen 1881). HEs: Odalen ♀, as *"hastiana"* (Schøyen). Bø: Modum ♂ September 1880, as *"lipsiana"* (Schøyen 1881), Vikersund ♂ ultimo April 1901, as *"maccana"*, ♀, as *"ferrugana"* (Strand 1902). Bv: Ål ♂ June 2nd 1898, as *"lipsiana"* (Strand 1899).

A. abietana (Hübner, 1819—1822)

The larva of the species which lives on *Picea abies*, seems to be confined to the southern part of eastern Norway, south of 61°. *A. abietana* has mainly been captured in the spring from April 7th to June 6th. Of the late summer brood, we only know of one capture (on August 7th).

Distribution:

Ø: Sarpsborg ♀ May 15th 1920, ♂, ♀ May 20th 1922, Rauer ♀ June 6th 1922 (Barca), Larkollen ♂, ♀ (Strand). AK: Oslo, V. Aker 2 ♀♀ May 5th 1880 (Schøyen), Nordstrandshøgda ♀ August 7th 1928, Sandvika ♂ April 1928, ♂ April 15th 1935 (Barca), Spro ♀ May 26th 1927 (Haanshus). Asker ♀ May 12th 1959, ♂ May 9th 1961 (Lühr). HEs: Odalen ♀ June 1881 (Schøyen). Bø: Vikersund ♂ (Strand). AAy: Laget ♂ April 20th 1925, 3 ♂♂ April 7th to 10th 1930 (J. & N. Knaben).

A. maccana (Treitschke, 1835) (Plate I, figs. 12—13)

There is a great deal of variation in this species; some of the forms have been confused with *A. hastiana* (L.). The ground

colour varies from greyish-white with sharp, dark markings, to a dull, dark-brown colour and indistinct lines. *A. maccana* evidently has an extensive distribution in Norway, but it seems to avoid the coast. It has been collected from April 4th to June 6th, and from August 14th to September 23rd. The larva feeds on *Vaccinium, Myrica* and *Ledum*. The species is holarctic.

Distribution:

AK: Spro September 2nd 1925 (Haanshus), Sandvika ♀ September 15th 1934, ♂ April 4th 1935 (Barca). HEs: Odalen 4 ♀♀ June 1881, 1889, ♂ (Schøyen). On: Lom ♀ September 18th, ♂ 23th 1958, Leirvassbu ♂ September 15th 1958 (Lühr). Bv: Ål ♀ May 22nd 1898, ♀ June 6th 1898, labelled *"lipsiana"* (Strand). Ri: Suldal ♂, ♀ autumn 1901, both as *"hastiana"* (Strand). HOi: Voss ♀ May 16th, ♀ August 14th 1925 (Grønlien). Nsi: Saltdal 3 ♂♂, 2 ♀♀ May 29th to June 1879 (Schøyen).

The record from Fi: Alta (Schøyen 1870) has not been verified.

A. literana (Linnaeus, 1758)

A male of this beautiful oak-wood insect was collected by J. & N. Knaben on April 20th 1925 at AAy: Laget (Norsk Ent. Tidsskr. 2 (1927), p. 152). It has not been found since in our country, In Sweden, the species has only been observed south of 59°.

A. emargana (Fabricius, 1775)

A. emargana is distributed over the greater part of Norway, but not found on the west coast. The typical form has only once been taken in Norway, at Ø: Sarpsborg on August 15th 1921 by Barca. The common forms met with are *caudana* Fab. and *effractana* Froel. In Norway, the species has only been captured in late summer and in autumn, from July 20th to October 5th. The larva feeds on different trees like *Salix, Populus* and *Betula*. The species is holarctic.

Distribution:

Ø: Halden July 20th 1910, Sarpsborg 2 specimens August 15th 1921, Moss 2 specimens August 10th 1910, Jeløy August 1st 1910 (Barca). AK: Oslo, Tøyen 4 specimens July 31st to August 21st 1846 (Siebke), V. Aker, Frogner 2 specimens August 26th 1845 (Esmark), Bygdøy August 17th 1845 (Esmark), August 28th 1926 (Munster), Holmenkollen August 28th 1919 (Rygge), Nordstrandshøgda September 9th 1923 and August 21st 1924, Sandvika August 10th 1934 (Barca), Spro 12 specimens August 29th to September 7th 1923, September 14th 1924, July 24th, September 5th and 13th 1925, August 28th 1926, September 2nd 1928 (Haanshus). HEs: Hovelsrud on Helgøy 6 specimens August 10th to 27th 1851 (Esmark), Odalen 5 specimens August 1878 (Schøyen). Os: S. Land 2 specimens August 12th 1881 (Schøyen). On: Lom 2 ♂♂ September 6th and 17th 1957, ♀ September 17th 1958, 8 ♂♂ August 24th to October 6th 1961, Høydalen in Lom ♀ August 18th 1958 (Lühr). Bø: Modum September 1880 (Schøyen), Åros in Røyken September 12th 1964

(Opheim). VE: Tjøme 3 specimens August 24th to 28th 1963 (Opheim). Ri: Suldal 2 specimens autumn 1901 (Strand). HOi: Voss (Grønlien), Ullensvang August 30th 1962 (Edland). SFi: Lærdal autumn 1900 (Strand). Nsy: Bodø August 14th 1861 (Wocke). Nnø: Fagernes in Ofoten August 21st, 23rd 1879, August 28th 1880 (Sparre Schneider). TRi: Moen August 13th 1883, Guldhav same date 1898, Balsfjord ex larva August 12th 1884 (Sparre Schneider).

Summary

In Haanshus' list from 1933, 18 species of *Acleris* Hb. are compiled. The number has now been increased to 23, less due to collecting in later years, but mainly due to the revision of the Norwegian material, the result of which is presented in this paper. Compared with Sweden's 27 species, our 23 give an indication that we are not lagging so far behind in respect of this genus.

Four of the 23 are new to the country, viz, *A. ferrumixtana* (Ben.), *A. ferrugana* (Schiff.) (= *lithargyrana* H. S.), the *Viburnum*-feeder *A. schalleriana* (L.) and *A. umbrana* (Hb.). It has been established that *A. fimbriana* (Thnbg.) belongs to the Norwegian fauna.

All of the Norwegian *Acleris* species are found in the lowlands, five only are also met with in the alpine zone, viz, *A. aspersana* (Hb.), *A. ferrumixtana* (Ben.), *A. logiana* (Cl.), *A. fimbriana* (Thnbg.) and *A. maccana* (Tr.).

It is surprising that as many as 9 of the Norwegian species also occur in North America.

Districts of Norway (According to A. Strand in Norsk Ent. Tidsskr. VI: 208—224, 1943). Abbreviations used in the paper:

Ø	= Østfold	R	= Rogaland
AK	= Akershus (incl. Oslo)	HO	= Hordaland (incl. Bergen)
HE	= Hedmark	SF	= Sogn og Fjordane
O	= Opland	MR	= Møre og Romsdal
B	= Buskerud	ST	= Sør-Trøndelag
VE	= Vestfold	NT	= Nord-Trøndelag
TE	= Telemark	N	= Nordland
AA	= Aust-Agder	TR	= Troms
VA	= Vest-Agder	F	= Finnmark

i = inner, y = outer, n = northern, s = southern, v = western and ø = eastern.

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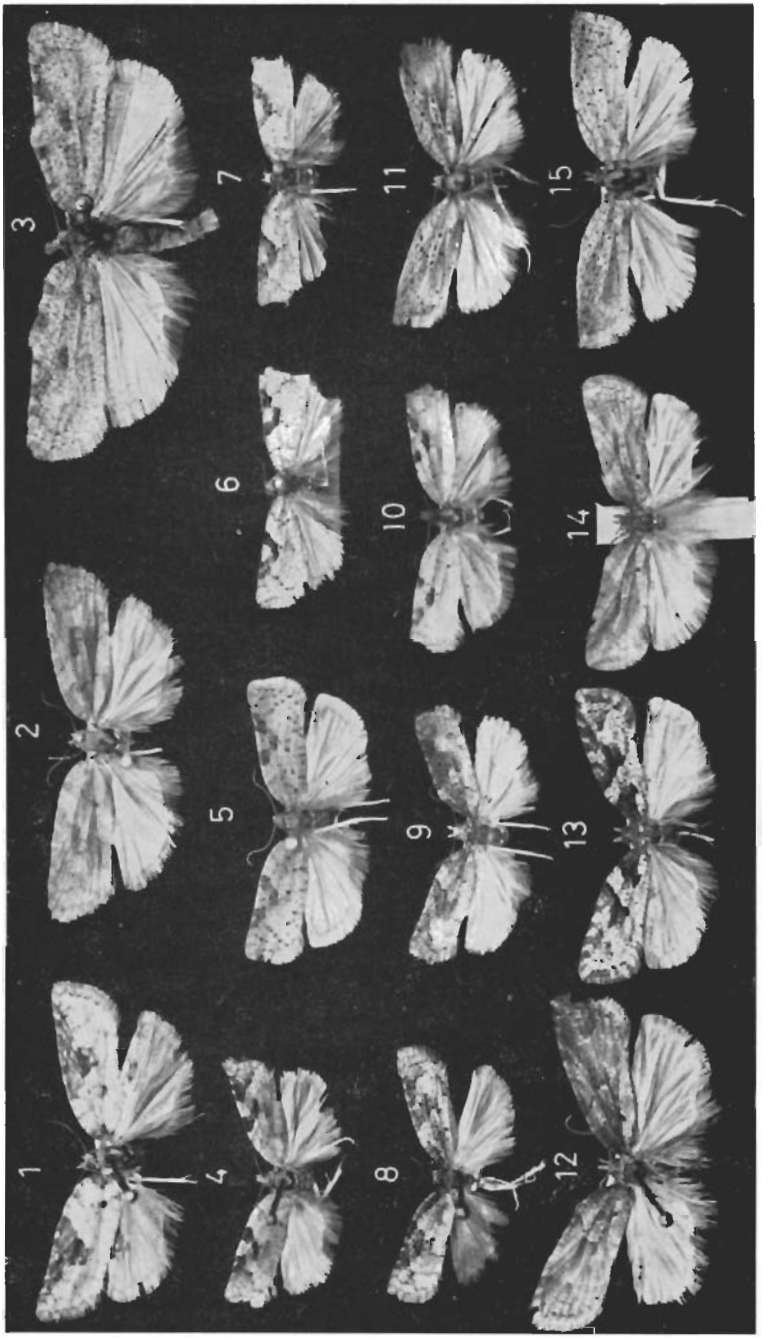
Addenda

A. sparsana (Schiff.). AK: Asker ♀ October 5th 1964 (Lühr).
A. rhombana (Schiff.). AK: Snarøya ♂ September 27th 1964 (Opheim).
A. abietana (Hb.). AK: Asker ♂ October 5th 1964 (Lühr).

Plate I

Figs. 1—2. *Acleris sparsana* (Schiff.), ♀♀. 1. Gera, Germany, 2. Bergen
» 3. *A. roscidana* (Hb.), ♂. Nes Verk.
» 4—7. *A. tripunctana* (Hb.), 4. ♀ Odalen, 5. ♀ Alta, 6. ♂ Meach Lake, Quebec, 7. ♀ Tøyen.
» 8—9. *A. ferrumixtana* (Benander), ♀♀ Odalen.
» 10. *A. ferrugana* (Schiff.), ♀ Germany.
» 11. *A. apiciana* (Hb.), ♀ Lysaker.
» 12—13. *A. maccana* (Tr.), 12. ♂ Odalen, 13. ♀ Suldal.
» 14. *A. schalleriana* (L.), ♂ Germany.
» 15. *A. lipsiana* (Schiff.), ♀ Stettin, Germany.
×2,1.



N. Knaben fot

Die Wegwespen-Fauna Norwegens (Hym., Pompiloidea)

Von Heinrich Wolf, Plettenberg

Frau Cand. real. A. Løken (Zoologisk Museum Bergen) und die Herren Dr. B. Christiansen (Museum Tromsø) und Dr. L. R. Natvig (Zoologisk Museum Oslo) legten mir einige norwegische Pompiliden zur Bestimmung oder Nachprüfung vor. Es handelt sich um 27 Arten und Unterarten in 266 Exemplaren, davon 167 ♀♀ und 99 ♂♂, also im Verhältnis 1,7:1. Über norwegische Pompiliden sind von Sparre-Schneider 1906 und Soot-Ryen 1924 im Zusammenhang mit anderen aculeaten Hymenopteren kurze faunistische Notizen erschienen, die aber in der Bestimmung unsicher und in der Nomenklatur überholt sind. Das vorliegende Material ist nicht umfangreich genug, um uns zu endgültigen Feststellungen über die tiergeografischen Areale der norwegischen Pompiliden kommen zu lassen. Trotzdem ist die Zuordnung der einzelnen Arten und Unterarten zu den verschiedenen Faunenelementen von tiergeografischem Interesse. Die Artenliste ist ohne Zweifel unvollständig. Weitere für Norwegen neue Arten werden in den kontinentalen Inlands- und den subarktischen Fjellregionen leben, sodass diese Regionen der besonderen Aufmerksamkeit anempfohlen seien. Diese 27 Arten und Unterarten verteilen sich auf folgende Faunenelemente, die durchweg eurosibirische Verbreitung haben:

1. boreal-kontinentale, meist xerothermophile Arten; mit vollständiger Disjunktion, wenn nur in den alpinen Kettengebirgen und in Fennoskandien vorkommend, oder mit unvollständiger Disjunktion, wenn im mitteleuropäischen Zwischengebiet Reliktstandorte vorkommen. Hierher 7 Arten, davon 2 weniger ausgeprägt, = 26 %.
2. taigaïsch-subarktisch-kontinentale Arten, die im eurosibirischen Nadelwaldgürtel leben, der in Mitteleuropa auskeilt. Hierher 2 Unterarten = 7 %.

3. subtaigaïsche, teilweise submediterrane und thermophile Arten, die am Südrand des eurosibirischen Nadelwaldgürtels leben. Hierher 3 Arten = 11 %.
4. taigaïsch-subtaigaïsche Arten mit ausgedehnt meridionalem Areal. Hierher 15 Arten und Unterarten = 56 %.
   a) überwiegend mitteleuropäisch-subatlantische Arten, die im europäischen Laubwaldgebiet leben; hierher 11 Arten und Unterarten.
   b) überwiegend submediterran-kontinentale Arten, die weit in den mediterranen Raum gehen; hierher 4 Arten und Unterarten.

Nur wenige Arten und Unterarten lassen sich zwanglos in diese 4 Faunenelemente einordnen; meist sind 2, selten 3 Elemente anteilig. Die Pompiliden erreichen in den Finnmarken Norwegens ihre nördlichste Verbreitung in Europa, vielleicht auf der Nordhalbkugel. Petersen 1956: 128 erwähnt von Island ausser *Bethylus fuscicornis* Jurine und *Bombus jonellus* Kirby, Lundbeck 1896: 249 von Grønland ausser *Bombus hyperboreus* Schönherr und *balteatus* Dahlbom keine aculeaten Hymenopteren.

Folgende Pompiliden gehören vielleicht zur Fauna Norwegens:

Cryptocheilus versicolor (Scopoli 1763)

1 ♀ ohne Patriazettel (B); das Vorkommen dieser submediterranen Art in Norwegen ist sehr unwahrscheinlich.

Pompilus (*Ammosphex*) *consobrinus consobrinus* Dahlblom 1843

Wahis 1957: 3 gibt eine Karte der Verbreitung dieser Art und verzeichnet einen Fundort in Nsy.

Pompilus (*Anoplochares*) *fuscomarginatus* Thomson 1870

Schøyen 1880: 10 erwähnt diese Art für Norwegen.

Obengenannten Dame und Herren verdanke ich die Kenntnis von Strand 1943, der die Einteilung Norwegens in biogeografische Regionen (Områder) vornimmt, sowie liebenswürdige Hilfe bei topografischen Schwierigkeiten. Die Abkürzungen (B), (O) und (T) bezeichnen die Museen von Bergen, Oslo und Tromsø.

Familie **CEROPALIDAE** Fox 1901

Subfamilie **CEROPALINAE** Ashmead 1900

Genus ***Ceropales*** Latreille 1796

1. *C. maculatus maculatus* (Fabricius 1775)

Taigaïsch-subtaigaïsch-eurosibirisch; im Osten bis Pazifische Küstengebirge und Kamtschatka. Im Norden bis Nordnorwe-

gen, Nordschweden und Mittelfinnland. Ubiquist. Wirte: *Pompilus*-Arten. In Mitteleuropa in 2 Generationen im Früh- und Spätsommer.
10 ♀♀ 11 ♂♂

AAy 13: Hisøy, 23/7 1935, Soot-Ryen (T); VAy 10: Mandal, 7/7 1935, Soot-Ryen (T); HOy 29: Herdla, 7. 1936, Brinkmann (B); 19/6 1936, Knaben (B); SFi 29: Sogndal (Årdalstangen), 3/7 1938, Knaben (B); SFi 33: Årdal (Utladalen), 10/7 1939, Knaben (B); Nsi 35: Saltdal (Storjord), 7. 1899 (T). Nach Sparre-Schneider 1906: 104 ♀♀♂♂ von MRi 56: Norddal und On 30: Nord-Fron. Die von Sparre-Schneider 1906: 104 und von Soot-Ryen 1924: 12 erwähnten ♀♀♂♂ lagen mir vor

Familie **POMPILIDAE** Leach 1819

Subfamilie **PEPSINAE** Ashmead 1900

Tribus **PEPSINI** Townes 1951

Genus ***Dipogon*** Fox 1897

Subgenus *Deuteragenia* Šustera 1912

2. *D. variegatum variegatum* (Linnaeus 1758)

Subtaigaïsch-submediterran-mitteleuropäisch; im Osten bis in die zentralasiatischen Gebirge, im Süden bis Atlas, Sizilien, Elburs. Im Norden bis Südengland, Südnorwegen, Mittelschweden, Öland, Gotland, Mittelfinnland. Xerophile Art auf Felsen und Mauern, in deren Ritzen und auch in Schneckenhäusern nistend. In Nordeuropa in einer Generation im Hochsommer, in Mitteleuropa meist in 2 Generationen im Spätfrühling und Hochsommer. Die ♂♂ sind, wie bei allen *Dipogon*-Arten, kurzlebig und deshalb sehr selten.
7 ♀♀

VAy 24: Kvinesdal (Gjemlestad), 9/7 1945, Knaben (B); HOy 10: Fitjar, 7. 1911, Lie-Pettersen (B); HOi 55: Granvin, 7. 1909, Lie-Pettersen (B); SFy 19: Eid, 27/7 1942, Knaben (B).

Genus ***Priocnemis*** Schiødte 1837

Subgenus *Umbripennis* Junco 1947

3. *P. perturbator perturbator* (Harris 1776)

Taigaïsch; nordwestliche Paläarktis, im Süden und Osten in anderen Unterarten. Im Norden bis Mittelnorwegen, Mittelschweden und Nordfinnland. Kühlstenothermische Art lichter Wälder und Waldränder. Eine Generation im Frühjahr.
16 ♀♀ 4 ♂♂

AK 14: Oslo (Aspeskog), 14/5 1932, Meidell (B); Ry 22: Høle (Fløysvik), 3/4. (B); Ri 49: Forsand (Lerang), 27/6 1934, Meidell (B); Ri 49:

Forsand (Hana-Luts.), 29/6 1934, Meidell (B); Ri 49: Forsand (Meling), 23/5 1936, Meidell (B); Ri 51: Hjelmeland, 20/5 1934, Meidell (B); Ri 55: Sauda (Svendalen), 23/5 1935, Meidell (B); Ri 55: Sauda (Saudasjøen), 18., 22/5 1935, Meidell (B); HOi 48: Ullensvang (Børve), 15/4 1945, Tambs-Lyche (B); HOi 55: Granvin, 7. 1913, Lie-Pettersen (B); HOi 55: Djønno, 2/6 1941, Knaben (B); SFi 32: Hafslo (Solvorn), 7/7 1938, Knaben (B).

Subgenus *Priocnemis* Schiødte 1837

4. *P. exaltatus exaltatus* (Fabricius 1775)

Taigaïsch-subtaigaïsch; nordwestliche Paläarktis, im mediterranen Gebiet fehlend und nur in humiden Waldländern. Im Norden bis Mittelnorwegen, lappländisches Schweden und Südfinnland. Eine Generation im Hochsommer.

22 ♀♀ 4 ♂♂

AK 14: Oslo (Bygdøy), 8. 1926, 7. 1928, Meidell (B); HOy 10: Fitjar, 7. 1912, Lie-Pettersen (B).

5. *P. exaltatus valkeilai* Wolf 1959

Taigaïsch-kontinental; nur aus Südnorwegen und ganz Finnland bekannt, wohl auch im europäischen Norden der Sowjetunion. Eine Generation im Hochsommer.

1 ♀

Ø 16: Øymark (Flagghytta), 7/8 1935, Soot-Ryen (T).

6. *P. femoralis* (Dahlbom 1829)

Subtaigaïsch-eurosibirisch, im Osten bis zentralasiatische Kettengebirge, im Süden bis Iberische Gebirge, Turkestan. Im Norden bis Südnorwegen, Südschweden, Öland, Mittelfinnland. Auch in Mitteleuropa wohl nur in einer Generation im Früh- bis Spätsommer.

1 ♀ 1 ♂

AK 14: Oslo (Bygdøy), 7. 1928, Meidell (B); AAy 13: Hisøy, 24/7 1935, Soot-Ryen (T).

7. *P. parvulus parvulus* Dahlblom 1845

Subtaigaïsch-taigaïsch-kontinental; im Osten bis pazifische Küstengebirge, im Süden bis Turkestan, Kleinasien, Iberische Gebirge, im Westen in England und Westfrankreich fehlend. Im Norden bis Südnorwegen, Nordschweden, Mittelfinnland. In Mitteleuropa meist in 2 Generationen im Früh- und Spätsommer, in Nordeuropa in einer Generation im Hochsommer.

2 ♂♂

VE 15: Stokke, 8/2 1932 (Zucht), Meidell (B); Ry 17: Sola, 24/1 1932 (Zucht), Meidell (B).

8. *P. schiödtei schiödtei* Haupt 1926
Subtaigaïsch-mitteleuropäisch; im Osten in anderen Unterarten, im Süden subalpin bis alpin. Im Norden bis Mittelengland, Südnorwegen, südliches Mittelschweden, Mittelfinnland. Auch in Mitteleuropa in nur einer Generation im Früh- bis Spätsommer.
1 ♀
Ø 16: Øymark (Flagghytta), 7/8 1935, Soot-Ryen (T).

Tribus **CLAVELIINI** Haupt 1936

Genus ***Calicurgus*** Lepeletier 1845

9. *C. hyalinatus* (Fabricius 1793)
Subtaigaïsch-holarktisch, kaum in den taigaïschen Nadelwaldgürtel gehend; in Südeuropa und Nordafrika subalpin. Im Norden bis Mittelnorwegen, Mittelschweden, Öland, Gotland und Mittelfinnland. An Waldrändern gerne auf Eichengebüsch. Eine Generation im Hochsommer, im südlichen Mitteleuropa 2 Generationen im Spätfrühling und Hochsommer.
2 ♀♀
HOi 55: Granvin, 7. 1913, Lie-Pettersen (B).

Subfamilie **POMPILINAE** Ashmead 1900

Tribus **POMPILINI** Haupt 1949

Genus ***Pompilus*** Fabricius 1798

Subgenus *Ammosphex* Wilcke 1942

10. *P. opinatus* Tournier 1890
Westpaläarktisch-borealpin-kontinental; in West- und Südeuropa fehlend; in den Pyrenäen und Alpen; in Mitteleuropa dealpin und nur in extrem xerothermischen Gebieten. Im Norden bis Südnorwegen, Mittelschweden, küstennahe Gebiete Südfinnlands. Petrophil, xerothermophil. *opinatus* leitet über zur alpin-mediterranen *alpivagus*-Gruppe. Eine Generation im Spätfrühling und Frühsommer.
1 ♂
VAy 10: Mandal, 10/7 1935, Soot-Ryen (T).

11. *P. anceps anceps* Wesmael 1851
Taigaïsch-subtaigaïsch-eurosibirisch; ganz Europa, im Süden in anderen Unterarten. Im Norden bis Nordnorwegen, Nordschweden, Nordfinnland. Eurytoper Ubiquist und bedingter Kulturfolger. 2 Generationen im Spätfrühling und Hochsommer, von

denen die erste in ungünstigen Jahren ausfällt. — *anceps* hiess früher *unguicularis*.

18♀♀ 10 ♂♂

Ø 12: Halden, Siebke (O); AK 14: Oslo (Bygdøy), 6. 1933, Munster (O); Oslo, Siebke (O); HEn 21: Amot, Siebke (O); Bø 2: Røyken (Slemmestad), 16/8 1935, Soot-Ryen (T); AAy 10: Arendal, 20/7 1952, Bakke (O); Ri 49: Forsand (Lerang), 29/6, 4/8 1934, Meidell (B); Ri 49: Forsand (Meling), 20/7 1930, Meidell (B); Ri 54: Suldal (Håvarstøl), 12/8 1936, Meidell (B); Ri 55: Sauda (Saudasjøen), 24/5 1935, Meidell (B); HOy 10: Fitjar, 7. 1912, Lie-Pettersen (B); HOy: 22: Bergen (Natland), 8/8 1936, Knaben (B); HOy 29: Herdla, 19/6 1936, Brinkmann (B); HOi 55: Granvin, 7. 1913, Lie-Pettersen (B); SFi 30: Leikanger (Hermansv.), 19/9 1941, Tambs-Lyche (B); Nsy 9: Alstahaug (Sandnes-Siren), 14/7 1951 (T); TRy 15: Tromsø, 24/6 1895, Sparre-Schneider (T); TRi 26: Malangen, 8. 1909, Sparre-Schneider (T).

12. *P. trivialis trivialis* Dahlbom 1843

Taigaïsch-subtaigaïsch-eurosibirisch; in ganz Europa, im Süden in anderen Unterarten. Im Norden bis Nordnorwegen, Nordschweden und Nordfinnland. Eurytoper und bodenvager Ubiquist. 2 Generationen im Spätfrühling und Hochsommer, möglicherweise eine dritte im Spätsommer, in Nordeuropa oft nur eine Generation.

3 ♀♀ 2 ♂♂

Ø 12: Halden, Siebke (O); AK 14: Oslo, Esmark (O); ?HEs 11: Elverum, Esmark; VAy 10: Mandal, 17/7 1935, Soot-Ryen (T); Hoi 55: Granvin, 7. 1909, Lie-Pettersen (B); nach Sparre-Schneider 1906: 101 (»*gibbus*«) ♀♀ von TRy 15: Tromsø.

13. *P. abnormis* Dahlbom 1842

Subtaigaïsch-eurosibirisch-borealpin-mitteleuropäisch-kontinental; im Osten bis Mandschurei, in Südeuropa fehlend. Im Norden bis Südnorwegen, Mittelschweden, Öland und Mittelfinnland. In Löss- und Sandlössgebieten. Im Norden eine, in Mitteleuropa zwei Generationen im Spätfrühling und Hochsommer, vielleicht eine dritte im Frühherbst.

1 ♂

VE 26: Larvik, Siebke (O).

14. *P. pseudabnormis* Wolf 1964

Taigaïsch-subtaigaïsch-borealpin-kontinental; ganz Deutschland, Ost- und Mittelfrankreich, Polen, Tschechoslowakei, Schweiz, Österreich, Apennin. Im Norden bis Südnorwegen, Nordschweden, Nordfinnland. Im Norden eine Generation im Frühsommer, sonst 2 Generationen im Spätfrühling und Hochsommer. — Die ♀♀ *pseudabnormis* sind seither stets als ♀ *abnormis*, die ♂♂ stets als ♂ *wesmaeli* bestimmt worden.

1 ♀

AAy 10: Arendal, 25/7 1935, Bakke (O).

Subgenus *Arachnospila* Kincaid 1900

15. *P. rufus* (Haupt 1927)

Subtaigaïsch-mitteleuropäisch; in Südeuropa subalpin oder alpin, im mediterranen Süden fehlend, im Osten durch andere Arten vertreten. Im Norden bis Südnorwegen, Südschweden, Gotland, Südfinnland. Weiter nördlich angegebene Fundorte beziehen sich auf *f. fumipennis* oder *sogdianus*. Eine Generation im Früh- und Hochsommer.

1 ♂

AK 14: Oslo, Esmark (O).

16. *P. fumipennis fumipennis* Zetterstedt 1838

Taigaïsch-holarktisch-borealpin-mitteleuropäisch: im Süden alpin und in anderen Unterarten, im Osten bis persische und zentralasiatische Gebirge und in anderen Unterarten. Bis in den äussersten Norden Norwegens, Schwedens und Finnlands. Von allen Pompiliden am weitesten nach Norden gehend. Bodenvag. Vielfach, wie *rufus*, mit *sogdianus* und *sogdianoides* verwechselt. Im Norden eine Generation im Hochsommer, sonst 2 Generationen im Früh- und Spätsommer.

11 ♀♀ 8 ♂♂

HEs 11: Elverum, Siebke (O); TEi 32: Tinn (Mjøsvand), Munster (O); Ri 54: Suldal (Mostøl), 15/7 1936, Meidell (B); HOi 55: Granvin, 7. 1913, Lie-Pettersen (B); Nsi 35: Saltdal, Hagemann, Schøyen (O); Nsi 35: Saltdal (Storjord), 7. 1899, Sparre-Schneider (T); TRi 28: Øverbygd (Frihetsli), 26/7 1922, Soot-Ryen (T); Fi 11: Karasjok, 1909, Munster (T); Fn 12: Kistrand (Porsanger), 7. 1909, Sparre-Schneider (T); Fn 15: Tana (Jalve), 18/7 1909, Sparre-Schneider (T). Die von Sparre-Schneider 1906: 102 und von Soot-Ryen 1924: 7 erwähnten ♀♀♂♂ (»*borealis*«) lagen mir vor. Nach Sparre-Schneider 1906: 101 ♀♀ von Fi 9: Alta.

17. *P. sogdianus* (Haupt 1927)

Borealpin-kontinental; in den alpinen Gebirgen Mittel- und Südeuropas und hier und da in den höchsten (klimatisch kontinentalen) Mittelgebirgen, als dealpin in den mitteleuropäischen Steppengebieten, im Osten in anderen Unterarten. Im Norden bis Südnorwegen, Nordschweden, Öland, Gotland. Xerothermophile Art. Eine Generation im Spätfrühling und Frühsommer.

2 ♀♀

Bø 15: Kongsberg, Munster (O); Ry 15: Høyland (Hana), 1/7 1931, Meidell (B).

Subgenus *Anoplochares* Banks 1939

18. *P. spissus* Schiødte 1837

Subtaigaïsch-taigaïsch-mitteleuropäisch; im Süden subalpin, im mediterranen Süden ausklingend. Im Norden bis Nordnor-

wegen, Nordschweden, Nordfinnland. 2 Generationen im Voll- bis Spätfrühling und im Hochsommer.
6 ♀♀ 8 ♂♂

AK 14: Oslo (Bygdøy), 8. 1926, Meidell (B); Bv 21: Flå (Gulsvik), 10/6 1963, Løken (B); AAy 10: Arendal, 25/7 1953, Bakke (O); VAy 10: Mandal, 7., 11., 14/7 1935, Soot-Ryen (T); Ri 49: Forsand (Lerang), 4., 16/7 1934, Meidel (B); HOy 10: Fitjar, 7. 1912, Lie-Pettersen (B); SFy 19: Eid, 28/7 1942, Knaben (B); SFi 25: Vik (Mollsnes), 6/7 1935, Meidell (B); Nnø 41: Leiranger (T).

Genus ***Evagetes*** Lepeletier 1845

19. *E. proximus* (Dahlbom 1843)

Taigaïsch-subtaigaïsch-borealpin-kontinental; im Süden alpin, om Osten bis pazifische Küstengebirge, als dealpin in Steppengebieten. Im Norden bis südliches Nordnorwegen, Nordschweden, Nordfinnland. Wirte: *Pompilus rufus, P. f. fumipennis,* wohl auch *Anoplius i. infuscatus* und *A. i. dispar* und *Episyron*-Arten. Im Norden eine Generation im Hochsommer, sonst 2 Generationen im Früh- und Spätsommer.
3 ♀♀ 1 ♂

HEs 11: Elverum, Siebke (O);. VE 26: Larvik, Siebke (O); Nsi 35: Saltdal (Storjord), 7. 1899, Sparre-Schneider (T). Das von Sparre-Schneider 1906: 102 erwähnte ♀♂ (»*crassicornis*«) lag mir vor.

20. *E. crassicornis crassicornis* (Shuckard 1835)

Subtaigaïsch-taigaïsch-holarktisch; im Süden alpin und in mediterranen Landschaften fehlend, im Osten bis pazifische Küstengebirge. Im Norden bis südliches Mittelnorwegen, Mittelschweden, Öland, Gotland, Mittelfinnland. Wirt: *Pompilus anceps.* Im Norden in einer Generation im Hochsommer, sonst in 2 Generationen im Spätfrühling und im Früh- bis Spätsommer.
1 ♀

HEn 21: Åmot, Siebke (O).

21. *E. crassicornis subarcticus* n. ssp.

? Taigaïsch-boreal-kontinental.

♀ Stirn und Scheitel, im Profil gesehen, mit etwa 45 Haaren, diese durchschnittlich so lang wie Schaft mitten dick. Schaft unterseits mit etwa 3—5 kurzen, abstehenden Haaren. Kammdornen länger; letzter Dorn des Metatarsus etwas kürzer als 2. Tarsus, letzter Dorn des 2. Tarsus so lang wie 3. Tarsus. 8 mm (5,5—7 mm). Holotypus «Mandal, 10—7 35, S-R«.

♂ Stirn und Scheitel, im Profil gesehen, mit etwa 35 Haaren, diese durchschnittlich kaum kürzer als Schaft mitten dick. Schaft unterseits mit etwa 8 Haaren, diese durchschnittlich

kaum halbsolang wie Schaft mitten dick. Analsternit wie bei *cr. crassicornis*. 6,5 mm. Allotypus «Mandal, 7—7 35, S-R«. Behaarung länger und dichter als bei *Evagetes implicatus* (Haupt 1941). Typen und Paratypen im Tromsø Museum.
3 ♀♀ 1 ♂

VAy 10: Mandal, 7., 10/7 1935, Soot-Ryen (T); Nsi 35: Saltdal (Storjord), 7. 1899, Sparre-Schneider (T), Das von Sparre-Schneider 1906: 103 erwähnte ♀ (»n, sp.«) lag mir vor.

Genus ***Agenioideus*** Ashmead 1902

Subgenus *Agenioideus* Ashmead 1902

22. *A. cinctellus* (Spinola 1808)

Subtaigaïsch-eurosibirisch; im mediterranen Süden subalpin bis alpin und ausklingend, im Osten bis pazifische Küstengebirge. Im Norden bis Südnorwegen, lappländisches Schweden, Öland, Gotland, Mittelfinnland. Xerophiler, stenotoper Ubiquist und bedingter Kulturfolger an Mauern und Lehmwänden. Eine Generation im Früh- bis Hochsommer.
4 ♀♀ 1 ♂

AK 14: Oslo Siebke (O); HOi 55: Granvin, 7. 1913, Lie-Pettersen (B).

Genus ***Anoplius*** Dufour 1834

Subgenus *Anoplius* Dufour 1834

23. *A. nigerrimus* (Scopoli 1763)

Subtaigaïsch-taigaïsch-holarktisch; in Südeuropa subalpin und in mediterranen Landschaften zerstreut, im Osten bis pazifische Küstengebirge. Im Norden bis Schottland, Mittelnorwegen, Nordschweden, Mittelfinnland. Eurytope Art und bedingter Kulturfolger. 2 Generationen im Vollfrühling und Hoch- bis Spätsommer, im Süden in günstigen Jahren eine dritte im Frühherbst.
16 ♀♀ 21 ♂♂

AK 8: Drøbak (O); AK 12: Bærum (Høvik), 18/6 1935, Soot-Ryen (T); AK 13: Aker, 10., 25/6 1874, Sparre-Schneider (O); AK 14: Oslo, Esmark, Moe, Siebke, Sparre-Schneider (O); HEs 11: Grundset, Siebke (O); HEn 21: Amot (Asset), Siebke (O); On 30: Nord-Fron (Gudbrandsdal), Moe (O); AAy 13: Hisøy, 22/7 1935, Soot-Ryen (T); VAy 10: Mandal, 10., 11/7 1935, Soot-Ryen (T); HOy 10: Fitjar, 7. 1911, Lie-Pettersen (B); HOy 13: Os (Hagavik), 18/7 1945, Johnsen (B); HOy 18: Fana (Eggholmen), 6/7 1952, Løken (B); HOy 22: Bergen (Bellevue), 17/5 1935, Knaben (B); 13/6 1871, Sparre-Schneider (O); HOy 29: Herdla, 5., 17., 20/6 1936, 28/7 1937, Brinkmann (B); HOi 55: Granvin. 7. 1913, Lie-Pettersen (B); SFi 33: Årdal, 3/7 1938, Knaben (B); MRi 56: Norddal (Valldalen), Siebke (O); STy 20: Åfjord (Mørreaunet), 4/7 1959,

Løken (B). Die von Sparre-Schneider 1906: 103 und von Soot-Ryen 1924: 13 erwähnten ♀♀ von Try, Fv, Fi und Fn dürften wenigstens teilweise zu *tenuicornis* gehören.

24. *A. tenuicornis* (Tournier 1889)

Taigaïsch-borealpin-kontinental; in den hochalpinen Gebirgen Mittel- und Südeuropas und hier und da in den höchsten (klimatisch kontinentalen) Mittelgebirgen, als dealpin in den mittel- und osteuropäischen Steppengebieten, im Osten bis pazifische Küstengebirge und Kamtschatka. Im Norden in tundrischen Gebieten, bis Nordnorwegen, Nordschweden, Nordfinnland. Eine Generationen im Hochsommer, in Steppengebieten 2 Generationen im Früh- und Spätsommer.

2 ♀♀ 2 ♂♂

HOi 41: Skånevik (Hardanger), 9/6 1935 (B); Nsi 35: Saltdal, Schøyen (O); TRy: 14 Tromsøysund (Tromsdal), 19/6 1890, Sparre-Schneider (T); TRi 26: Malangen, 8. 1909, Sparre-Schneider (T). Die von Sparre-Schneider 1906: 104 und von Soot-Ryen 1924: 8 (»*frigidus*«, »*tromsoeensis*«) erwähnten ♀♂ lagen mir vor.

25. *A. concinnus* (Dahlbom 1845)

Subtaigaïsch-eurosibirisch-borealpin; im Süden bis westlicher Atlas, nördliche Iberische und nördliche Apennin-Halbinsel, ganze Balkan-Halbinsel, als dealpin in den mittel- und osteuropäischen Steppengebieten, im Osten bis pazifische Küstengebirge und Kamtschatka. Im Norden bis Südnorwegen, südliches Mittelschweden, Mittelfinnland. Im mitteleuropäischen Mittelgebirge nur in den Alluvionen grösserer Flüsse. Eine Generation im Spätfrühling bis Frühsommer.

2 ♀♀ 1 ♂

AK 14: Oslo, Siebke (O); HEs 15: Hamar, 15/7 1890, Siebke (O).

Subgenus *Pompilinus* Ashmead 1902

26. *A. fuscus fuscus* (Linnaeus 1761)

Subtaigaïsch-taigaïsch-subatlantisch; atlantische Paläarktis, im Osten und Süden in anderen Unterarten. Im Norden bis Mittelnorwegen, Mittelschweden, Mittelfinnland und hier im Süden und Osten in *f. paganus* übergehend. In Gebieten höherer Luftfeuchte. (Karte). Ubiquist und bedingter Kulturfolger in Dörfern und an Stadträndern. Bodenvag. Eine oder 2 Generationen im Spätfrühling bis Frühherbst; die überwinterten ♀♀ (der letzten Generation) erscheinen im Vorfrühling.

22 ♀♀ 15 ♂♂

Ø 1: Hvaler (Reff, Kirkøy), 30/4 1938 (B); Ø 9: Sarpsborg, Sparre-Schneider (O); AK 13: Aker (Ryenbjerg), Schøyen, 16/5 1951, Siebke (O); AK 14: Oslo, Esmark, Moe, 9. 1875, Siebke (O); HEs 15: Hamar,

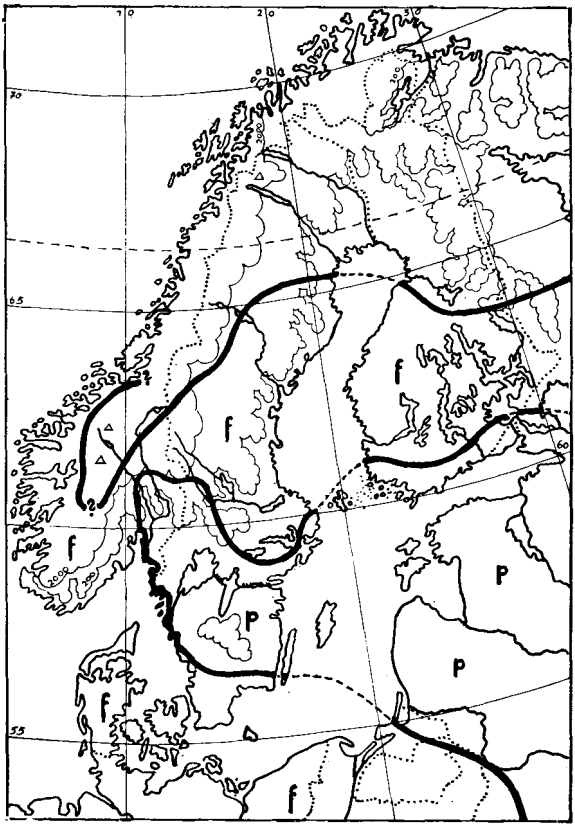


Fig. 1. Verbreitung von *Anoplius fuscus fuscus* (f) and *A. fuscus paganus* (p) in Nordeuropa.

19/5 1961, Rost (B); Bø 5: Hole (Ringerike), Seip (O); Bø 15: Kongsberg, Munster (O); VE 26: Larvik, Siebke (O); TEy 9: Langesund, 20/7 1838, Esmark (O); TEy 16: Kragerøy, Ellingsen (O); AAy 10: Arendal, 29/7 1953, Bakke (O); AAy 12: Tromøy (Bjelland), 8/8 1954, Bakke (O); AAy 13: Hisøy, 11/7 1935, Soot-Ryen (T); VAy 6: Øvrebø, 22/7 1886, Schøyen (O); VAy 10: Mandal, 10., 11/7 1935, Soot-Ryen (T); VAy 24: Kvinesdal (Gjemlestad), 7. 1936, Knaben (B); Ry 9: Ogna, 25/5 1931, Meidell (B); Ry 17: Sola (Rygdal), 27/5 1931, Meidell (B); SFi 29: Sogndal (Kaupanger), 6/4 1944, Johnsen (B).

27. *A. fuscus paganus* (Dahlbom 1834)

Subtaigaïsch-kontinental-submediterran; mittelwestliche, mittlere und östliche Paläarktis, im Osten bis Nordchina und Mandschurei, im Süden in anderen Unterarten. Im Norden bis Südostnorwegen, Süd- und südliches Mittelschweden, Öland,

Gotland, Süd- und Südostfinnland. In Gebieten geringer Luftfeuchte. (Karte). Sonst wie *f. fuscus*.
13 ♀♀ 4 ♂♂

Ø 1: Hvaler, Schøyen (O); Ø 12: Halden, Siebke (O); AK 7: Frogn, 7., 13/5 1887, 23/5 1888, Kiær, 27/7 1945, Esmark (O); AK 14: Oslo, Esmark, 23/5 1886, Schøyen, Siebke (O); HEs 2: Vinger, Siebke (O); HEs 5: Sør-Odal, Schøyen (O); Bø 5: Hole (Ringerike), Seip (O).

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Die Genitalorgane der nordischen Arten der Gattung *Atheta* Thoms. (Col., Staphylinidae)

Von Andreas Strand, Oslo,
und Anders Vik, Sandefjord

Die Gattung *Atheta* Thoms. ist die artenreichste der nordischen Käferfauna und ist gewöhnlich auch für die schwierigste gehalten worden. Der Ausdruck »nordisch« steht hier für Fennoskandien (einschliesslich des russischen Teils) und Dänemark.

Die gebräuchlichen Bestimmungswerke — wie z. B. Ganglbauers, das für seine Zeit hervorragend war — sind jetzt mehr oder weniger veraltet und unzulänglich geworden. Durch das Studium von Merkmalen, die früher ganz oder teilweise übersehen wurden, wie z. B. die Kopf- und Halsschildbehaarung, die Mikroskulptur und besonders die Form und Ausrüstung der Genitalorgane, ist unsere Kenntnis erheblich erweitert und sind die Hilfsmittel zur Bestimmung der Arten wesentlich verbessert worden.

Die Ehre hierfür gebührt vor allem Professor Lars Brundin. In mehreren hervorragenden und grundlegenden Arbeiten hat er eine Reihe von Untergattungen behandelt, und besonders durch Untersuchung der wichtigen inneren Struktur des Penis hat er wohl das zuverlässigste Mittel zur Trennung der Arten gefunden. Leider besteht keine Aussicht, dass er die angefangene Revision der paläarktischen Arten vollenden wird.

Eine ausgezeichnete, mit vielen Abbildungen von Genitalien ausgestattete Arbeit über die Arten von Dänemark und Nachbargebieten hat neuerdings Victor Hansen (1954) publiziert.

Da die nordische Fauna viele Arten enthält, die in diesen Arbeiten nicht behandelt wurden, sind wir der Meinung, dass eine Übersicht über die Form der Genitalorgane von sämtlichen nordischen Arten sehr erwünscht ist, um so mehr, als es sich erwiesen hat, dass die Form sowohl des Penis als auch der Samenkapsel in der Gattung *Atheta* von grosser taxonomischer Bedeutung ist.

Die Arbeit haben wir unter uns so verteilt, dass Strand das Material bereitgestellt und Vik es gezeichnet hat.

Sämtliche Zeichnungen sind nach uns vorliegenden Präparaten angefertigt worden. Nr. 2—24 und die Penis in Nr. 58—63 sind in etwa 50- und die übrigen in etwa 70-facher Vergrösserung abgebildet.

So viel wir wissen, ist das ♀ von 81 *wireni*, 96 *platonoffi*, 141 *acutangula* und 188 *pilosicollis* sowie das ♂ von 79 *flavicollis* und 84 *nitella* bis jetzt nicht gefunden worden.

Es ist uns auch nicht gelungen, des ♂ von 45 *trybomi* habhaft zu werden. Wie Brundin erwähnt (1943b, S. 6), ist es zweifelhaft, ob diese Art überhaupt eine *Atheta* ist.

Von dem Organ des ♂ sind die Parameren nicht gezeichnet, weil sie fast immer ohne taxonomische Bedeutung sind.

Bei den Penes ist besonders auf den stark chitinisierten Apikalteil und vor allem den Apex Gewicht gelegt worden. In Ventral- und Dorsalansicht ist der Apikalteil in horisontaler Lage gezeichnet worden.

So weit unsere Erfahrung reicht, ist die Form des Penis erstaunlich konstant. Der Präputialsack, der in normalem Zustand im Penisrohr eingeschlossen ist, ist sehr oft mehr oder weniger ausgestülpt, und dadurch kann der Eindruck entstehen, dass eine Variation vorliegt, was folglich nur scheinbar ist. Der Penis von *acutangula* ist jedoch sowohl bezüglich Grösse als auch Form merkwürdig variabel.

Die Samenkapsel ist für die Arten der Untergattung *Philhygra* (Nr. 1—24) nicht gezeichnet, weil sie bei diesen Arten erheblich kleiner und viel schwächer chitinisert ist, als bei den übrigen *Atheta*-Arten, und keine taxonomische Bedeutung hat (Brundin, 1943a, S. 171).

Bei den übrigen Arten ist die Samenkapsel stark chitinisiert, in weitem Umfang konstant und von grosser taxonomischer Bedeutung. Es kommen indessen Variationen vor, siehe z. B. 118 *euryptera*, 157 *picipennis*, 166 *islandica* und *198 fungi*. Der röhrenförmige Teil ist oft einer Deformierung dadurch ausgesetzt, dass er gedreht, gestreckt oder zusammengedrückt wird. Wenn er, wie z. B. in der *castanoptera*-Gruppe, ungewöhnlich lang und knäuelförmig ist, sehen wohl nie zwei Kapseln einer Art ganz gleich aus.

Während in Norwegen ♀♀ von 99 *glabricula* und 100 *glabriculoides* vorkommen, mit Samenkapsel, wie die Abbildungen zeigen, ist das ♂ nur der einen dieser Arten bekannt, und zwar höchstwahrscheinlich das von *glabriculoides*.

Aus Dänemark sind ♀♀ von *glabricula*, aber nicht von *glabriculoides* bekannt, während die zwei ♂♂, die uns bekannt sind, mit den norwegischen ♂♂, d. h. den vermutlichen *glabriculoides*, übereinstimmen.

Aus den Alpen liegen ♀♀ von *glabricula*, aber nicht von *glabriculoides* vor. Die zwei untersuchten ♂♂, wovon das eine von Benick als *glabricula* bestimmt ist, sind *dura* Brundin.

Obwohl die Frage, was *glabricula* ♂ eigentlich ist, nicht als endgültig gelöst angesehen werden kann, ist es sehr wahrscheinlich, dass es sich um *dura* handelt, eine Auffassung, der sich Brundin brieflich angeschlossen hat. In Übereinstimmung hiermit ist der Penis von *dura* als *glabricula* gezeichnet.

134 *paracrassicornis* und 167 *hercynica* sind im weiblichen Geschlecht von 133 *crassicornis* bzw. 166 *islandica* nicht zu unterscheiden. Die Samenkapseln dieser Arten sind von Tieren abgebildet, die aus Gebieten stammen, wo sämtliche gefundenen ♂♂ zu *paracrassicornis* bezw. *hercynica* gehören.

Wie Brundin (1953b, S. 384, 385) erwähnt, sind die ♀♀ von 157 *picipennis*, 158 *picipennoides* und 159 *parapicipennis* nicht immer sicher zu unterscheiden. Normal sind die Borsten der Tibien bei *parapicipennis* und *picipennoides* stärker als bei *picipennis*, und der Hinterrand des 6. freien Tergits ist bei *parapicipennis* ♀ etwas eckig, bei *picipennoides* ♀ dagegen gerundet. Die Samenkapseln, die recht ähnlich und variabel sind, ermöglichen wohl nicht immer eine sichere Trennung der Arten.

Fungi scheint eine sehr heterogene Art zu sein, und es ist wohl eine Frage, ob es sich nicht bei den für diese Art gehaltenen Tieren um mehr als eine Art handelt.

In der folgenden, alphabetischen Liste der Arten geben die Zahlen die Nummer der Figuren an:

141 *acutangula* H. K. Hns.
51 *aequata* Er.
138 *allocera* Epp.
silesiaca Gerh.
63 *alpestris* Heer
nitidula Kr.
95 *alpina* G. Bck.
160 *altaica* Bernh.
199 *amblystegii* Brd.
86 *amicula* Steph.
77 *angusticollis* Thoms.
50 *angustula* Gyll.
150 *aquatica* Thoms.
152 *aquatilis* Thoms.
53 *arcana* Er.
2 *arctica* Thoms.
punctulata J. Sahlb. p. p.
clavipes Sharp
194 *aterrima* Gr.
97 *atomaria* Kr.
173 *atramentaria* Gyll.
124 *autumnalis* Er.
125 *basicornis* M. & Rey
80 *benickiella* Brd.
validiuscula auct., nec Kr.
132 *boleticola* J. Sahlb.
suecica Bernh.
127 *boletophila* Thoms.
94 *boreella* Brd.
mortuorum Munst., H. K. Hns., nec Thoms., nec Ganglb.
7 *botildae* Brd.
135 *britanniae* Bernh. & Scheerp.
fulvipennis M. & Rey
reperta Sharp
22 *britteni* Joy

54 *brunnea* F.
147 *brunneipennis* Thoms.
valida Kr.
110 *cadaverina* Bris.
103 *canescens* Sharp
148 *castanoptera* Mnh.
177 *cauta* Er.
parvula auct., nec Mnh.
104 *celata* E. (anstatt *arenicola*)
arenicola Thoms.
162 *cinnamoptera* Thoms.
47 *clancula* Er.
201 *clientula* Er.
193 *consanguinea* Epp.
191 *convergens* A. Str.
129 *coriaria* Kr.
89 *corvina* Thoms.
34 *coulsoni* Last
longicollis Will.
133 *crassicornis* F.
inoptata Sharp.
101 *cribrata* Kr.
179 *cribripennis* J. Sahlb.
25 *currax* Kr.
rivulorum Thoms.
105 *dadopora* Thoms. (anstatt *celata*)
19 *debilis* Er., Joy, Brd.
20 *debiloides* A. Str.
24 *deformis* Kr.
complana auct., nec Mnh.
39 *delicatula* Sharp
5 *dentifera* Brd.
75 *depressicollis* Fauv.
139 *diversa* Sharp
dluholuckae Roub.
119 *divisa* Märk.
56 *dubiosa* G. Bck.
180 *dwinensis* Popp.
fractipes Munst.
144 *ebenina* M. & Rey
27 *eichhoffi* Scriba
11 *elongatula* Gr.
118 *euryptera* Steph.
72 *excellens* Kr.
83 *excelsa* Bernh.
187 *exigua* Er.
18 *fallaciosa* Sharp
36 *fallax* Kr.
79 *flavicollis* Brd.[1]
76 *frigida* J. Sahlb.
198 *fungi* Gr.
137 *fungicola* Thoms.
nitidicollis Fairm.
ignobilis Sharp
70 *fungivora* Thoms.
169 *fusca* Sahlb.
65 *gagatina* Baudi
99 *glabricula* Thoms., Brd.
minuscula H. K. Hns.
? *dura* Brd.
100 *glabriculoides* A. Str.
155 *graminicola* Gr.
58 *granigera* Kies.
sexnotata Thoms.
32 *gregaria* Er.
6 *grisea* Thoms.
8 *gyllenhali* Thoms.
15 *halophila* Thoms., Brd.
volans Scriba
tomlini Joy
111 *hansseni* A. Str.
121 *harwoodi* Will.
57 *hepatica* Er.
167 *hercynica* Renk., Brd.
153 *heymesi* Hubenth.
109 *hybrida* Sharp
14 *hygrobia* Thoms., Brd.
malleus Joy
10 *hygrotopora* Kr.
168 *hyperborea* Brd.
154 *hypnorum* Kies.
149 *incognita* Sharp
93 *indubia* Sharp
123 *inhabilis* Kr.
82 *inquinula* Gr.

[1] Nach Mitteilung von Dr. Benick, der meine Type von *flavicollis* gesehen hat, ist diese Art mit *Pseudomicrodota jelineki* Krása, von der er ein Pärchen aus der Slovakei besitzt, identisch.

29 *insecta* Thoms.
165 *intermedia* Thoms.
176 *ischnocera* Thoms.
166 *islandica* Kr., Brd.
74 *janssoni* Bernh.
174 *laevana* M. & Rey
146 *laevicauda* J. Sahlb.
33 *languida* Er.
walshi Will.
161 *lapponica* J. Sahlb.
sjöbergi G. Bck.
185 *lateralis* Mnh.
44 *laticeps* Thoms.
203 *laticollis* Steph.
170 *latifemorata* Brd.
52 *linearis* Gr.
116 *liturata* Steph.
163 *livida* M. & Rey
35 *longicollis* M. & Rey
languida Will.
183 *longicornis* Gr.
61 *longuiscula* Gr.
9 *luridipennis* Mnh.
37 *luteipes* Er.
181 *macrocera* Thoms.
12 *magniceps* J. Sahlb., Brd.
164 *marcida* Er.
42 *marina* M. & Rey
186 *melanaria* Mnh.
13 *melanocera* Thoms.
lindrothi Bernh.
43 *meridionalis* M. & Rey
60 *microptera* Thoms.
71 *monticola* Thoms.
91 *mortuorum* Thoms., Brd.
pseudocribrata H. K. Hns.
171 *munsteri* Bernh.
196 *muscorum* Bris.
128 *myrmecobia* Kr.
21 *nannion* Joy
subdebilis Joy
88 *nesslingi* Bernh.
130 *nidicola* Johans.
49 *nigella* Er.
106 *nigra Kr.*
120 *nigricornis* Thoms.
55 *nigrifrons* Er.
melanocephala Fauv.
178 *nigripes* Thoms.
117 *nigritula* Gr.
84 *nitella* Brd.
192 *obfuscata* Gr., Will.
126 *oblita* Er.
62 *oblongiuscula* Sharp
oblonga Er.
georgiana Motsch.
16 *obtusangula* Joy
69 *occulta* Er.
200 *orbata* Er.
202 *orphana* Er.
145 *pachycera* Epp.
sexdentata A. Jans.
59 *pagana* Er.
78 *palleola* Er.
115 *pallidicornis* Thoms.
1 *palustris* Kies.
131 *pandionis* Scheerp.
134 *paracrassicornis* Brd.
159 *parapicipennis* Brd.
197 *parvula* Mnh.
parva Sahlb.
98 *perexigua* Sharp
151 *pertyi* Heer
157 *picipennis* Mnh.
158 *picipennoides* H. K. Hns.
73 *picipes* Thoms.
140 *pilicornis* Thoms.
gynandrica Sharp
156 *piligera* J. Sahlb.
brundini A. Jans.
188 *pilosicollis* Brd.
28 *planifrons* Waterh.
debilicornis auct., nec Er.
96 *platonoffi* Brd.
3 *polaris* Bernh.
punctulata J. Sahlb. p. p.
114 *procera* Kr.
182 *puncticollis* G. Bck.
195 *pusilla* Brd.
190 *pygmaea* Gr., Will., Brd.
17 *ripicola* H. K. Hns.
48 *rudiventris* Epp.

66 *scapularis* Sahlb.
23 *scotica* Ellim.
caucasica Brd.
175 *setigera* Sharp
189 *silvicola* Kr.
planipennis Thoms.
68 *sodalis* Er.
184 *sordida* Marsh.
102 *sordidula* Er.
112 *sparre-schneideri* Munst.
85 *spatuloides* G. Bck.
26 *strandi* G. Bck.
136 *strandiella* Brd.
113 *subglabra* Sharp
30 *subgrandis* Brd.
172 *subplana* J. Sahlb.
204 *subsinuata* Er.
67 *subterranea* M. & Rey
87 *subtilis* Scriba
38 *subtilissima* Kr.
31 *sulcifrons* Steph.
90 *södermani* Bernh.
92 *talpa* Heer
122 *taxiceroides* Munst.
40 *tenella* Mnh.
4 *terminalis* Gr., Brd.
41 *thinobioides* Kr.
longula Heer
143 *triangulum* Kr.
108 *trinotata* Kr.
45 *trybomi* J. Sahlb.
205 *varendorffiana* Bernh. & Scheerp.
64 *vestita* Gr.
46 *vilis* Er.
81 *wireni* Brd.
142 *xanthopus* Thoms.
107 *zosterae* Thoms.
hodierna Sharp
oloriphila Keys
206 ? n. sp. prope *glabricula* Thoms. (Asker, Norwegen, H. K. Hanssen leg.)
207 ? n. sp. prope *glabricula* Thoms. (Brønnøya, Norwegen, A. Strand leg.)
208 ? n. sp. prope *glabricula* Thoms. (Dyrehaven, Dänemark, Victor Hansen leg.)

Die Reihenfolge der Figuren ist auf der im Catalogus Coleopterorum Fennoscandiae et Daniae von 1960 benutzten Einteilung in Untergattungen basiert, und zwar:

Nr.
1—24 *Philhygra* Muls. et Rey
25—35 *Aloconota* Thoms.
36 *Dacrila* Muls. et Rey
37 *Dilacra* Thoms.
38 *Hydrosmectina* Ganglb.
39—41 *Hydrosmecta* Thoms.
42—43 *Brundinia* Tott.
44—45 *Parameotica* Ganglb.
46 *Dralica* Muls. et Rey
47—48 *Dochmonota* Thoms.
49 *Pachnida* Muls. et Rey
50—53 *Dinaraea* Thoms.
54—56 *Plataraea* Thoms.
57 *Enalodroma* Thoms.
58—63 *Liogluta* Thoms.

64 *Thinobaena* Thoms.
65—68 *Alaobia* Thoms.
69—72 *Bessobia* Thoms.
73—77 *Traumoecia* Muls. et Rey
78—100 *Microdota* Muls. et Rey
101 *Pachyatheta* Munst.
102—107 *Datomicra* Muls. et Rey
108—180 *Atheta* s. str.
181—182 *Badura* Muls. et Rey
183 *Chaetida* Muls. et Rey
184—205 *Acrotona* Thoms.

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Abkürzungen:

A = Apex des Penis, Dorsalansicht
D = Penis, Dorsalansicht
L = Penis, Lateralansicht
S = Samenkapsel
V = Penis, Ventralansicht
Vp = Ventralplatte der Vulva

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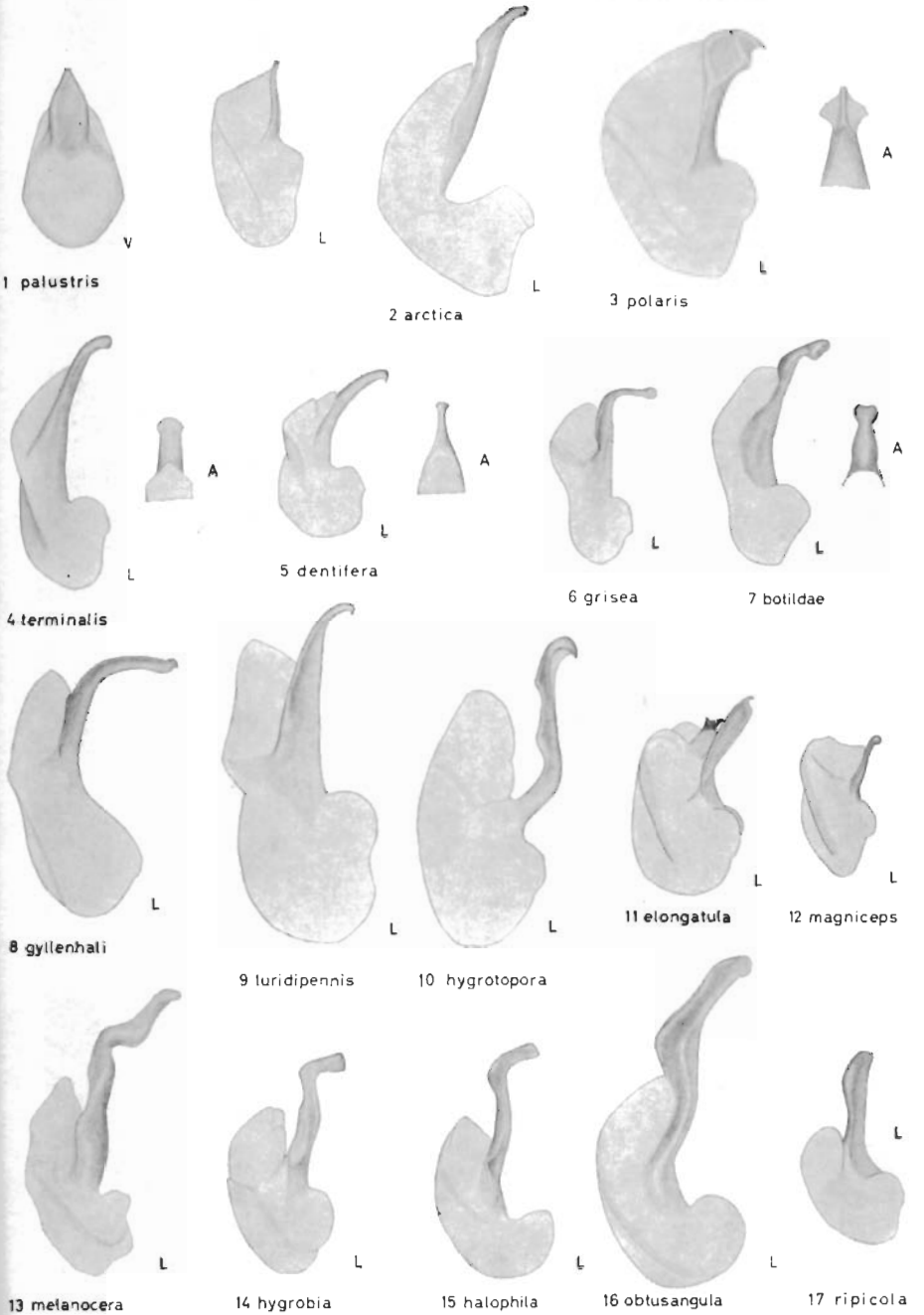
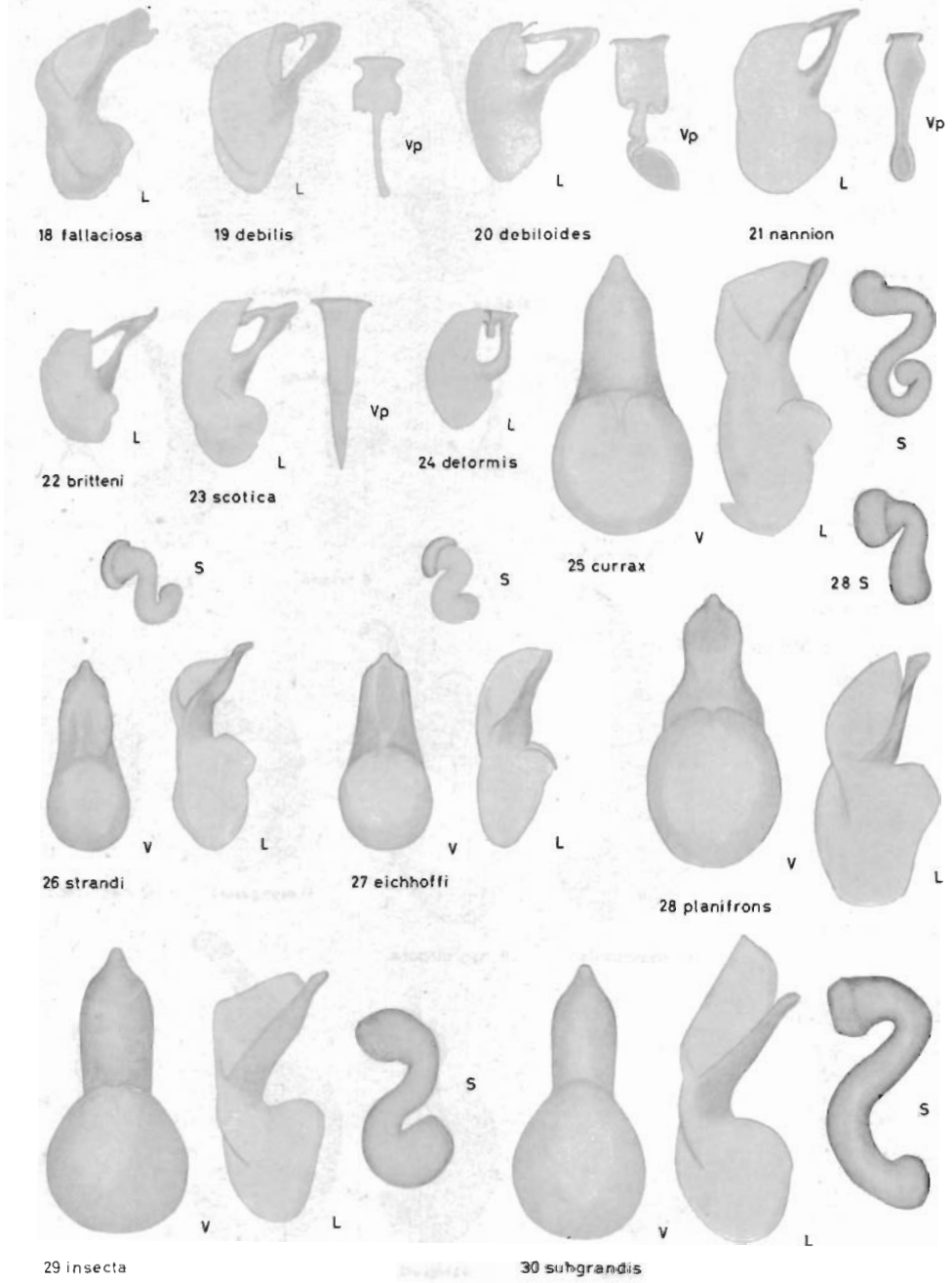
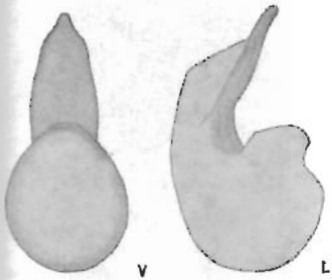


1 palustris
2 arctica
3 polaris
4 terminalis
5 dentifera
6 grisea
7 botildae
8 gyllenhali
9 luridipennis
10 hygrotopora
11 elongatula
12 magniceps
13 melanocera
14 hygrobia
15 halophila
16 obtusangula
17 ripicola

Anders Vik del.

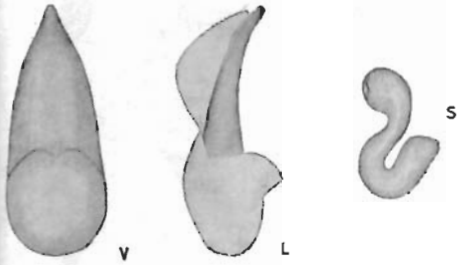


Anders Vik del.

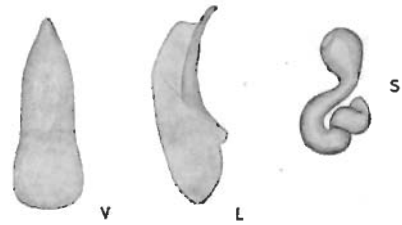


31 sulcifrons

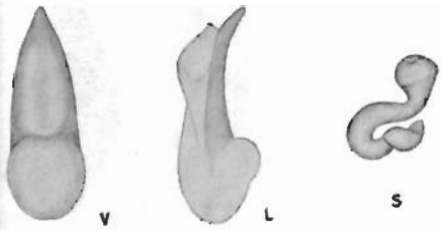
32 gregaria



33 languida

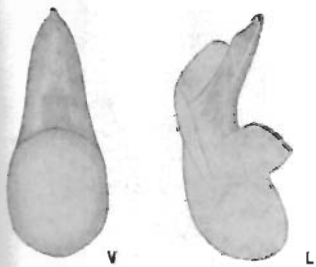


34 coulsoni



35 longicollis

36 fallax



37 luteipes

38 subtilissima

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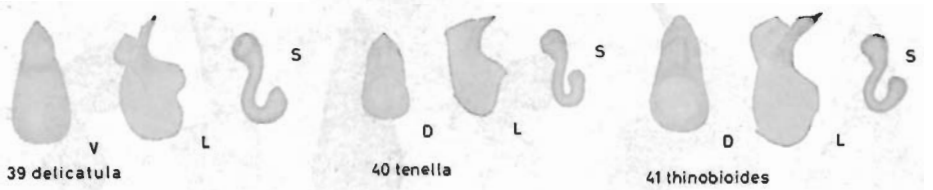

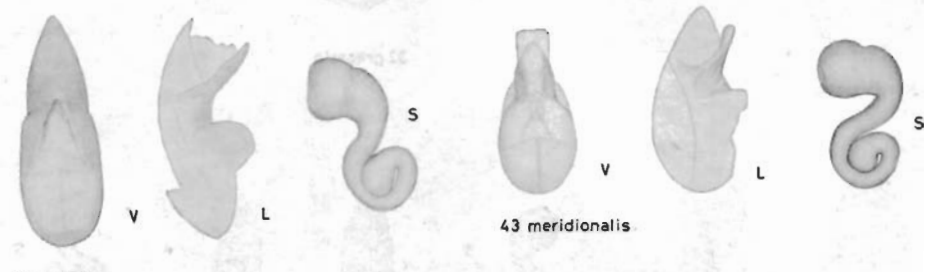

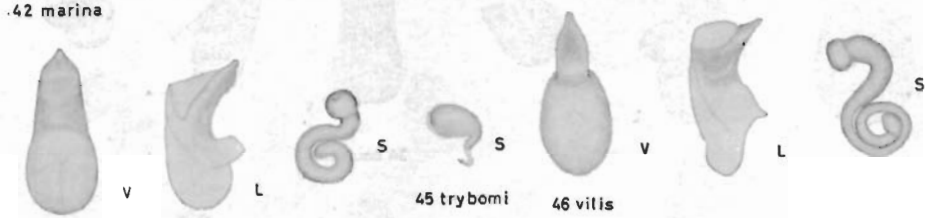

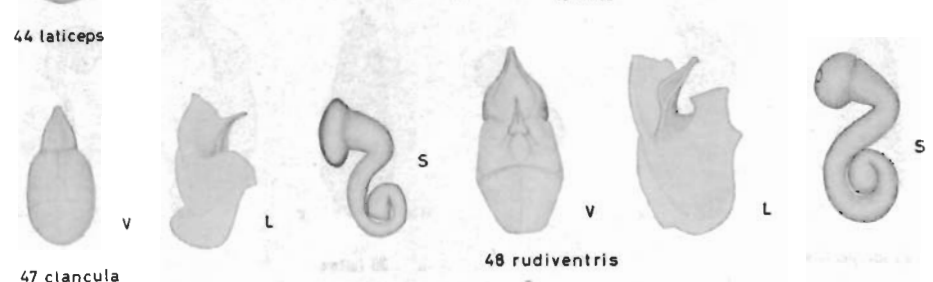

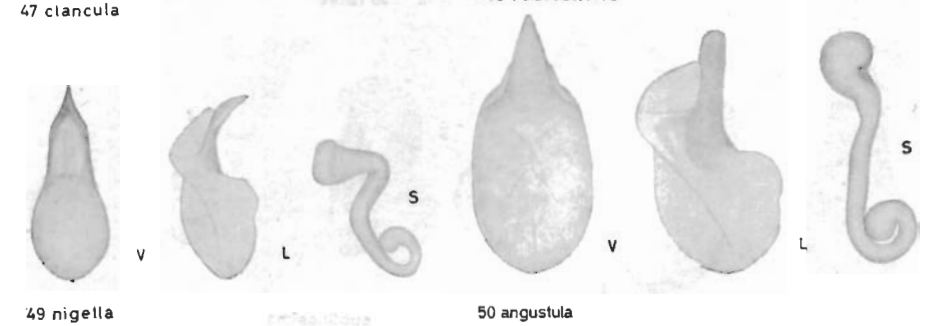

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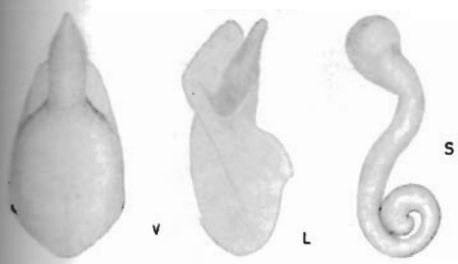
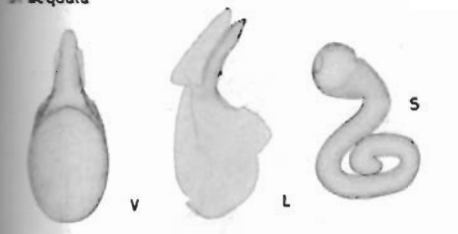
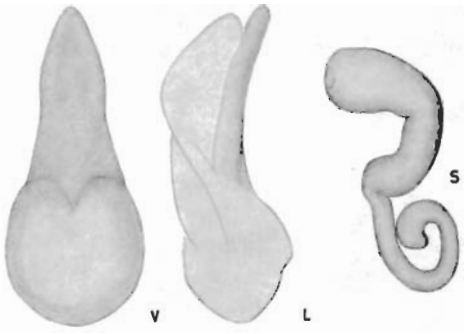


51 aequata

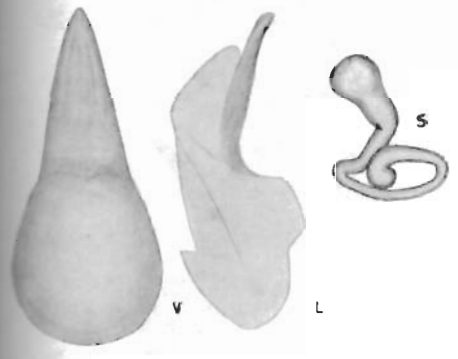
52 linearis



53 arcana



54 brunnea



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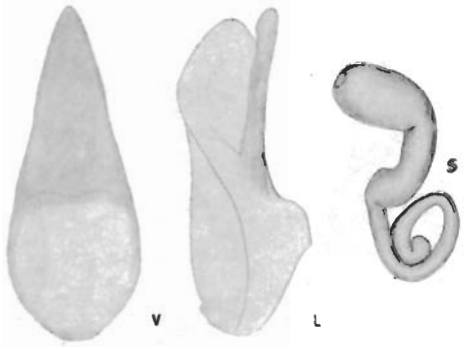
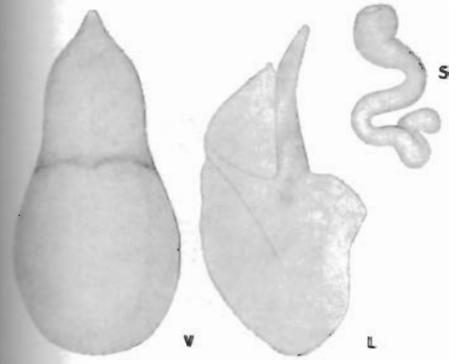
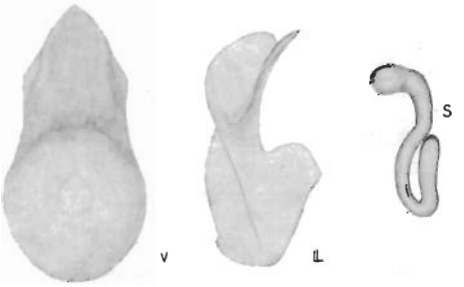


56 dubiosa



57 hepatica



58 granigera

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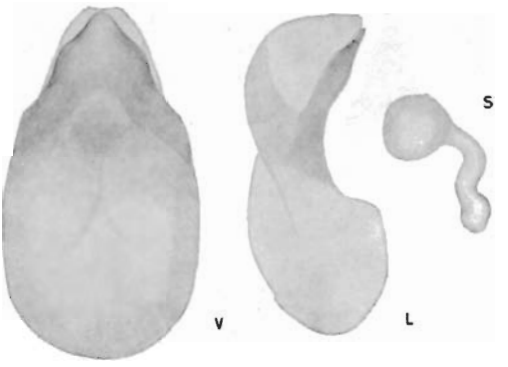
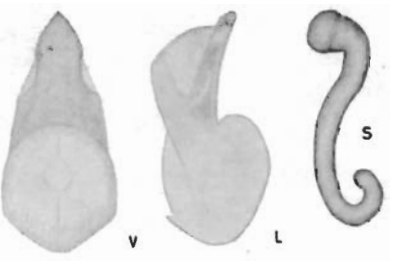
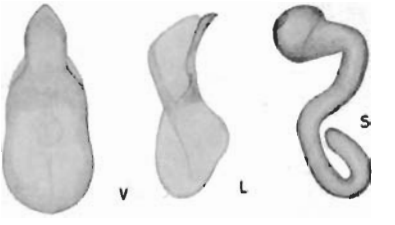


59 pagana

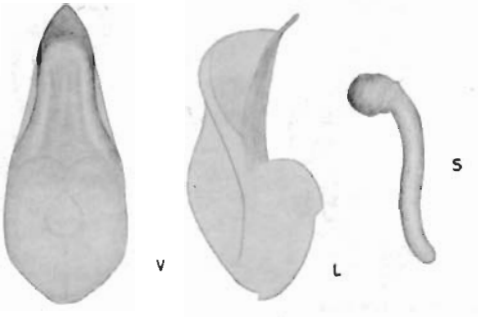


60 microptera

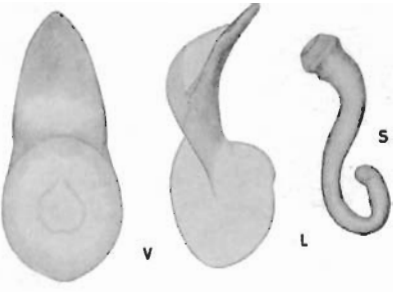
61 longiuscula



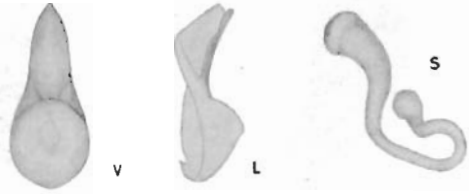
62 oblongiuscula



63 alpestris



64 vestita



65 gagatina

66 scapularis

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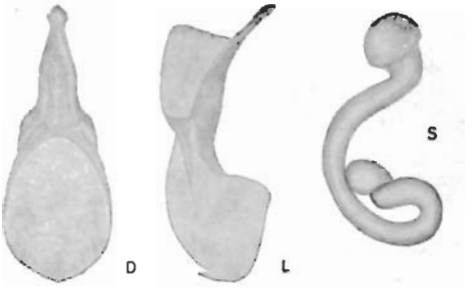
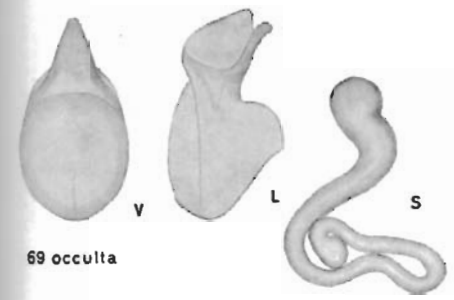
67 subterranea

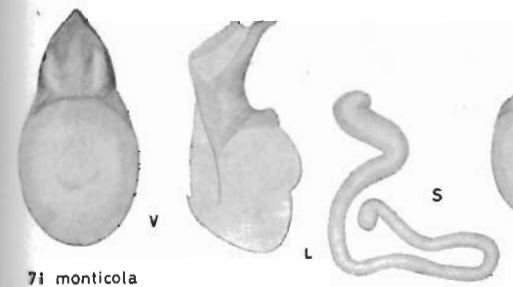


68 sodalis



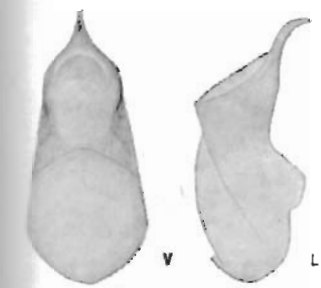
69 occulta

70 fungivora

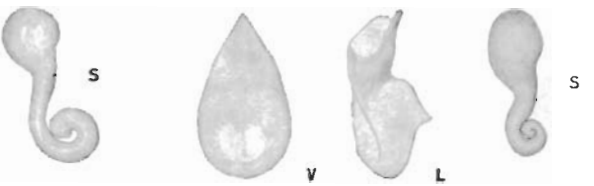


71 monticola

72 excellens



73 picipes



74 janssoni

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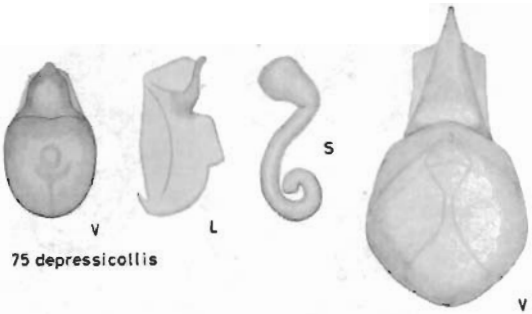
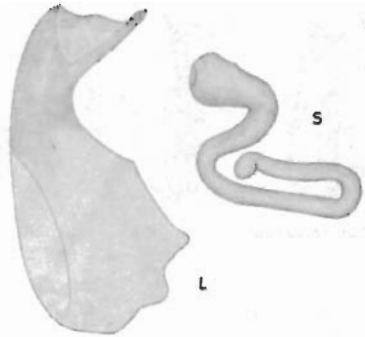


75 depressicollis

76 frigida



77 angusticollis

78 palleola

79 flavicollis

80 benickiella

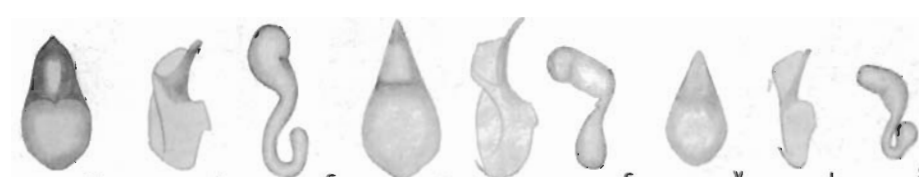
81 wireni

82 inquinula

83 excelsa

84 nitella

85 spatuloides



86 amicula

87 subtilis

88 nesslingi

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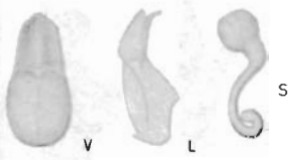
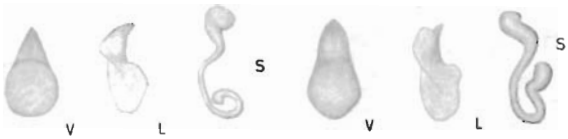
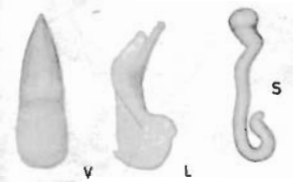


89 corvina

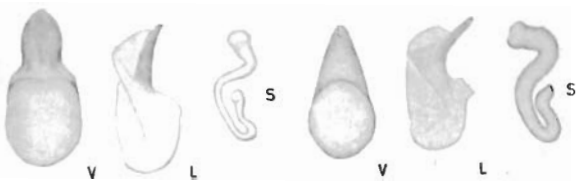


90 sodermani

91 mortuorum

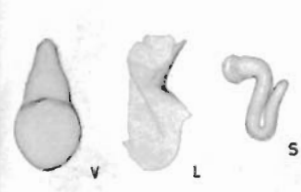


92 talpa



93 indubia

94 boreella

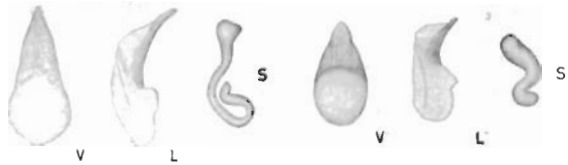


95 alpina

96 platonoffi

97 atomaria

98 perexigua



99 glabricula

100 glabriculoides

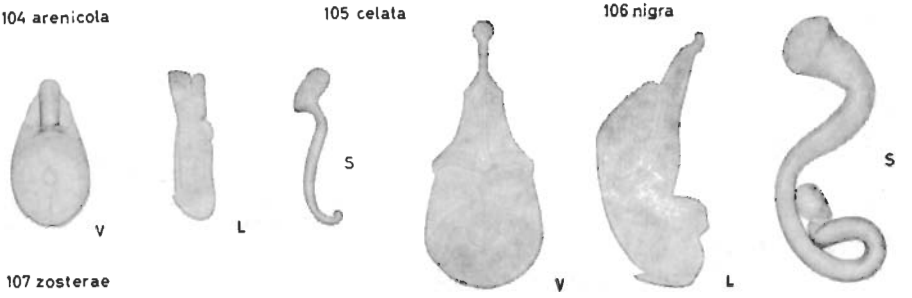
101 cribrata

102 sordidula

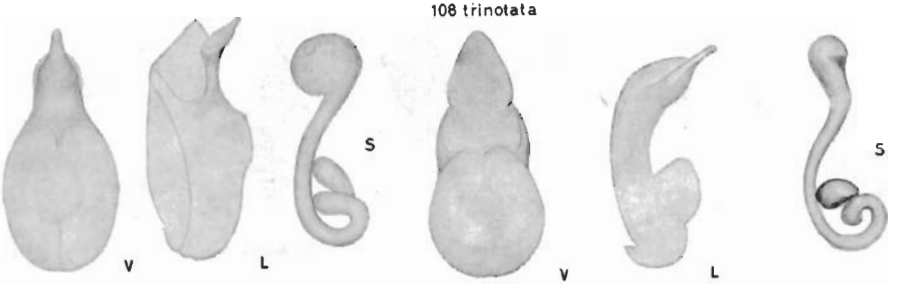
103 canescens

Anders Vik del.

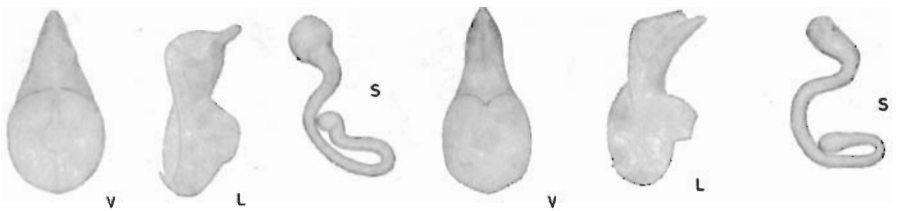
104 arenicola 105 celata 106 nigra



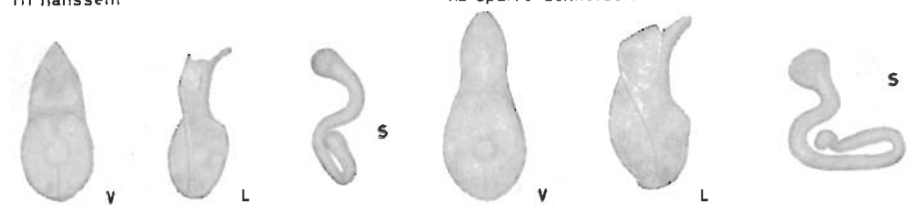
107 zosterae 108 trinotata



109 hybrida 110 cadaverina



111 hansseni 112 sparre-schneideri



113 subglabra 114 procera

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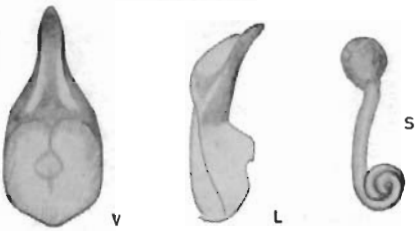
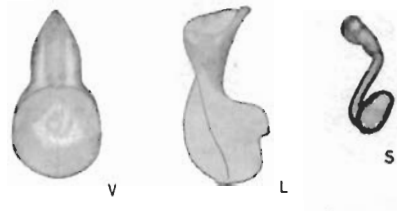
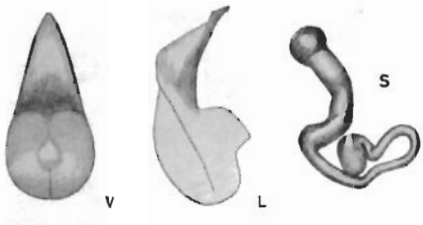


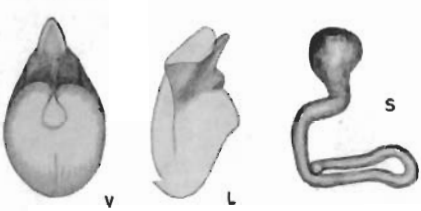
115 pallidicornis



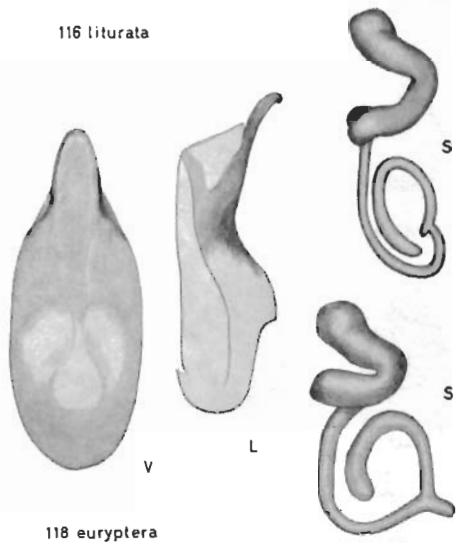
116 liturata



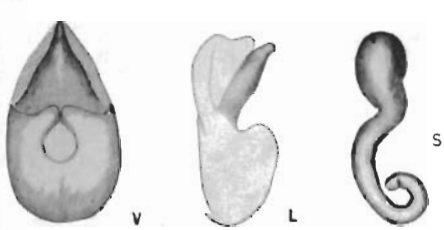
117 nigritula



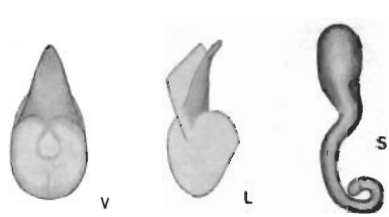
119 divisa



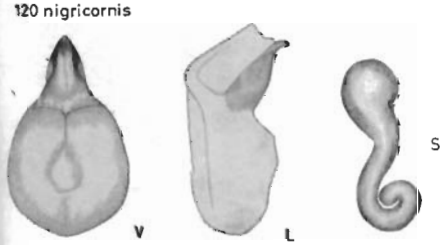
118 euryptera



120 nigricornis



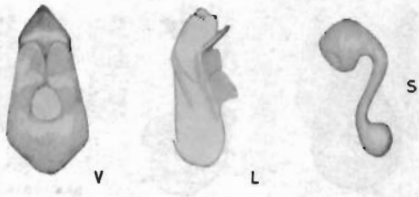
121 harwoodi



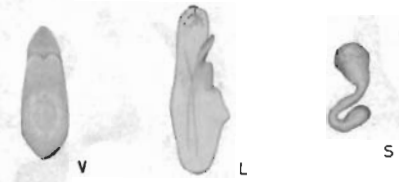
122 taxiceroides

123 inhabilis

Anders Vik del.

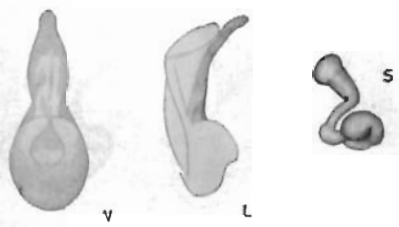


124 autumnalis



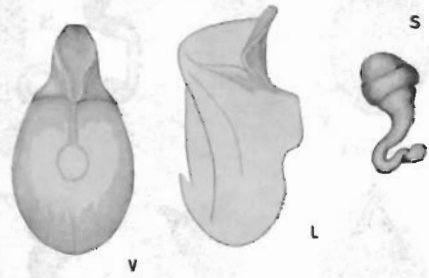
125 basicornis

126 oblita

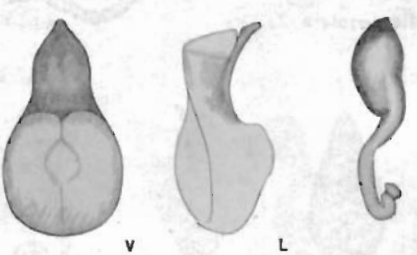


127 boletophila

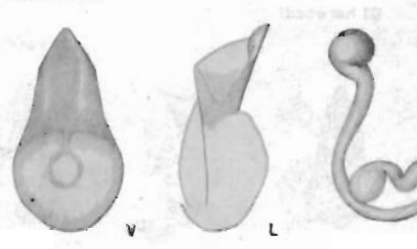
128 myrmecobia



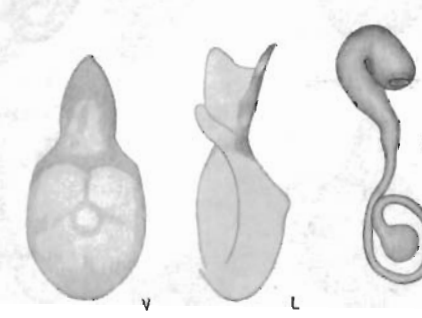
129 coriaria



130 nidicola

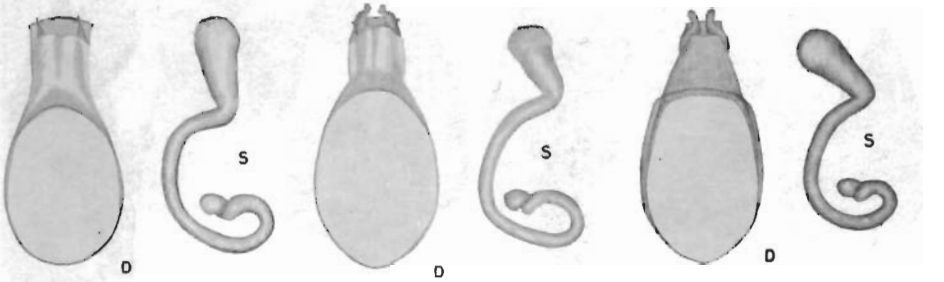


131 pandionis

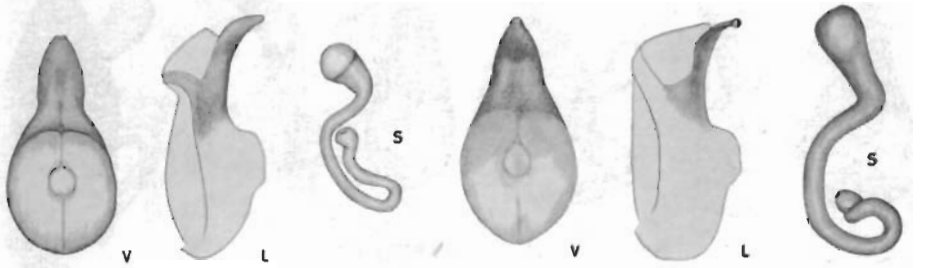


132 boleticola

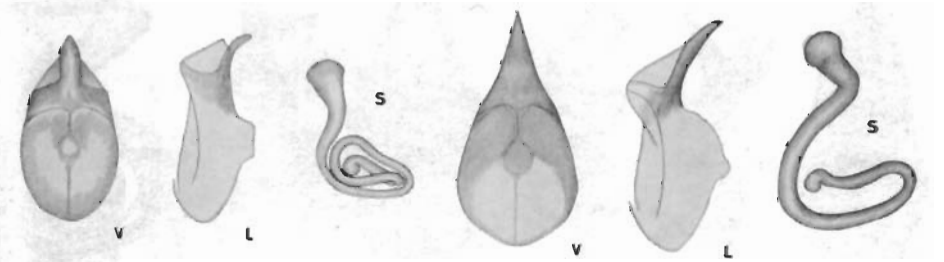
Anders Vik del.



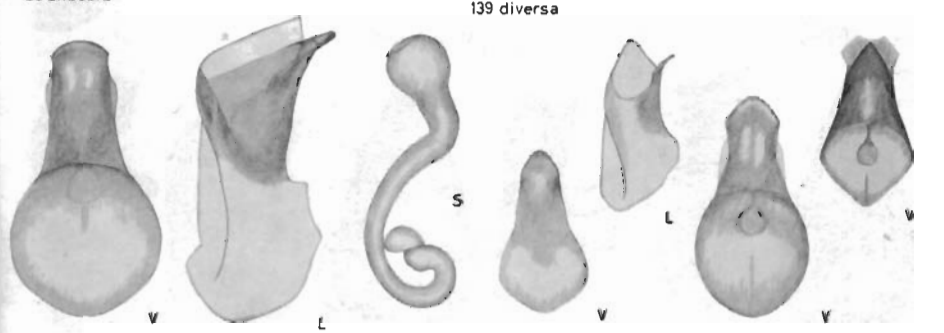
133 crassicornis 134 paracrassicornis 135 britanniae



136 strandiella 137 fungicola

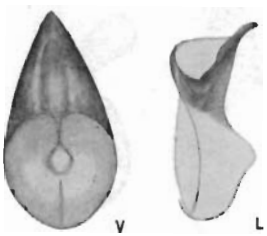


138 affocera 139 diversa

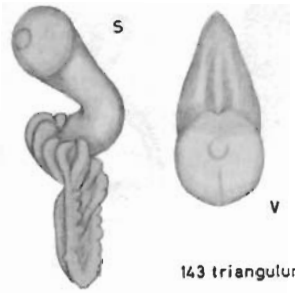


140 pilicornis 141 acutangula

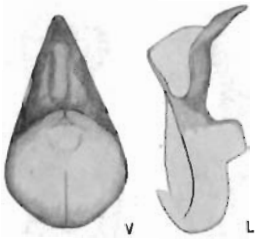
Anders Vik del.



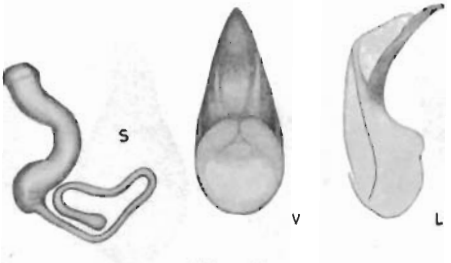
142 xanthopus



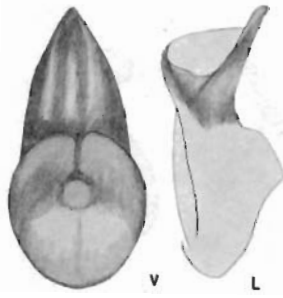
143 triangulum



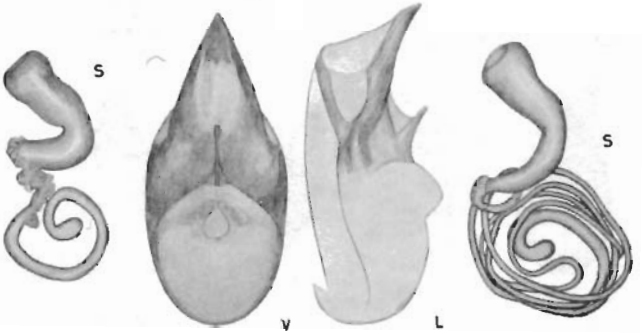
144 ebenina



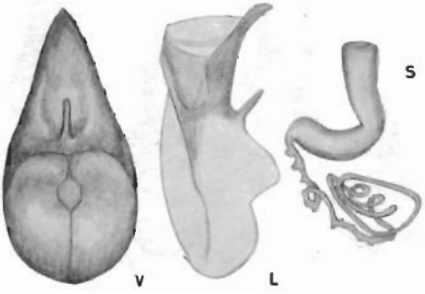
145 pachycera



146 laevicauda



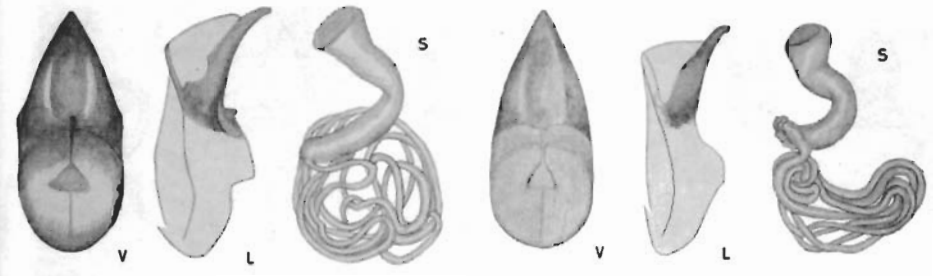
147 brunneipennis



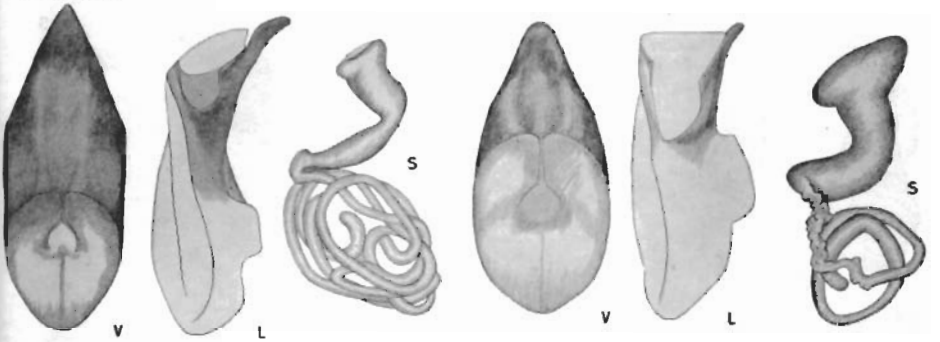
148 castanoptera

149 incognita

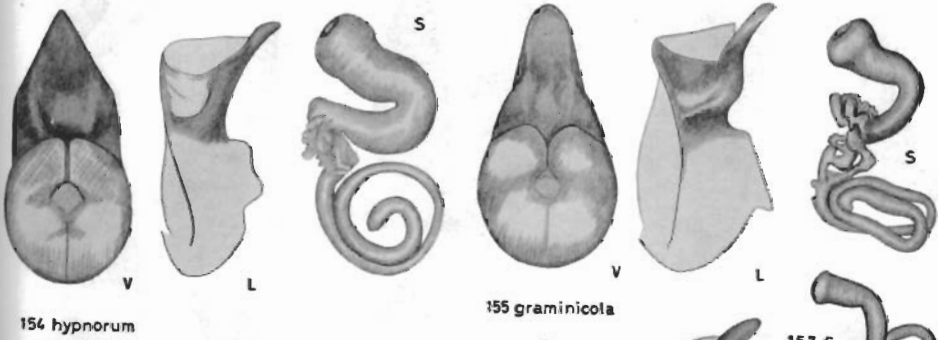
Anders Vik del.



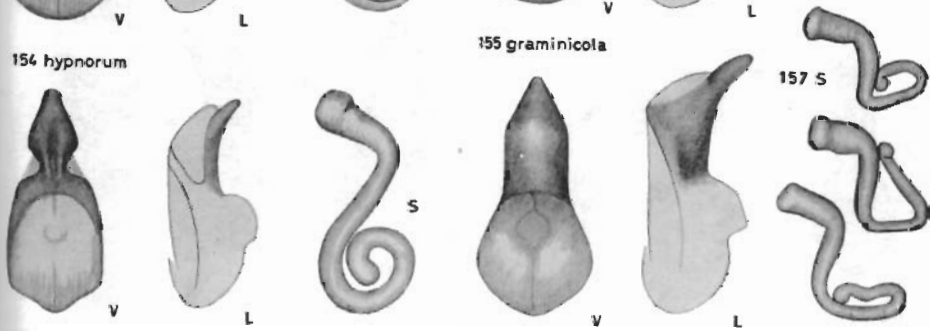
150 aquatica 151 pertyi



152 aquatilis 153 heymesi

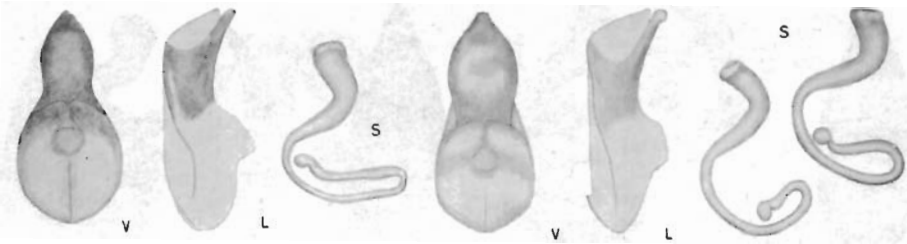


154 hypnorum 155 graminicola



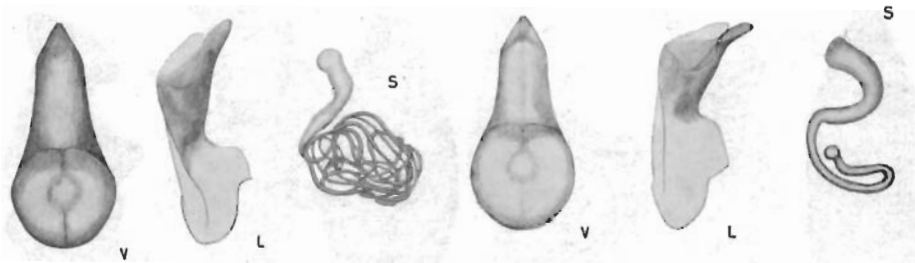
156 piligera 157 picipennis

Anders Vik del.



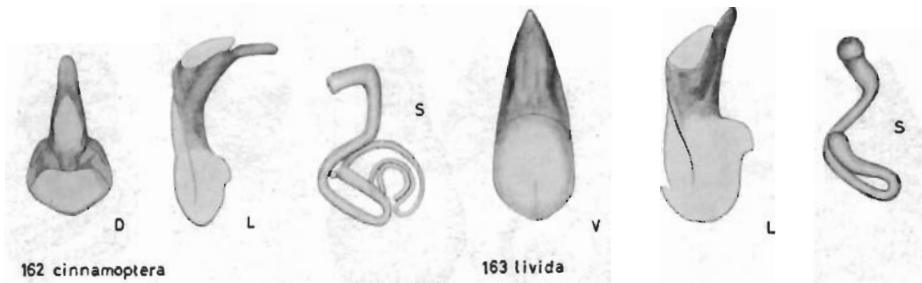
158 picipennoides

159 parapicipennis



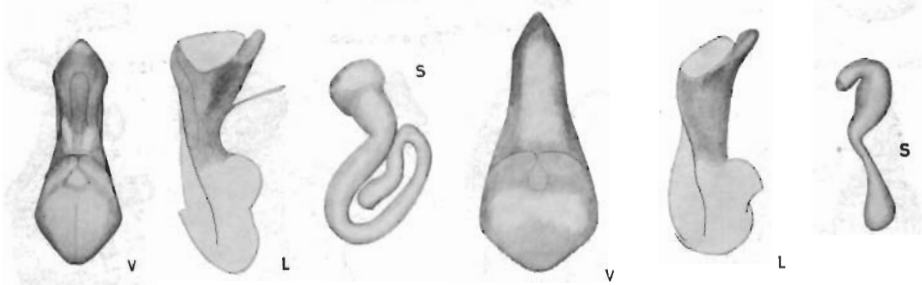
160 altaica

161 lapponica



162 cinnamoptera

163 livida



164 marcida

165 intermedia

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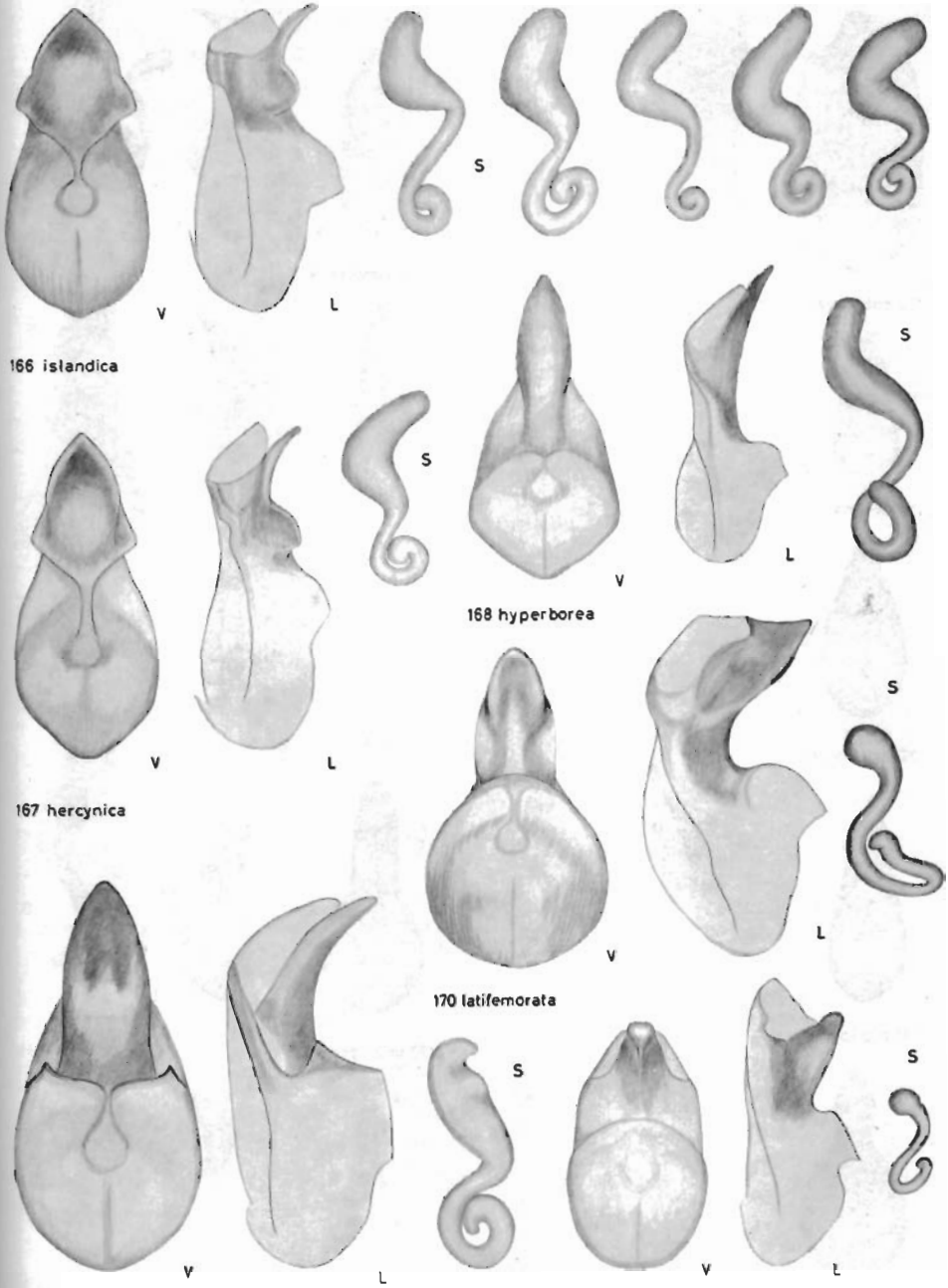
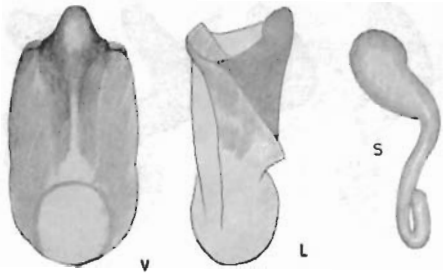
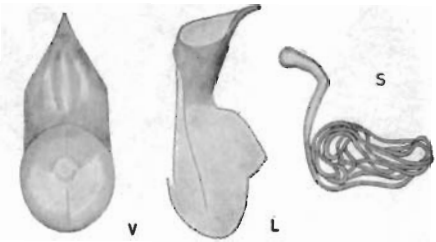


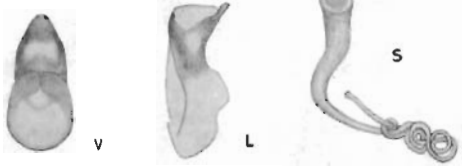
Anders Vik del.



172 subplana



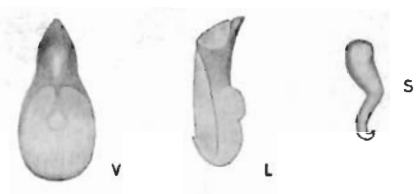
173 atramentaria



174 laevana

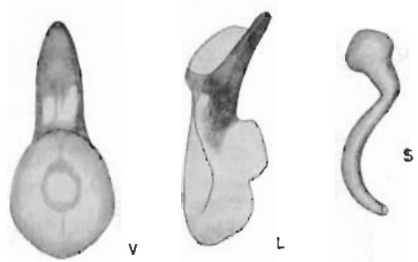
175 setigera

176 ischnocera

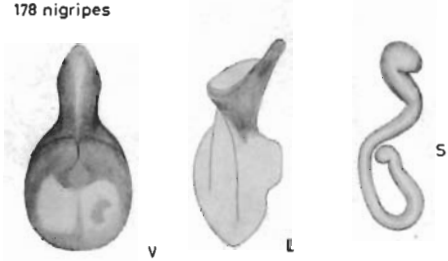


177 cauta

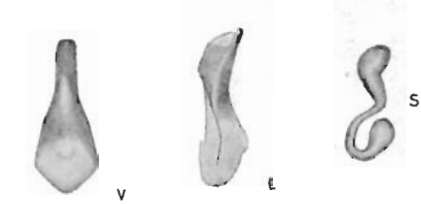
178 nigripes



179 cribripennis



180 dwinensis

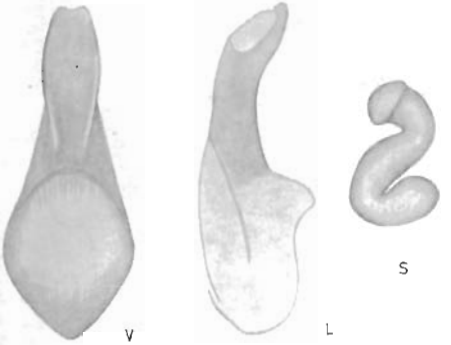


181 macrocera

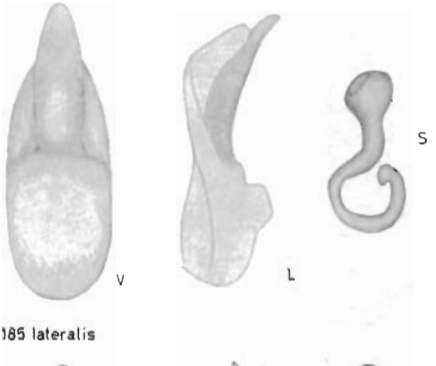
Anders Vik del.

182 puncticollis

183 longicornis

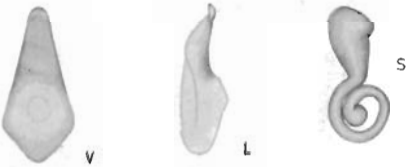


184 sordida



185 lateralis

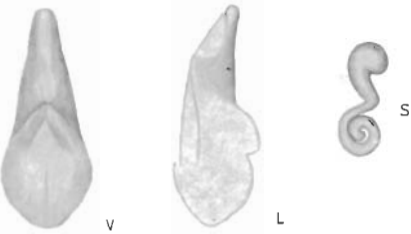
186 melanaria



187 exigua

188 pilosicollis

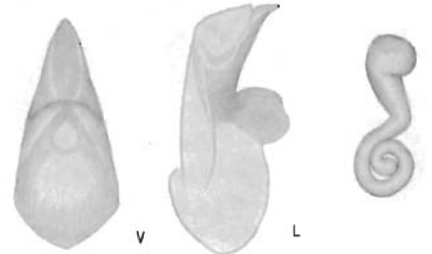
189 silvicola



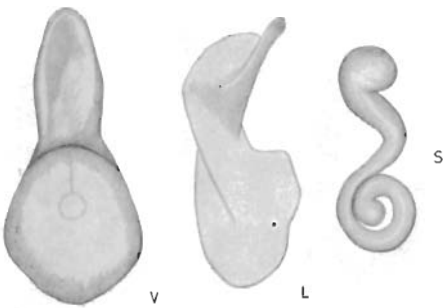
190 pygmaea

Anders Vik del.

191 convergens



192 obfuscata



193 consanguinea

194 aterrima

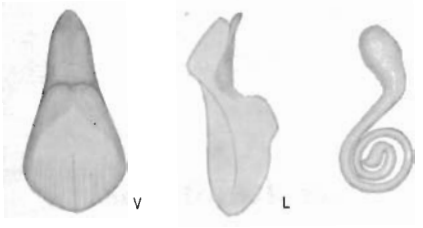
196 muscorum

195 pusilla

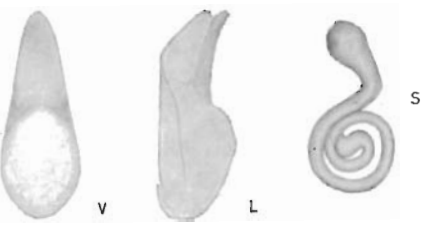
197 parvula

198 fungi

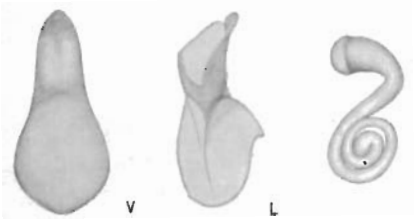
Anders Vik del.



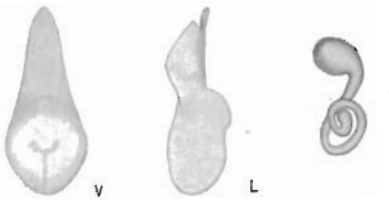
199 amblystegii



200 orbata

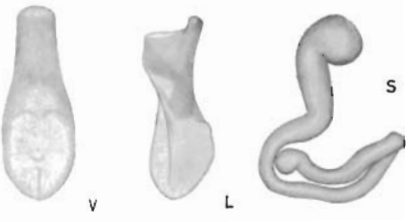


201 clientula



202 orphana

203 laticollis



204 subsinuata

205 varendorffiana

206 ? n.sp. prope glabricula

207 ? n.sp. prope glabricula

208 ? n.sp. prope glabricula

Anders Vik del.

Små forsøk med husbukken *Hylotrupes bajulus* L. (Coleoptera, Cerambycidae) på Nord-Vestlandet

Av R. Lyngnes, Løvik, Sunnmøre

Innledning

Til laboratoriet mitt i Dalsfjord, som ligger vestenfor husbukkens naturlige utbredelses-område på Nord-Vestlandet i Norge, fikk jeg 21. juni 1955 tilsendt en avskåret del av en kraftledningsstolpe fra Stryn i Nordfjord. I indre Nordfjord har husbukken i siste mannsalder opptrått i relativt nye hus og i ikke impregnerte stolper ute.

På ytterflaten av stolpestykket var i 1955 flere relativt nye flyhuller langs hele lengden, men helst på den side som hadde vendt mot solen. Dette stolpestykke bød seg fram som materiale til å undersøke om husbukken kan fullføre utviklingen utenfor sitt naturlige utbredelsesområde.

Forsøk

Det tilsendte stolpestykke som var en avkuttet del av en avbarket furustokk, ble kappet i 3 kapp-ender: A, B, og C hver med diameter 18 cm og lengde 15 cm.

Kapp-ende A: Den 21. juni ble den forsiktig kløvet opp i skiver. Den hadde 26 levende larver på 6 mm—20 mm lengde og 2 pupper 18 mm lange. De ble alle benyttet til mine forsøk med virkemidler mot husbukk.

Kapp-ende B: Den 22. juni ble denne del satt i bur av netting og plasert på stueloftet mot vindu med heldags sol.

2. august kom det ut 3 imagines gjennom utgnagede flyhuller på sideflaten.

10. august kom det ut 2 imagines + 1 imago som var skadet.

Senere i august kom 3 imagines. Den ble så satt i en kald kjeller. Larvene levet også under slik lav temperatur, det viste de årlig nye mjølhauger på endeflatene, men det kom ikke flere imagines.

Kapp-ende C: Den 23. juni 1955 ble denne kapp-ende satt i nettingbur i naust ved sjøen i Dalsfjord, men ingen imago

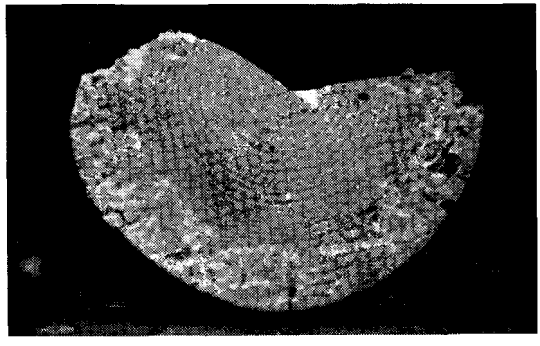


Fig. I. Halve tversnitt av en kapp-ende av furu angrepet av husbukk, etter å ha ligget 8 år i nettingbur plasert utenfor husbukkens utbredelsesområde.

kom ut i nettingburet. 6. juli 1963 ble kappenden kløvet i to halvdeler. Den ene ble på ny satt i buret, men den andre ble kløvet i skiver til analyse. Der ble funnet 1 død puppe, 5 døde larver og noen rester som ikke lot seg bestemme. Og uventet var det å finne 2 levende larver på 14 mm og 17 mm lengde inne i ytterkanten av ailen. De var spill levende og fortsatte å gnage livlig etter å være overført til hver sin gang. Den ene i en innboret navergang i en furukloss og den andre i en grankloss.

Husbukkens gnagestrukturer i kapp-ende C

Det har lenge vært kjent at husbukken til vanlig ikke gnager i central ved (ail) av furu. Det samme gjelder alle de treborende insekter jeg har observert i hus.

Figur 1, som er et tverrsnitt i furu av den halve kapp-ende C, like før den ble kløvet opp, viser at husbukklarver som har vært nødt til å ete av veden mer enn 8 år likevel har en markert boregrense mellom centralveden (ailen) med 21 år-ringer og ytterveden (geitveden) med 19 år-ringer.

Videre sees i ailen på tverrsnittet en lys (mjølfylt) og to mørke flekker som alle tre er tverrsnitt av langsgående boreganger inne i centralveden.

Slike enkelte eller meget fåtallige ganger i furuail kan også andre treborende arter i hus prestere, uvisst av hvilken grunn.

Diskusjon

Prøven med kapp-ende C i naust i Dalsfjord viser at husbukken som larve kan leve over 8 år i materialer flyttet ut fra dens utbredelsesområde. Da de to levende larvene, etter at

geitveden var oppbrukt, var kommet med sine ganger helt inne i ytterkanten av ailen, ser det ut som de har evne til å klare seg i dette materiale.

Videre viste prøven med k a p p - e n d e B at ved gunstige temperaturforhold i juli—august kan det utvikles imagines av husbukklarver plaserte utenfor grensen av husbukkens tilholdsdistrikt. I noen fortsatte varme augustdager vil så imago kanskje også kunne parre seg og legge egg her.

Temperaturen i naustet i Dalsfjord lå stadig under den høyeste temperatur oppe i bygda og selv i varme dager her kan solgangsbrisen fra havet virke regulerende nedover. På mine reiser på Nord-Vestlandet har jeg lagt merke til at i husbukkens grenseområde, mellom de indre og ytre distrikter, finnes den ikke hvor havvinden fritt står på, men kan dukke opp i hus stående på lune lokaliteter, gjerne vernet mot havtrekken av frodig furuskog. Som eksempel på dette kan nevnes ytre del av Tingvoll halvøy på Nordmøre.

At temperaturen i juli—august er en viktig faktor for husbukkens utbredelse på Nord-Vestlandet tror jeg at liknende forsøk også vil stadfeste.

Funn av *Thermobia domestica* (Pack.) i Norge (Thysanura)

Av Albert Lillehammer, Oslo

Den 6. nov. 1963 ble det til Zoologisk Museum innlevert noen insekter fra Universitetsiblioteket i Oslo, som liknet sølvkreet (*Lepisma sacharina* L.), og var kommet med en båtforsendelse av trykksaker fra U. S. A. Ved nærmere undersøkelse viste det seg å være *Thermobia domestica* (Pack., 1873), på engelsk kalt «firebrat». Denne art er ikke tidligere omtalt funnet i Norge.

Ifølge K. Escherich (1904) og I. M. Delany (1954) kjennes den fra sølvkreet på at antennene er like lange eller lenger enn kroppen, som er nesten paralellsidig og ikke smalner noe vesentlig av. Thorax er bare litt kortere enn abdomen (figur 1). Dessuten er maxilarpalper 6 leddet, mens den hos sølvkreet er 5 leddet. Grunnfargen er gulhvit og thorax er lysere enn abdomen. Skjellkledningen på oversiden er vekslende svart og gul, mens undersiden og ben er sølvglinsende.

Thermobia domestica er ifølge K. Escherich, spredt over den tropiske og den tempererte sone, og finnes selv i kolde regioner hvor oppvarmede bygninger er vanlige. Den må opprinnelig ha vært et varmklimatisk insekt. Navnet «firebrat» har muligens forbindelse med at den har en forkjærlighet for ildsteder.

Som sin slektning sølvkreet, foretrekker den stivelsesholdige matvarer av forskjellig slag og ødelegger bøker og annet stivelsesholdig papir, men spiser også mat som er rik på proteiner.

Thermobia domestica trives best der det er nær 37° C og 84 % relativ fuktighet, men utvikler og formerer seg ved 32—41° C og relativ fuktighet 48—97 %. Egg klekkes i temperaturintervallet 24—47° C og relativ fuktighet mellom 12 og 100 %. De kan tåle lange perioder der temperaturen er under 24° C og likevel klekkes dersom de etterpå blir plassert i gunstige omgivelser. Nymfene utvikles til voksne i temperaturintervallet 27—44° C og med relativ fuktighet på 48—100 %. Optimum er nær 38 ° C og 84 % relativ fuktighet, utviklingen tar da 2—4 måneder. Nymfene drepes lett ved temperaturer under 0 og over 44° C.

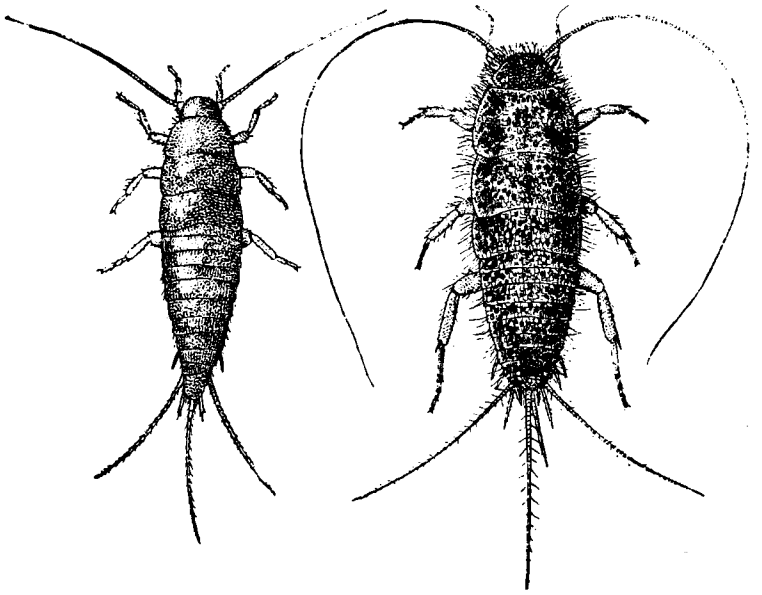


Fig. 1. *Thermobia domestica* (Pack.), til h. og *Lepisma sacharina* L. ca. 6x. Etter Economic Leaflets. No. 3, 1939 British Museum, Natural History.

Levetiden i gunstige omgivelser er 2—2½ år ved 32° C og 1—1½ år ved 37° C (L. Sweetman 1938).

Insektet bekjempes (C. L. Metcalf and W. P. Flint 1962, s. 905) ved å sprøyte enten med 5 % D.D.T., 2,5 % chlordan, 1 % lindan, 0,5 % dieldrin eller 1 % pyrethrin.

Summary

On November 6th., 1963 the author received for identification some small silverfish-like insects from The University Library, Oslo. The insects were supposedly received with a shipment of printed matters from U.S.A. By closer examination the specimens turned out to be the «firebrat», (Thermobia domestica, (Pack., 1873), which species has hitherto not been reported fromNorway.

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Norsk Entomologisk Forening

Årsmelding 18. februar 1963 — 17. februar 1964

M e d l e m s t a l l. I meldingsåret har foreningen fått 5 nye medlemmer: professor dr. Hans Kauri, Bergen, gymnasiast Arne Lorentsen, Glomfjord, cand. mag. Ivar Mysterud, Blindern, Stellan Eriksson, Bromma, Sverige, og jägm. Stig Lundberg, Barkarby, Sverige.

Ett medlem døde i 1963, og 3 medlemmer er utmeldt. Foreningen har nå 141 medlemmer. Medlemmene fordeler seg slik: 89 norske, personlige medlemmer, 8 norske institusjoner, 38 utenlandske, personlige medlemmer, hvorav 5 er korresponderende, og 6 utenlandske institusjoner.

T i d s s k r i f t e t. Hefte 3—4, bind XII, av Norsk Entomologisk Tidsskrift kom ut i desember 1963.

M ø t e r. I vårsemesteret ble det holdt 2 møter og i høstsemesteret 3 møter. Styret har hatt 2 sammenkomster (Referater fra de forskjellige møtene vil bli trykt i Norsk Entomologisk Tidsskrift).

Årsmøtet 18. februar i Fellesbygget, Vollebekk 1963.

Det annonserte foredraget av kontorsjef Andreas Strand måtte dessverre gå ut på grunn av sjukdom.

Forsøksassistent Trygve Rygg ga en orientering om en del fangstmetoder for insekter. Foredraget vil bli trykt i «Fauna», og særtrykk vil seinere bli sendt medlemmene.

Statsentomolog Jac. Fjelddalen innledet til en samtale om arbeidet med navneliste for norske insekter. Han mente det burde bli lite nydøping, men at navnekomiteens arbeid vesentlig ville gå ut på å samle det som fantes av norske navn, velge ut det beste og så sette opp listen ordnet etter systematisk inndeling. — Mange av møtedeltakerne deltok i samtalen. Natvig nevnte det store arbeidet komiteen ville få ved å måtte gå gjennom litteraturen og registrere de navn som hadde vært brukt. Semb Johansson mente det måtte være en oppgave for komiteen å luke ut navn som er direkte misvisende. Seglen framholdt at en burde legge vekt på å få best mulig samsvar mellom latinske og norske navn. Løken nevnte at en burde undersøke de insektnavn som ble brukt i de andre skandinaviske land, og velge slike navn når det var praktisk mulig. Sundby mente det ville være verdifullt om listen kunne gi en felles norm for insektenes systematikk.

Det var ingen merknader til årsmeldingen for tiden 19. februar 1962 til 18. februar 1963, og det reviderte regnskapet ble godkjent.

Valget på tillitsmenn ga følgende resultat: Styremedlem: Per F. Waaler (30 st.), kasserer: C. F. Lühr (30 st.), medlem av redaksjonskomite: Arne Semb Johansson (30 st.), valgkomite: Leif R. Natvig (29 st.), Olav Kvalheim (30 st.), Helene Tambs-Lyche (29 st.).

Formannen redegjorde for en henvendelse fra Norske 4-H om å delta i Norske 4-H Studieforbund. Som medlem i forbundet kan NEF få økonomisk støtte til kurs- og studievirksomhet. Medlemskap medfører ingen økonomiske forpliktelser for foreningen. Det var enighet om at NEF burde delta, og Rygg ble valgt som NEF's representant i studieforbundet.

Det ble innvalgt tre nye medlemmer i komiteen som arbeider med norske insektnavn: Alf Bakke, Ragnhild Sundby og Hans Tambs-Lyche.

Som distributør tok Fjelddalen opp flere spørsmål ved salg av Norsk Entomologisk Tidsskrift. Etter en del diskusjon ble det gjort følgende vedtak:

1. Prisen på eldre hefter og årganger settes til kr. 10,— pr. 48 sider.
2. Så lenge det er 15 eller flere komplette eksemplarer av et bind på lager, kan bindet selges til alle som ønsker å kjøpe. Når det er under 15, men over 5, kan det bare selges til nordiske institusjoner. De 5 siste eksemplarene av et bind er ikke for salg, men skal oppbevares av foreningen.

Møte på Zoologisk laboratorium 27. mars 1963.

Hr. Siegfried Cymorek fra «Bayer»-konsernet i Tyskland fortalte om «Der Hausbock, *Hylotrupes bajulus*, als Zucht und Prüfobjekt». Foredragsholderen fortalte om hva husbukken betyr som skadedyr og pekte på at moderne trehus vil bli raskere ødelagt av husbukkangrep enn eldre hus, fordi treverket i eldre hus var grovt overdimensjonert, mens det i dag blir spart mest mulig på treverket. For å komme fram til effektive midler mot angrep er det nødvendig å holde husbukken i kultur, — både for å gi materiale til prøving av kjemikalier, og for å utforske biologien til skadedyret. Cymorek forklarte de metoder som blir brukt for å holde husbukken i kultur, og fortalte om de vansker en hadde hatt med å komme fram til en tilfredsstillende kulturmetode. — Det ble vist en rekke gode lysbilder og en film som på glimrende måte viste oss husbukkens levevis.

Det var 21 medlemmer til stede på møtet.

Møte på Zoologisk laboratorium 25. september 1963.

Kontorsjef Andreas Strand ga en interessant og verdifull oversikt over i hvilken utstrekning det har vært samlet biller i de forskjellige områdene av Norge. Styret har bedt Strand om å utarbeide foredraget til en artikkel for tidsskriftet Fauna.

NEF skal stå som arrangør av det nordiske entomologmøte i 1965. I diskusjonen om opplegget av møtet var det enighet om at en burde ta opp bestemte emner til behandling, og innby framstående forskere innenfor disse feltene til å holde innledningsforedrag. I tillegg til disse faste postene må det være seksjoner som står åpne for påmelding av foredrag fra andre entomologiske felt. Flere av medlemmene pekte på at det personlige samvær utenom foredragsmøtene var noe av det mest verdifulle ved slike kongresser, og at arrangementet burde gi rikelig anledning til slik kontakt.

Det var 23 medlemmer til stede på møtet.

Et nytt medlem er innvalgt i foreningen: Jägm. Stig Lundberg, Våbergavägen 85, Barkarby. Lundberg er særlig interessert i biller, og ønsker byttekontakt med norske samlere. Han er særlig interessert i å få tak i norske biller som ikke er funnet i Sverige, og tilbyr sjeldne svenske arter i bytte.

Møte på Zoologisk laboratorium 30. oktober 1963.

I samtalen om sommerens fangst mente Strand det var påfallende hvor lite biller det var å finne i løpet av 1963. Likevel hadde han gjort en del interessante funn hvoriblant følgende: *Stomis pumicatus* Panz. i jordrotteganger på Brønnøya, *Bryoporus crassicornis* Mäkl. flygende på Røa, *Atheta consanguinea* Epp. i råtten *Polyporus* på bjørk på Håøya, *Ocyusa tullgreni* Palm. ved Røa, *Cryptopleurum subtile* Sharp. flygende på Røa og Brønnøya, samtlige nye for Norge. På *Beteroa incana* tok han i Oslo en rekke eksemplarer av *Ceuthorrhynchus hampei* Bris. (tidligere bare ett norsk funn) og på *Arabis hirsuta* fant han i Oslo og omegn *Ceuthorrhynchus unguicularis* Ths. i antall (også av denne arten var det tidligere bare gjort ett norsk funn) (Autorref.).

For øvrig deltok Fjelddalen, Taksdal, Bakke, Austarå, Knudsen, Mehl, Sømme, Sneli og Andersen i samtalen. Ing. Opheim viste til slutt en del interessante lysbilder.

Under eventuelt nevnte Strand en del om framgangsmåten ved preparering av biller, og understreket sterkt hvor viktig det er for bestemmelse av materialet at insektene er drept og preparert på beste måte.

17 medlemmer var til stede.

Møte på Ruseløkka skole, Oslo 2/12, 1963.

Statsentomolog Jac. Fjelddalen fortalte fra en studiereise i Canada. Først ga han en oversikt over hvordan entomologien var bygget opp og påpekte hvilken dominerende stilling selve grunnforskningen hadde. I det kanadiske landbruksdepartement er ansatt ca. 500 entomologer, fordelt på 49 institusjoner, som alle vesentlig arbeider med grunforskning. Den anvendte forskning og veiledningsvirksomhet foregikk på provinsbasis.

Fjelddalen oppholdt seg en kortere tid ved 13 forskjellige entomologiske institutt, vesentlig de som arbeidet med økologisk forskning i forbindelse med biologisk og integrert bekjempelse. Man var kommet ganske langt i forskningen vedrørende nye biologiske bekjempelsesmidler mot skadeinsekter, særlig ved hjelp av entomogene nematoder og bakterier. Også fysiske faktorers virkning, f. eks. lyd, var gjenstand for omfattende undersøkelser (i Belleville). Lyd kan ha både tiltrekkende, frastøtende og drepende virkning på insekter.

Kombinasjonen av biologiske bekjempelse (utnyttelse av de naturlige forekommende parasitter og rovinsekter) og sprøyting med selektive kjemiske midler ble spesielt studert i Kentville, Nova Scotia. I frukthagene hadde man ved å integrere bekjempelsen på denne måten klart å redusere forbruket av kjemikalier ganske betydelig. (Autorref.).

Etter foredraget ble det servert kaffe og smørbrød. Deretter viste Fjelddalen og Sømme hver sin serie med gode og interessante lysbilder fra ulike deler av Canada.

Det var 19 medlemmer til stede på møtet.

Per Knudsen

Junioravdelingen.

I dette året har avdelingen begynt på nytt med et kull på 15 betalende medlemmer. De tidligere medlemmer var omtrent på samme alder, og da de tok eksamen artium, gikk de fleste over i hovedforeningen på samme tid.

Frammøtet dette året har vært noe varierende, men en har forsøkt å legge vinn på at medlemmene fikk grei orientering om innsamlingsarbeid,

utstyr og prepareringsteknikk. På de siste møtene utover våren har en også fått tid til å orientere om systematikken innen området Lepidoptera, som synes å interessere de fleste av medlemmene.

Junioravdelingen er takknemlig for de gaver en har mottatt fra seniorene i form av kasser, mollplatten og nåler. Alt slikt utstyr koster penger, og det betyr så mye for de unge å bli hjulpet litt på vei i den første, vanskelige tiden.

Igjen har juniorene høstet godt av velvillig innsats fra konservator Nils Knaben og ingeniør Magne Opheim — noe som har vært av uvurderlig betydning for juniorarbeidet.

Olav Kvalheim

Thure Palm 70 år

Den 30. januar 1964 fylte den kjente svenske koleopterolog jägmästare fil. dr. h. c. Thure Palm 70 år.

Palm er født på Bellinga nær Ystad i Skåne og er forstmann av utdannelse. Han begynte tidlig å samle biller, og i årenes løp har han ved opphold i forskjellige deler av landet og ved omfattende reiser fra lengst i sør til lengst i nord skaffet seg et så inngående kjennskap til den svenske billefaunaen og en så omfattende samling som neppe noen annen.

Det kanskje mest imponerende ved Palms mangeårige og intense arbeid med billene er hans store allsidighet.

I en lang rekke publikasjoner har han bidradd til i vesentlig grad å utvide kjennskapet til artenes utbredning og deres levevis. En rekke kritiske grupper har han revidert og flere nye arter har han beskrevet.

Den også for norske entomologer så viktige og velkomne serien «Svensk insektfauna» har det gått trått med, men til stor glede for alle som er interessert i de nordiske biller, har Palm påtatt seg arbeidet med den mest etterlengtede og vanskeligste billedelen, nemlig den som gjelder staphylinidene, og tre hefter på tilsammen over 400 sider foreligger allerede.

Men mest imponerende er hans to arbeider om de svenske løvtrebiller («Die Holz- und Rinden-Käfer der nordschwedischen Laubbäume» — Medd. Statens Skogsf.-inst, 40/2, 1951, 242 sider og «Die Holz- und Rinden-Käfer der süd- und mittelschwedischen Laubbäume» — Opusc. Ent., Suppl. 16, 1959, 421 sider). I en lang rekke år har Palm ved arbeid i marken skaffet seg et så inngående kjennskap til disse billers levevis, at han for den vesentligste del har kunnet basere disse arbeider på egne iakttagelser, og meget nytt er kommet fram.

Med årene er Palms interesse mer og mer gått over på et felt som er lite bearbeidd, nemlig larvene.

Og som om ikke dette var nok har han på reiser i en rekke land samlet et stort billemateriale, som også krever sin tid. Men Palm er av de mennesker som synes å få tid til alt.

Også vi i Norge sender Palm våre hjerteligste lykkønskninger og håper han må få mange gode år ennå.

Andreas Strand

Bokanmeldelser

Serien Svensk Insektfauna, utgitt av Entomologiska Föreningen i Stockholm.

Denne serien ble startet i 1917 med et arbeid om *Cerambycidae, Chrysomelidae* og *Bruchidae* av Chr. Aurivillius, og i 1920 og 1924 fulgte *Anthribidae-Curculionidae* av samme forfatter. I 1924 kom *Heteromera* av C. H. Østrand og i 1925 *Scolytidae* av P. Spessivtseff.

Samtlige disse er begrenset til den svenske faunaen og inneholder bestemmelsestabeller og for det meste sparsomme beskrivelser og tegninger.

Med C. H. Lindroths arbeid av 1933 om *Heteromera*, som avløste Østrands, ble opplegget vesentlig endret. Det er i dette og de senere arbeider gitt langt mer utførlige beskrivelser og et større bildemateriale, mer detaljerte oppgaver over utbredelsen samt opplysninger om forekomst i naboland og dessuten er tatt med også arter som mangler i Sverige, men forekommer i nabolandene.

I 1942 kom Lindroths arbeid om *Carabidae*, som i 1961 er fulgt av en ny, omarbeidd utgave, i 1957 kom Bengt-Olof Landins arbeid om *Lamellicornia* og endelig har Thure Palm i tre hefter fra 1948, 1961 og 1963 behandlet *Staphylinidae* til og med *Staphylininae*.

I Landins, Lindroths og Palms arbeider har vi fått førsteklasses bearbeidelser av vedkommende familier, og da de også helt dekker den norske faunaen, bør ingen norsk koleopterolog forsømme å skaffe seg disse arbeider.

Heftene kan bestilles hos foreningens distributør, f. t. museiassistent B. H. Hansson, Riksmuseet, Stockholm 50. Prisen er for *Carabidae* kr. 29,00 (23,00), *Staphylinidae* h. 1 kr. 5,00 (4,00), h. 2 kr. 16,00 (12,00), h. 3 kr. 20,00 (15,00), og for *Lamellicornia* kr. 15,00 (10,00). Alt er i svenske kroner, og beløpene i parentes gjelder medlemmer av foreningen i Stockholm.

Andreas Strand

Hjalmar Munthe-Kaas Lund: *Dyreliv i vann og vassdrag.* J. W. Cappelens forlag. 2. utg. 1964. Pris kr. 15,50.

En morsom og hyggelig bok som gir mange gode opplysninger om ferskvannsfaunaen og kan være til nytte som håndbok for sportsfiskere og andre interesserte.

Hensikten med boken antydes i forordet, at den vil forsøke å besvare følgende spørsmål: «Hva heter alle disse forunderlige dyrene? Hvor kommer de fra? Hvordan og hvor lever de her i landet?» Dette er et meget vidt opplegg og det er meget vanskelig å gjennomføre det i denne lille boken, hvilket forfatteren er klar over og nevner i forordet. Et annet sted i forordet heter det: «I en slik håndbok er jo tegningene det viktigste».

Ser vi på tegningene så er de meget livfulle og kunstnerisk utført og gir et godt bilde av hvordan mange av dyrene ser ut og hvor de oppholder

seg. Imidlertid synes jeg at forfatteren burde ha vært mere forsiktig med å sette artsnavn på en del av de avbildede insekter og insektlarver og heller brukt spesis fordi tegningene ikke viser de for arten karakteristiske kjennetegn, selv ikke der disse hadde vært lette å få med. Tegningene av endel vårflue- og steinfluelarver (nymfer) er heller ikke gode nok til å operere med slekter og i en del tilfeller heller ikke for familier. Eks.: en kan ikke av tegningene nr. 115 og 116, side 23 si om steinfluelarvene (nymfene) hører til familien Capnidae eller Leuctridae.

I teksten s. 76—111 gis opplysninger om dyrenes utbredelse. Forfatteren er imidlertid ikke konsekvent, idet han for en del dyr oppgir hvor de er funnet, mens han for andre ikke gir noen opplysninger selv der det ville være lett å hente opplysninger om dette, f. eks. i Norsk Entomologisk Tidsskrift.

Annen utgave av boken er likevel meget bedre enn første idet en del opplysninger er korrigert og uheldige figurtekster er rettet på.

Boken kan trygt anbefales idet den gir opplysninger og inspirasjon til at en går ut for å se på den ofte rike dyremengde som finnes i ferskvann, og som folk flest legger liten eller ingen merke til.

A. Lillehammer

Maurice Maeterlinck: *Blomstenes intelligens og Glasedderkoppen*. Utgitt i serien Den levende natur, Munksgaards forlag A/S, Kjøbenhavn. Heftet D. kr. 8,50 (N. kr. 10,00).

Forfatteren av disse to morsomme «naturvitenskapelige» essays fikk nobelprisen i litteratur i 1913.

«Blomstenes intelligens» ble skrevet i 1906. Dette essayet forteller om de mange forunderlige veier plantene har gått for å oppnå en så effektiv kryssbefruktning som mulig, og om de mange metoder som benyttes for å spre frøene langt vekk fra morplanten.

«Glasedderkoppen» (vannedderkoppen *Argyroneta aquatica*) ble skrevet i 1932. Her forteller Maeterlinck om denne interessante edderkoppens liv; om hvorledes den bygger sin undervannsklokke som den oppholder seg i, om parringstid og egglegging.

Man kan selvsagt finne mange feil, edderkoppene er ikke insekter, og også mange feiltolkninger av både Maeterlincks og de siterte forfatteres observasjoner, men man bør da ha klart for seg i hvilke år disse essays ble skrevet.

Hans naturfilosofi må det også bli opp til hver enkelt leser å tenke gjennom. Oversetteren, T. W. Langer, sier i sitt forord at Maeterlinck er blitt til de grader misforstått av både zoologer, filosofer, teologer og litteraturhistorikere. Maeterlinck studerer ikke dyret for dets egen skyld, heller ikke fordi det er til nytte eller skade for mennesket, men fordi han gjennom studiet av det håper å finne en sammenheng både legemlig og åndelig mellom alt levende, en alle tings gjennomtrengende intelligens, om man vil. De to essays er da heller ikke beregnet på spesialister, men er mer et forsøk på å gi mennesket et bedre kjennskap til seg selv, og for å få oss til å legge merke til livet i den natur som omgir oss.

Og her kan kanskje boken ha en oppgave: å hjelpe oss til å oppfatte sammenhengen mellom alt det skapte. En følelse som er nødvendig dersom vi også skal kunne vurdere vår egen plass i denne sammenheng fullt ut.

Boken gir ikke noen løsning; oppgaven er da også alt annet enn enkel. Men den peker på en kanskje farbar vei som fører oss annetsteds hen enn den nøkterne naturvitenskap, dersom man har mot og tålmodighet til å akseptere det irrasjonelle. Man må være forberedt på å bli ledd av.

Boken anbefales.

Jon-Arne Sneli

Thoralv Ramsfjell og Jac. Fjelldalen: «*Sjukdommer og skadedyr på jordbruksvekster*». 196. XV. s.; 44 ill.; 110 pl. Bøndernes Forlag. Oslo 1962.

Denne boken har hittil ikke vært anmeldt i NET, men den fortjener i høy grad en omtale, da den, foruten sin lødige tekst, er et lite praktverk med de sjelden smukke plansjer.

Foruten hovedredaktørene, statsentomolog Fjelldalen og statsmykolog Ramsfjell, som behandler sine fagområder, har forsøkslederne Bjørnstad og Støen bidraget med avsnitt om virussykdommer resp. nematoder.

Det innledende korte avsnitt «Symptomer» gir en grei oversikt over synlige tegn på plantesykdommer og angrep av skadedyr og forklarer de vanlige brukte faguttrykk for disse symptomer.

Annet avsnitt «Årsaker og smitteforhold» gir en generell introduksjon til de grupper av sykdommer og skadedyr, som senere i boken behandles mer inngående. En skjematisk oversikt (s. 16) over smittemåter for de forskjellige sykdommer, er meget instruktiv.

Under omtalen av insekter redegjøres forholdsvis kort for deres ytre bygning og deres utvikling. Det er ikke lett på begrenset spalteplass å gi en klar beskrivelse av disse ting likeoverfor en ikke-fagkyndig lesekrets. Anmelderen tror imidlertid, at fornyet gjennomarbeidelse av dette avsnitt vil lønne seg ved neste utgave av boken. Det ville f. eks. være en fordel om det, allerede i det innledende avsnitt (s. 20), hvor insektkroppens hoveddeler og vedheng oppregnes, ble anført at alt er omgitt av et fast kitinpanser som er oppdelt i plater og ringer. Likeså at samtlige ledd er forbundet med elastisk bindehud. I foreliggende utgave er bindehuden bare nevnt under omtale av bakkroppen. Likeledes burde det presiseres at larvenes vekst sker i forbindelse med hudskifter. Av nåværende tekst vil muligens enkelte lesere få det inntrykk at hudskifter er et særtrekk for ufullstendig forvandling. En noe tydeligere pointering av at det bare er insekter med ufullstendig forvandling som har larver med ytre vingeanlegg, ville også være ønskelig.

Bokens hoveddel «Sjukdommer og skadedyr på de enkelte jordbruksvekster» er meget oversiktlig ordnet: «Korn og gras; Kløver og lusern; Potet; Bete; Gulrot; Korsblomstplanter» og for hver av disse innledes med en nøkkel hvor symptomene er gruppert etter plantens forskjellige deler, fra roten og oppover. Beskrivelsen av de enkelte skadeformer er fyldig og tallrike sidehenvisninger til tekst, figurer og fargeplansjer gjør det lett å finne frem i det fyldige stoff. Et eget avsnitt «Skadedyr som angriper flere vekster» følges av kortere oversikter «Mangelsjukdommer»; «Klimaskader og uheldige jordbunnsforhold»; Kjemikalieskader»; «Bekjempelse». Boken avsluttes med et register og en fyldig plansjetekst.

Det bør være en selvfølge at dette smukke verk anskaffes til alle offentlige biblioteker, også entomologer vil her finne samlet en mengde interessante opplysninger om skadeinsekters biologi og forekomst i vort land.

Leif R. Natvig

Eldre bind av

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Særtrykk selges av følgende avhandlinger:

K. HAANSHUS: *Fortegnelse over Norges Lepidoptera.* — N.E.T., Bd. III 1933. Kr. 2,—.

H. HOLGERSEN: *Bestemmelsestabell over norske maur.* — N.E.T., Bd. VI, 1943. Kr. 2,—.

A. NIELSEN: *Bidrag til Rogalands macrolepidopterfauna, med særlig henblikk på Jæren.* — N.E.T., Bd. X, 1956. Kr. 3,—.

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