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NORSK ENTOMOLOGISK FORENING

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Spiders and Harvestmen from Möre & Romsdal and Tröndelag, Norway

ERLING HAUGE

Hauge, E. 1972. Spiders and Harvestmen from Möre & Romsdal and Tröndelag, Norway. *Norsk ent. Tidsskr. 19,* 117–121.

The present paper gives a list containing 65 species of spiders (Araneae) and 3 species of Opiliones collected in various deciduous forests in Möre & Romsdal and Tröndelag, Norway. Five of the spider species must be considered as the first records in Norway. These species are: *Agyneta conigera* (Cambr.), *Meioneta beata* (Cambr.), *Mioxena blanda* (Sim.), *Minicia marginella* (Wid.) and *Pelecopsis nemoralis* (Blw.).

Erling Hauge, Zoological Museum, University of Bergen, N-5000 Bergen, Norway

By commission of Norsk IBP (Conservation of Terrestrial Communities), there have been made, during the summer of 1971, faunistic collections in some areas with deciduous forest in Möre & Romsdal and in Tröndelag. The collections were accomplished by Mr. Dag Dolmen, NLTH. The methods used were mainly net-catching in the foliage of the trees and in the grass on the ground, but also searches under stones and bark, etc. At two localities (VII and XIV) Barber traps were used. Araneae and Opiliones were sent to me for identification.

Knowledge of Norway's Arachnid fauna is still very poor, and this is particularly true for the parts of our country mentioned above. Information about the spider fauna in Tröndelag mainly emanates from Storm (1898) (later on partly revised by Tambs-Lyche (1941)), and Cooke (1967), who also gives some records from Möre & Romsdal. Beyond these sources, practically nothing seems to have been recorded from these areas.

With this background, I feel justified in presenting a complete list of the 65 species of Araneae and 3 Opiliones I have identified, although some of the species are very common elsewhere.

In the brief presentation of the localities below, I have decided to number by the Roman numerals I–XIV, and in the following species list to refer to the localities and collecting periods with these numerals in brackets.

LOCALITIES

Möre & Romsdal

I. MRy: Tingvoll, Eikrem. Oak forest, collecting period 12–14 July.

II. MRi: Surnadal, Kalsetlia, Böfjorden. Large, rich growth of elms and hazel, 10–11 July.

III. MRi: Surnadal/Rindal, between Almberg and Dalsegg. Mountain side with elms, 6–9 July.

IV. MRy: Nesset, Eikesdal. Growth of elms and hazel, 15–16 July.

V. MRy: Tingvoll, Vulvik. Elm forest, 12–14 July.

Tröndelag (south)

VI. STi: Skaun, southern part of Buvikåsen. Some small hazels only, 18 June.

VIIa. STi: Byneset, Bosbergtröen/Lerdal. Mountainside with elms, 16–21 June.

VIIb. STi: Byneset, Bosbergtröen/Lerdal. Mountainside with elms, 8–9 Sept.

VIIc. STi: Byneset, Bosbergtröen/Lerdal. Bogs, 16–21 June.

VIII. STi: Stören, Rognes, Growth of elms, 18–19 Aug.

IX. STy: Snillfjord, Krogstadöra. Growth of elms, 17–18 Aug.

Tröndelag (north)

X. NTy: Næröy, Grytbogen forest, in the innermost part of Foldenfjorden. Growth of elms, 9 Aug.

XI. NTy: Næröy, Teplingen forest, in the innermost part of Foldenfjord. Growth of elms, 8 Aug.

XII. NTi: Steinkjer, Byahalla. Growth of elms, 2–3 Aug.

XIII. NTi: Snåsa, Seem forest. Growth of black alder, 4–5 Aug.

XIV. NTi: Grong, Sanddödalen. Growth of elms, 6 Aug.

LIST OF SPECIES

Linyphiidae:

Gonatium rubellum (Blw.). Five ♀♀ + 4 ♂♂ (I), 1 ♀ + 1 ♂ (II), 2 ♀♀ + 1 ♂ (IV), 3 ♀♀ (V), 12 ♀♀ + 5 ♂♂ (VIII), 4 ♀♀ + 4 ♂♂ (IX), 2 ♀♀ (X), 3 ♀♀ + 1 ♂ (XII), 8 ♀♀ + 3 ♂♂ (XIII), 2 ♀♀ + 3 ♂♂ (XIV).

Tiso vagans (Blw.). One ♂ (I). Previously recorded only from the vicinity of Stavanger and Hop near Bergen (Strand 1902a).

Savignia frontata (Blw.). Two ♂♂ (III).

Gongylidiellum rufipes L. Four ♀♀ + 1 ♂ (III), 3 ♀♀ + 2 ♂♂ (XII).

Entelecara acuminata (Wid.). Two ♀♀ + 1 ♂ (III), 3 ♀♀ + 1 ♂ (vIIa), 2 ♀♀ (VIIc), 2 ♀♀ (XII).

Agyneta conigera (Cambr.). One ♀ (III). Hitherto no records published from Norway. In the Skjomen fjord (Nnv: Ankenes) I have taken 6 ♀♀ and 1 ♂ of this species in the summers of 1967 and 1968 (unpublished).

Dismodicus bifrons (Blw.). One ♀ (V), 1 ♂ (VIIa), 1 ♀ (XII), 1 ♀ (XIV). Strand (1902a) has collected 4 specimens from Suldal, and considered the species to be common in Northern Norway. Strand (1906) recorded it from Vefsn, Hattfjelldal and Tysfjord (all Nordland). I found this species in Skjomen (Nnv: Ankenes), 1 ♀ 29 June 1968, on the ground in a birch forest about 400 m above sea level (previously unpublished), which must be considered as the most northern record in Norway.

Thyreosthenius parasitticus (Westr.). One ♀ (VI).

Centromerita bicolor (Blw.). One ♀ (VIIb).

Meioneta rurestris (C. L. Koch). One ♂ (VIIa).

M. beata (Cambr.). One ♂ (VIIa). This species should be regarded as new to the Norwegian fauna. In addition, I took 3 ♂♂ in a heather near Fonnes (HOy: Lindås) north of Bergen, in Barber traps 3–6 June 1971 (previously unpublished). According to Wiehle (1956) this species is known from England, France, Czechoslovakia and Germany. Holm (1968) also mentions Finland, the Netherlands and Switzerland.

Mioxena blanda (Sim.). One ♂ (VIII). The species is new to Norway. It is known from Germany, England, France and Switzerland (Wiehle 1960), from Denmark (Böggild 1962, Larsen &Böggild 1970), and from Sweden (Holm 1968).

Pelecopsis nemoralis (Blw.). One ♀ (IX). The species has a wide distribution in Europe, including our neighbouring countries, Sweden and Denmark, but has previously not been recorded from Norway. Fig. 1 shows the vulva of my specimen, which should not leave much doubt about the species.

Dicymbium tibiale (Blw.). One ♀ (XII).

Minicia marginella (Wid.). One ♂ (XIII). The species is new to Norway. According to Wiehle (1960) it is known from France, Switzerland, Northern Italy, Czechoslovakia, Austria and Germany. Palmgren (1965) has some records from Northern Finland.

Maso sundevalli (Westr.). One ♀ (VIIc). Previously recorded as far north as Skarmodalen in Nordland (Strand 1906). I found one female in Skjomen (Nnv: Ankenes) 25 August 1967 on *Juniperus communis* on a south faced, steep mountainside, and 4 ♀♀ + 1 ♂, 8 July 1971, in the ground cover of a birch forest near Harstad (Troms). From Arnöy/Skjervöy (Troms) I

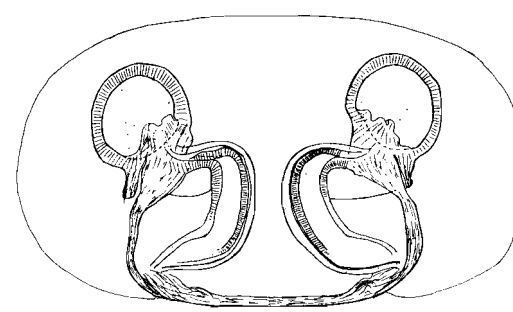

Fig. 1. *Pelecopsis nemoralis* (Blw.), vulva.

identified a female taken in Barber traps 17–21 August 1971 (T. Solhöy leg.).

Lepthyphantes obscurus (Blw.). One ♀ (I), 2 ♀♀ (V), 3 ♀♀ (VIIa), 1 ♀ (IX), 1 ♀ (XII).

L. zimmermanni Bertk. One ♂ (I).

L. tenebricola (Wid.). One ♂ (IV), 1 ♀ (VIIa), 1 ♀ (VIIb), 2 ♀♀ (VIII), 1 ♀ (X), 1 ♂ (XII), 1 ♀ (XIV).

L. alacris (Blw.). Two ♀♀ + 4 ♂♂ (VIIb), 4 ♀♀ (VIIa), 2 ♀♀ + 15 ♂♂ (VIII), 1 ♂ (IX), 1 ♀ (X), 1 ♀ (XI), 41 ♀♀ + 24 ♂♂ (XIII).

L. mengei Kulcz. One ♀ (VIIb), 1 ♀ (VIII), 1 ♀ (IX).

L. cristatus (Menge). One ♀ (VIIb), 1 ♀ (VIII), 1 ♀ (IX).

L. expunctus (Cambr.). Two ♂♂ (XII).

Linyphia clathrata Sundev. Two ♀♀ + 1 ♂ (I), 1 ♂ (IX).

L. peltata Wid. One ♂ (II), 2 ♀♀ (III), 3 ♀♀ + 1 ♀ (IV), 1 ♀ + 1 ♂ (V), 2 ♀♀ (VI), 7 ♀♀ + 2 ♂♂ (VIIa), 1 ♀ (IX), 2 ♀♀ (X), 3 ♀♀ (XI), 8 ♀♀ (XIII), 4 ♀♀ (XIV).

L. montana (Clerck). One ♂ (IV), 1 ♀ (VIIb), 7 ♀♀ (VIII), 1 ♀ (IX), 1 ♀ (X), 1 ♀ (XI).

L. triangularis (Clerck). Three ♀♀ (VIIb), 10 ♀♀ + 3 ♂♂ (XII).

L. pusilla Sundev. One ♀ (XII).

Pityohyphantes phrygianus (C. L. Koch). Three ♀♀ + 1 ♂ (III), 1 ♀ (VI).

Bolyphantes index (Thor.). One ♀ (VI).

B. alticeps (Sundev.). Four ♀♀ + 2 ♂♂ (VIIb), 61 ♀♀ + 67 ♂♂ (VIII), 1 ♂ (IX), 4 ♀♀ (X), 1 ♀ (XI), 7 ♀♀ (XII), 2 ♀♀ + 2 ♂♂ (XIII), 4 ♀♀ + 1 ♂ (XIV).

Helophora insignis Blw. One ♀ + 7 ♂♂ (VIIb), 30 ♀♀ + 5 ♂♂ (VIII), 1 ♀ (XIV).

Drapetisca socialis (Sundev.). One ♂ (VIIb), 2 ♀♀ (VIII), 1 ♂ (XI).

Bathyphantes nigrinus Westr. One ♀ + 2 ♂♂ (VIII), 2 ♀♀ + 1 ♂ (XII), 1 ♂ (XIII), 1 ♀ (XIV). Previously known only from Tysfjord, Nordland (Strand 1902b) and from Sogn (Kauri 1966).

Argiopidae:

Araneus diadematus Clerck. One ♀ + 1 ♂ (VIII), 2 ♀♀ (IX), 1 ♀ (XIV).

A. marmoreus Clerck. One ♀ (XIII).

A. sturmi (Hahn). One ♀ (XIII). Stören, south of Trondheim (Storm 1898) has hitherto been the most northern locality in Norway.

A. cucurbitinus Clerck. Two ♀♀ (I), 1 ♀ (II), 1 ♂ (V), 2 ♀♀ (VIIa), 2 ♂♂ (VIIc).

A. alpicus (L. koch). One ♀ (VIIa). The few Norwegian records of this species date back to Collett (1876): Asker, Åmot (Hedmark) and Folda (Namdalen).

A. umbricatus Clerck. One juv. (XIII).

Meta mengei (Blw.). One ♀ (II), 2 ♀♀ + 1 ♂ (III), 1 ♀ + 2 ♂♂ (V), 8 ♂♂ (VI), 1 ♀ (VIIb), 2 ♀♀ + 1 ♂ (X), 4 ♀♀ + 1 ♂ (XI), 1 ♀ (XIV).

Cyclosa conica (Pallas). 1 subad. ♂ (XIII), 1 ♀ (XIV).

Tetragnathidae:

Tetragnatha extensa (L.). One ♂ (III).

Pachygnatha listeri Sundev. One ♀ (III), 1 ♀ (VIII), 1 ♀ (XIII).

Theridiidae:

Robertus neglectus (Cambr.). One ♂ (I), 1 ♂ (VIII). Previously known only from Hadsel (Vesterålen) and Rösvannsholmen (Nordland) (Strand 1902b).

Theridion pallens Blw. One ♂ (III), 1 ♀ (IV), 1 ♀ + 1 ♂ (VIIa), 1 ♀ (VIII).

T. ohlerti Thor. One ♂ (III). Rare, previously found near Trondheim and in Hallingdal (Strand 1899).

T. sisyphium (Clerck). Two ♀♀ (VIIa).

T. varians Hahn. One ♂ (XII).

Dictynidae:

Dictyna arundinacea L. One ♂ (VI), 1 ♀ (XI).

Lycosidae:

Xerolycosa nemoralis (Westr.). One ♀ + 3 ♂♂ (VI).

Pardosa cursoria C. L. Koch. One ♀ (VI).

P. lugubris (Walck). One ♀ + 1 ♂ (I), 3 ♀♀ (II), 3 ♀♀ + 1 ♂ (III), 4 ♀♀ (V), 2 ♀♀ (VI), 2 ♀♀ + 3 ♂♂ (VIIa), 3 ♀♀ (VIII), 1 ♀ (XII), 1 ♀ (XIV).

P. amentata (Clerck). One ♀ (II), 1 ♀ (III), 2 ♀♀ (VIIa), 1 ♀ (XII).

P. tarsalis (Thor.). One ♀ (II).

P. pullata (Clerck). One ♀ (II)

Trochosa terricola Thor. One ♀ (XII).

Tarentula pulverulenta (Clerck). One ♀ + 1 ♂ (VI).

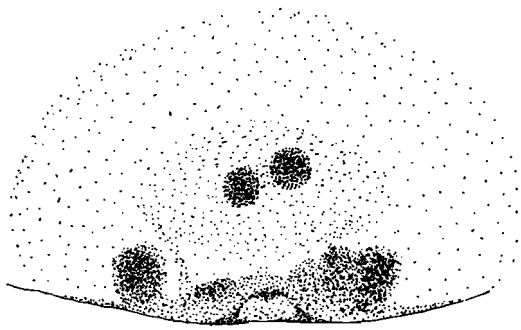

Fig. 2. *Clubiona subsultans* Thor., epigyne.

Thomisidae:

Xysticus cristatus (Clerck). One ♀ (VI), 1 ♀ (VIII), 1 ♀ + 1 ♂ (IX), 1 ♀ (XIV).

Misumena vatia (Clerck). One ♀ + 2 juv. (VI). Previous records: Mostadmarken near Trondheim (Storm 1898) and Hövåg, Indre Årsnes, Aust-Agder, 1 ♂ 28 May 1971 (det. E. Hauge, leg. K. Syvertsen).

Tibellus oblongus (Walck.). One ♀ (II), 4 ♀♀ + 1 subad. ♂ + 5 juv. (IX)

T. maritimus (Menge). One ♀ (VIIb).

Gnaphosidae:

Haplodrassus signifer (C. L. Koch). One ♀ (VI).

Clubionidae:

Clubiona subsultans Thor. One ♀ (VI). The epigyne of this specimen (Fig. 2) is somewhat irregular, and it is thus difficult to identify the specimen with any certainty, but the vulva (Fig. 3) shows the same basic plan as given in the drawings made by Wiehle (1965, Fig. 84) and Tullgren (1946, Fig. 8), and there should not be much doubt about the species. However, the two receptaculae have an ovoid shape in the drawings of both Wiehle and Tullgren, whereas on my specimen they are almost circular. They are heavily chitinized, and can be seen through the epigyneal plate (Fig. 2) as two dark spots, laying close together, but assymetrical in proportion to the median line.

The circular shape of the receptaculae may be due to a coincidence, depending on the angle by which the vulva is looked upon. In Fig. 3 the receptaculae point towards the observer. Looked upon from further behind, the receptaculae have a more ovoid or sack-like shape, as indicated in Fig. 4, and they are much more chitinized in the tips than elsewhere,

My specimen is consistent with the description of *Clubiona subsultans* given by Tullgren (op. cit.) in almost every detail, i.e. in colour, spines on the legs, the eyes. The outer row of the chelicerae has 6 teeth, as described by Tullgren, but the inner row has four teeth instead of three, two equal larger teeth and two (distal) very small teeth.

Total length of my specimen is 7.91 mm, carapace is 2.98 mm long and 2.08 mm broad.

Measurement of the legs (ta.- Mt.- Tib.- pat.-fem.):

I (0.78-1.15-1.57-1.11-1.88) = 6.49 mm,
II (0.78-1.15-1.16-1.11-1.84) = 6.49 mm,
III (0.59-1.41-1.24-0.86-1.64) = 5.74 mm,
IV (0.70-2.27-2.20-1.00-2.20) = 8.37 mm.

C. reclusa (Cambr.). One ♂ (X).

Opiliones:

Mitopus morio (Fabr.). Seems to be common on all localities.

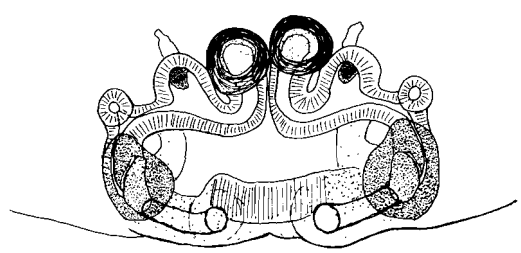

Fig. 3. *Clubiona subsultans* Thor., vulva.

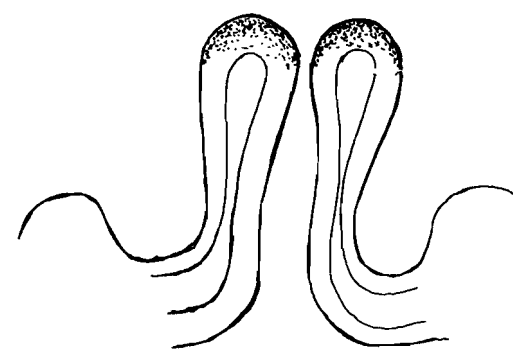

Fig. 4. *Clubiona subsultans Thor.*, receptaculae seen from behind.

Platybunus triangularis (Herbst). Localities: V, VIIa, XIII.

Megabunus diadema (Fabr.). Localities: I, II and V.

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Physocyclus simoni Berland (Araneae, Pholcidae) New to Norway

FINN ERIK KLAUSEN

Klausen, F. E. 1972. *Physocyclus simoni* Berland (Araneae, Pholcidae) New to Norway. *Norsk ent. Tidsskr. 19,* 123–125.

A spider new to Norway, *Physocyclus simoni* Berland, is described. Its locality and total distribution in Europe are given.

Finn Erik Klausen, Zoological Museum, University of Bergen, N-5000 Bergen, Norway

The first time I captured *Physocyclus simoni* Berland was on 17 Nov. 1967. It was collected from a fruit case delivered by a grocery in Bergen. The specimen was an adult female. The second time I caught the species was on 9 Dec. 1971 in the wine cellars of Vinmonopolet A/S in Bergen. This specimen was a female too, but it was immature. The locality was visited for a second time 10 Feb. 1972, when I got hold of five more specimens. They consisted of 1 adult female, 1 adult male; 2 females and 1 male, all immature. In addition, I collected about a dozen exuviae and counted a few dozen more hanging from the walls. This may be of some interest, since it gives a hint of conditions tolerable enough to make the place a suitable habitat.

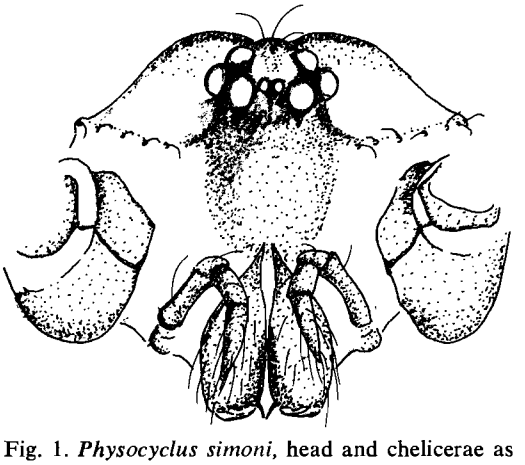

Fig. 1. *Physocyclus simoni,* head and chelicerae as seen from in front.

The species is hitherto not recorded from Scandinavia. It has undoubtedly been imported, probably from France or England.

DESCRIPTION OF CHARACTERS

The adult specimens are approximately 3 mm long with legs up to 10 mm. The legs, which are extremely long in proportion to the body, are brown, sometimes with a greenish tinge on the femur. The tarsi are falsely segmented in the same way as in the Opiliones.

The carapace, which is broader than long, is either light brown or light grey with blue-green in the foeval region. Perhaps the latter is a characteristic of newly molted specimens. The head is sharply divided from the thoraric region and has a wide and concave clypeus.

The eyes, as shown by Fig. 1, are set in a pattern typical of the family Pholcidae, to which the species belongs. The anterior laterals, together with the posterior laterals and

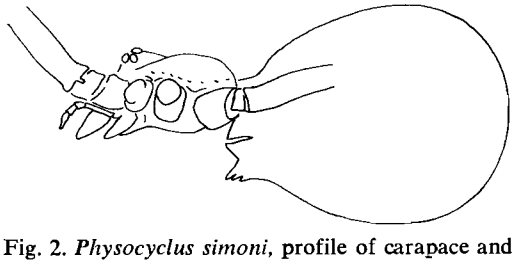

Fig. 2. *Physocyclus simoni,* profile of carapace and abdomen.

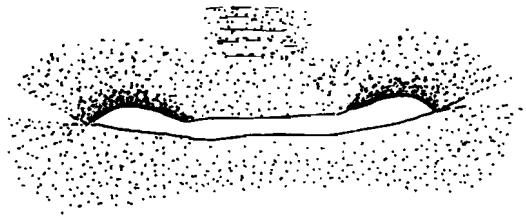

Fig. 3. *Physocyclus simoni*, epigyne.

medians, are set close to each other, forming a triangle on each side of the head. In comparison the anterior medians are very small, sitting close together in front of the head.

The chelicerae converge towards the base, having a conspicuous tooth on the inner margin. In addition, the male has a large tooth on the outside of the basal segment.

The abdomen is almost globular, coloured light brown with 2–3 whitish transverse bars on the back. Spinners are drawn ventrally, close to the epigastric fold (Fig. 2). The epigyne is very simple, just forming a transverse slit (Fig. 3).

Male palp is shown in Fig. 4.

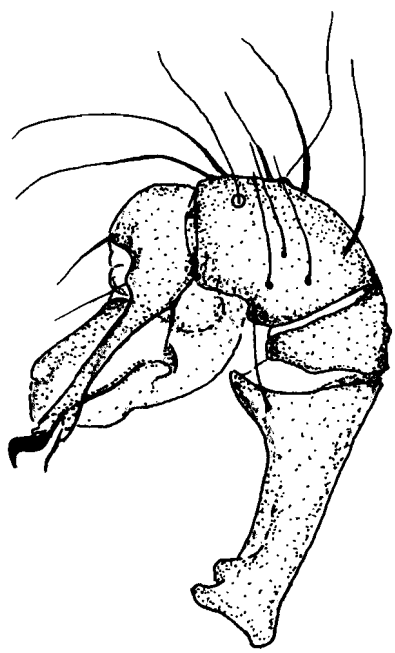

Fig. 4. *Physocyclus simoni*, male palp.

DESCRIPTION OF LOCALITY

The specimen from the first locality was brought up in the fruit case from the cellar of the grocery. The second locality, the wine cellars of Vinmonopolet, consists of several huge rooms made up of concrete walls. Casks and bottles, piled up in the cellars, form corners and cavities which facilitate the building of webs. The species seemed to prefer the darker corners along the floor. I could find no specimens, webs, or exuviae along the ceiling, which were illuminated by electric bulbs. The localities have no means of heating; in spite of this the temperature is fairly constant, about 13 °C the whole year. The humidity is very low.

DISTRIBUTION AND RECORDS FROM OTHER COUNTRIES

France: The first country in which the species was recorded. First recorded by Berland in 1911 from the cellars of the Sorbonne. Believed to be accidentally introduced to the country, since known members of the genus live mainly in the tropical regions of Africa and South-America. Origin thought to be unknown. Several later captures have confirmed it to be a true member of the French fauna.

England: First discovery in Bury St. Edmunds (Bristowe 1933). Since then found in a dozen other counties. Thought to be originally imported with wine from France, reported to be found exclusively in dry wine cellars.

Switzerland: One record by Comellini (1954).

Poland: One record by Dziabaszewski (1967).

Denmark: One record from the cellars of the Museum of Zoology in Copenhagen in 1956, two from the cellar of a cheesemonger in Randers in 1959 and 1960 (Brændegård 1966).

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The Number and Size of Drifting Nymphs of Ephemeroptera, Chironomidae, and Simuliidae by Day and Night in the River Stranda, Western Norway

IVAR STEINE

Steine, I. 1972. The Number and Size of Drifting Nymphs of Ephemeroptera, Chironomidae, and Simuliidae by Day and Night in the River Stranda, Western Norway. *Norsk ent. Tidsskr. 19,* 127–131.

Observations on the drift fauna in River Stranda (Voss, western Norway) were carried out in August 1969. Quantitative samples were taken at hourly intervals throughout a 24-hour period at two different localities in the river Stranda. The nymphs of Ephemeroptera, Chironomidae, and Simuliidae were most abundant. The body size of drifting nymphs of the Ephemeroptera varied according to the time of day, with small individuals making up the population during day-time and larger animals at night. No such diurnal change was observed in the case of the Chironomidae and Simuliidae.

Ivar Steine, Zoological Museum, University of Bergen, 5000 Bergen, Norway

The downstream transport of benthic organisms in the rivers has for some time been recognized as an important feature of lotic life. The drift fauna has been especially studied with respect to its circadian rhythm, but a number of investigations have dealt with drift as a component of population ecology (summarized by Müller (1966) and Ulfstrand (1968)). The possibility that different instars in a population may predominate in the drift at different times of day and night does not seem to have attracted much attention. It is with this latter problem we are concerned.

STUDY AREA

The study area is located in Strandavassdraget, Voss, western Norway. The drainage area is 368 km^2 at the outlet of lake Lundarvatn (Fig. 1). Two water courses were investigated. Locality A, Vinje (Fig. 2) on the first, is situated 2 km from the centre of the village of Vinje, about 190 m a.s.l. Locality B, Lönavatn (Fig. 3), on the second, is at the eastern inlet to lake Lönavatn about 80 m a.s.l. The distance between the stations is approximately 9 km. Both stations comprise flat river areas which provide suitable conditions for sampling. The substrate is quite homogeneous and consists of sand and various sizes of bare stones. Above Loc. A and for some distance between the stations, the bottom is covered by moss. The water has a high oxygen content and low conductivity. The streams above Lönavatn are little affected by human activity.

METHODS AND MATERIAL

Samples were taken with a Larsen sampler (Mossestad 1972) (Fig. 4). The sampler was 80 cm long excluding the net and 12.5 cm wide. The net-bag was 100 cm long and had a mesh size of 0.25 mm. Sampling was carried out at a constant distance above the bottom. At Loc. A the sampler was placed so that its centre was 34 cm from the bottom, at Loc. B 31 cm. Due to reduced water-flow during the investigation periods (Fig. 5), the total depth of the stream was reduced from 57 to 48 cm at Loc. A, and from 43 to 40 cm at Loc. B.

All samples were thus taken in the upper water layers (Ulfstrand 1968). One series was

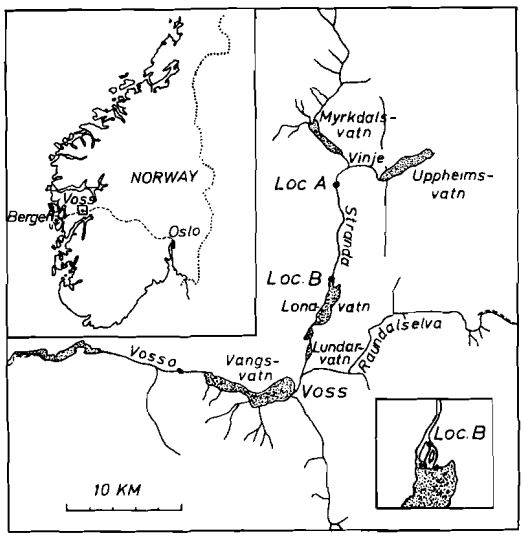

Fig. 1. Map of the water system and its situation in western Norway.

taken over 24 hrs at each station. Samples were taken during the first 30 min of each hour at Loc. A and during the first 55 min of each hour at Loc. B. The water temperature, light conditions, and water flow were recorded at the same time.

Sampling at Loc. A was carried out on 1 and 2 Aug. 1969 and at Loc. B on 4 and 5 Aug. It should be noted that sampling at Loc. A was carried out after a period of rain. Further rain later increased the water flow but this was decreasing again by the time sampling took place at Loc. B.

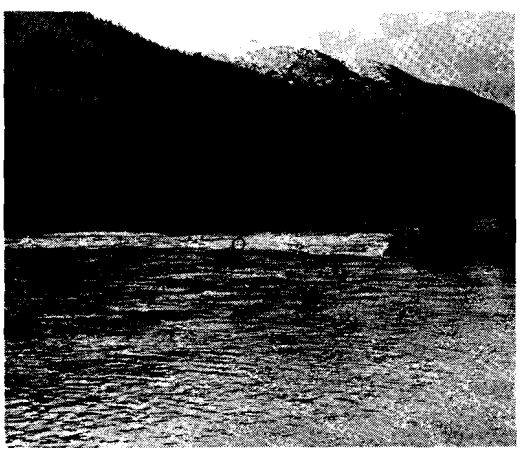

Fig. 2. Loc. A (Vinje) Strandaelva. The sampling site is indicated by a circle. The water-flow was about 30 m^3/sec when the photograph was taken. Photo I. Steine, May 1972.

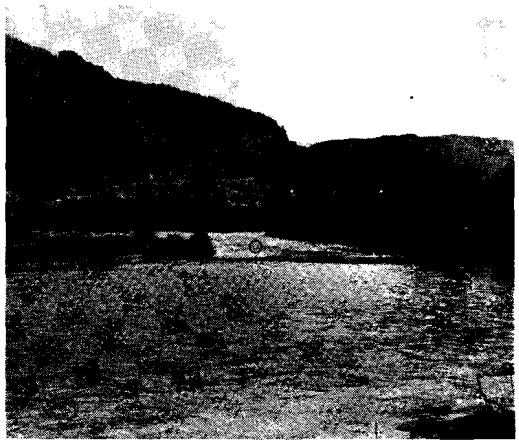

Fig. 3. Loc. B (Lönavatn) Strandaelva. The sampling site is indicated by a circle. The water-flow was about 30 m^3/sec when the photograph was taken. Photo I. Steine, May 1972.

DIURNAL RHYTHM AND ANIMAL SIZE

The diurnal rhythm in the drift of nymphs of Ephemeroptera, Chironomidae, and Simuliidae is illustrated in Fig. 5. For all these groups an increase in the drift occurred during the periods of dark. In the case of the Ephemeroptera and Chironomidae, this is most noticeable at Loc. B, and in the case of the Simuliidae at Loc. A. The wet weight of the nymphs of Ephemeroptera varied during the period of observation (Fig. 6); during the light periods small nymphs made up the greatest part of the drift, while

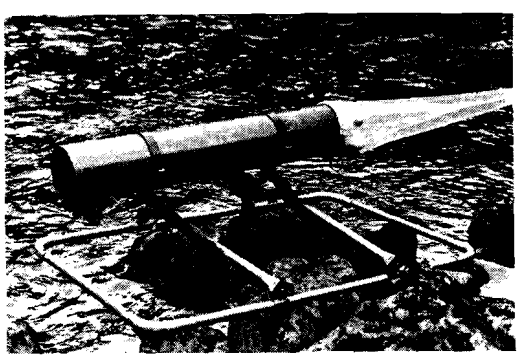

Fig. 4. The Larsen sampler. Photo I. Steine.

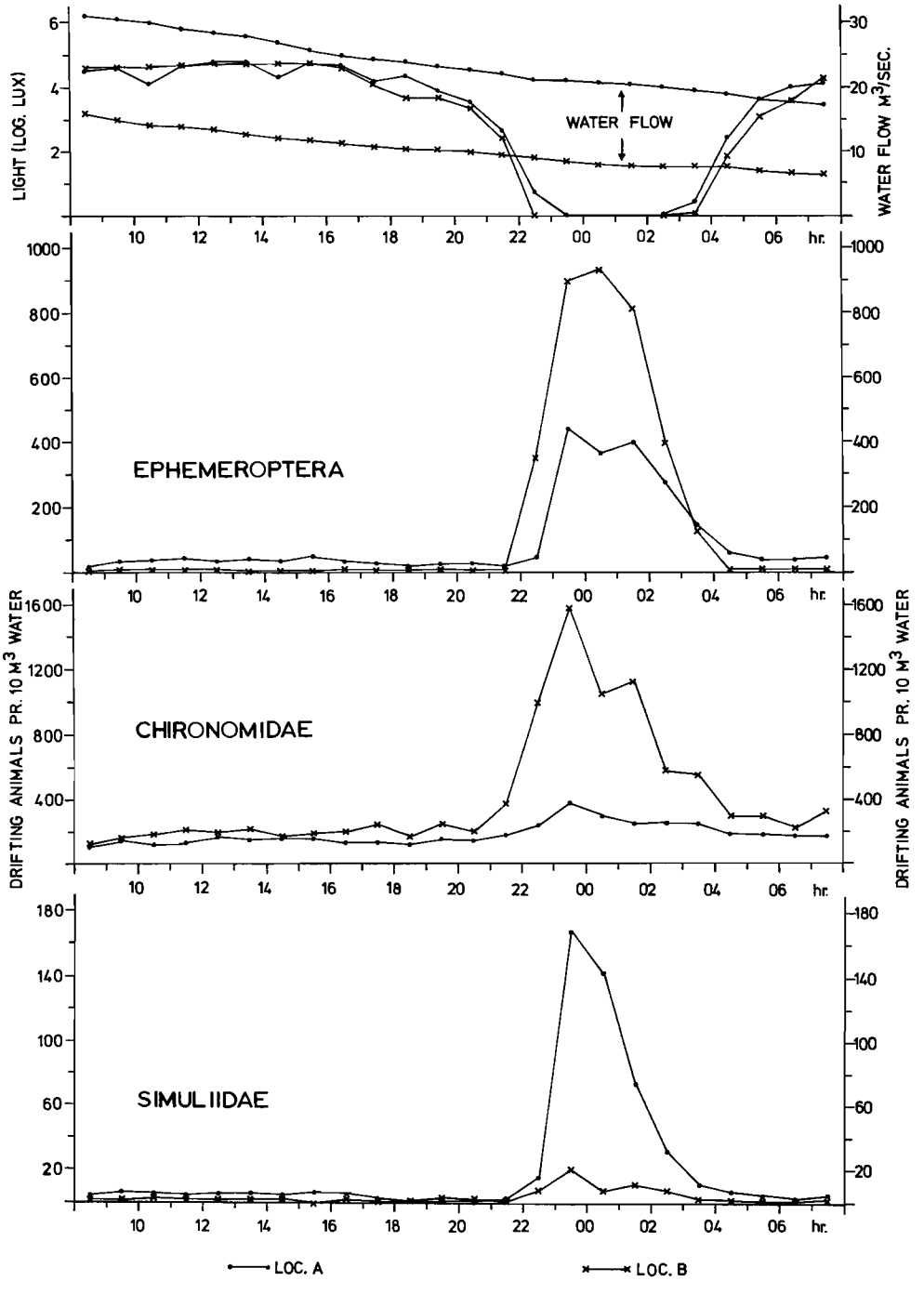

Fig. 5. Drifting animals obtained during the first 30 min of each hour at Loc. A (1–2 Aug. 1969) and during the first 55 min of each hour at Loc. B (4–5 Aug. 1969). The light conditions and water flow during the observation periods are also given.

larger animals dominated in the dark periods. The pattern is the same at both localities. A corresponding pattern was not observed in the case of the Chironomidae and Simuliidae, although some observations indicate a slight increase in individual size of the Simuliidae during the dark periods.

DISCUSSION

Several investigations on drift have been carried out in recent years and hace been summarized by Waters (1972). The possibility that different instars in a population might predominate in the drift at different times of day and night does not seem to have attracted much attention. Anderson & Lehmkuhl (1968), however, have discussed the problem in connection with investigations of 'catastrophic drift' due to freshets. They found that specimens of some genera of Ephemeroptera and of Chironomidae collected at night were heavier than those collected during the day-time. Müller (1966) confirmed that the maximum drift of baetid mayflies occurs immediately before metamorphosis and shortly before pupation in the case of the Simuliidae. Anderson (1967) reported that the activity of caddis-fly larvae depended upon their size, the large larvae being active at night, while the early larvae were active during the day-time.

During the present study the chironomid population only consisted of very small individuals. Newly hatched individuals were the most abundant in the populations of Ephemeroptera and Simuliidae too, but there were also some larger individuals. The increasing activity of the Ephemeroptera during the dark at Loc. A and Loc. B, however, does not seem to be associated with impending metamorphosis (Müller 1966).

The flow of water during the period of observation has been calculated to vary between 17 and 31 m^3/sec at Loc. A, and 7 and 16 m^3/sec at Loc. B (Fig. 5). As the water-flow diminished during the observation periods, the results are not thought to be affected by freshets, although the flow at Vinje on 30th July 1969 was estimated to be about 75 m^3/sec. In May 1971, when snow was melting and there had been heavy rainfall, a water-flow of 145 m^3/sec was recorded at Vinje.

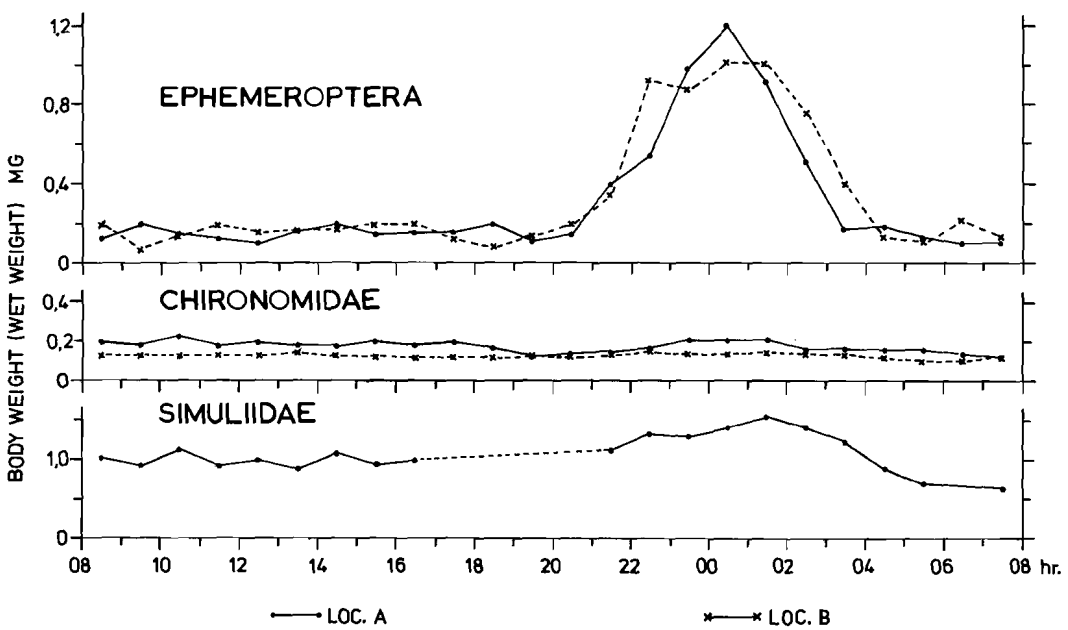

Fig. 6. Comparison of mean weights per individual at Loc. A and Loc. B during the observation periods.

Elliott (1967b) and Ulfstrand (1968) have established that the drift of insects increases with flow volume. Anderson & Lehmkuhl (1968), however, suggest that the number of drifting insects per unit volume of water is similar before and during freshets. Several investigators have indicated a diurnal rhythm in drift which is dependent not only on external factors, but also on intrinsic ones. The controlling factor, however, is usually the light intensity.

The question as to the cause of the greater size of the animals drifting during darkness does not seem to have been discussed directly in the literature. I think there may be a very simple explanation. When animal populations consist of various stages of development, it may be expected that the older and larger individuals are stronger than the small ones and are better able to occupy the best retreats. Thus the smaller, weaker animals are restricted to less favourable hiding places, i.e. the more exposed parts of the substrate. This would result in the small animals being easily swept away sown the river. According to Waters (1965) this represents 'constant drift', which occurs throughout the whole 24-hr period. In the case of Ephemeroptera, their typical greater activity at night will result in the larger specimens emerging from their hiding places then and appearing in the drift. This can be regarded as 'behavioral drift' (Waters 1965). The evidence for increased drifting during the later stages in the life cycle has been reviewed by Waters (1972) and he also discussed the varios theories relating to this phenomenon. It has often been suggested that increased drift may be a result of increased activity before pupation or emergence, when mature larvae move to more suitable areas.

The present observations indicate that the Ephemeroptera, Chironomidae, and Simuliidae were affected by the light intensity. The population of Ephemeroptera consisted of relatively young individuals of which the largest predominated at night. It has already been pointed out that this is not a consequence of greater activity before emergence. The pattern of change of mean body size of the drifting Ephemeroptera should be regarded as a reflection of 'behavioral' drift of nocturnal animals at night and of a casual drift of smaller animals during the day-time.

ACKNOWLEDGEMENT

Bergenshalvöens kommunale kraftverk (The municipal power company of the city of Bergen and surrounding districts) supported the project in Strandavassdraget between 1969 and 1971, of which this work forms a part. Professor Hans Kauri supervised the investigations and provided valuable advice. I also wish to express my gratitude to Dr. J. Matthews for checking the English.

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Mites (Acari, Gamasina) from Small Mammals in Norway

ANDERS EDLER & REIDAR MEHL

Edler, A. & Mehl, R. 1972. Mites (Acari, Gamasina) from Small Mammals in Norway. *Norsk ent. Tidsskr. 19*, 137-147.

3747 gamasid mites of 27 species were collected from small mammals in Norway. All species were new to Norway. The host relationship and distribution are discussed. Distribution maps of 15 species are presented. In Scandinavia, the mountain species *Laelaps clethrionomydis*, *Haemogamasus nidiformis*, and *Hirstionyssus tatricus* occur at lower altitudes with increasing latitude.

Anders Edler, Department of Animal Ecology, University of Lund, S-22362 Sweden
Reidar Mehl, Zoological Museum, University of Oslo, Sars gt. 1. Oslo 5, Norway

The present paper deals with mite material from independent Norwegian and Swedish investigations of small mammals and their ectoparasites. The Norwegian study was carried out by R. Mehl, Oslo, and the Swedish by A. Edler, Lund, who identified some species and the nymphs in Mehl's collection as well. The rest of the mites from the Norwegian investigation were determined by Mehl. Although in the last few years papers on gamasid mites from Scandinavia and Finland have been published (Mrciak & Brander 1965, Edler 1968, 1969, 1972 a, b and 1973, Mehl 1971, 1972), this is the first survey of mites from small mammals in Norway. Data on the geographical distribution and the host specificity of the mites are presented.

LOCALITIES

Each locality listed below has a number that corresponds to the number on the map (Fig. 1.) The localities are arranged according to the counties of Norway. For most of the localities, the altitude and the mammals collected are given, but there are no descriptions of the localities themselves. Four photos, however, show typical and common biotopes (Figs. 2, 3, 4, 5).

Finnmark

1. Vadsö, 17 Aug. 1969, *C. rufocanus* and *M. oeconomus*.
2. Kobholmfjorden, Sör-Varanger 19 June 1966, 50 m, *C. rufocanus*.
3. Vinterfiskevann, Övre Pasvik, Sör-Varanger 9–18 June 1966, 100 m, *C. rutilus*.
4. Nyrud, Sör-Varanger 11–17 July 1966, 40 m, *C. rutilus*, *C. rufocanus* and *M. oeconomus*.
5. Ellejavrre, Sör-Varanger 27 June – 3 July 1966, 100 m, *C. rutilus*.
6. Festningstua, Porsanger 6–7 Aug. 1924, 500 m *M. oeconomus* (ZMO).
7. Bossekop, Alta 28 June 1968, 50 m, *S. araneus*, *S. caecutiens*, *C. rutilus* and *M. agrestis*.
8. Talvik, Alta 3–6 Aug. 1969, *C. rufocanus*.
9. Masi, Kautokeino 6 Aug. 1969, 300 m, *M. agrestis*.

Troms

10. Storslett, Nordreisa 27 June 1968, 20 m, *S. araneus*, *S. caecutiens* and *M. agrestis*.
11. Kirkenes, Storfjord 26 June 1968, 50 m, *C. rutilus* and *M. agrestis*.
12. Kirkenesseter, Iselvdal, Målselv 28–29 July 1969, 410 m, *L. lemmus* and *M. agrestis*.
13. Kirkesjord, Målselv 28–30 July 1969, 200 m, *M. agrestis*.
14. Harstad 24–25 June 1968, 50 m, *S. araneus* and *C. rutilus*.

Nordland

15. Ballangen 7–8 June 1970, 30 m, *S. araneus* and *M. agrestis*.

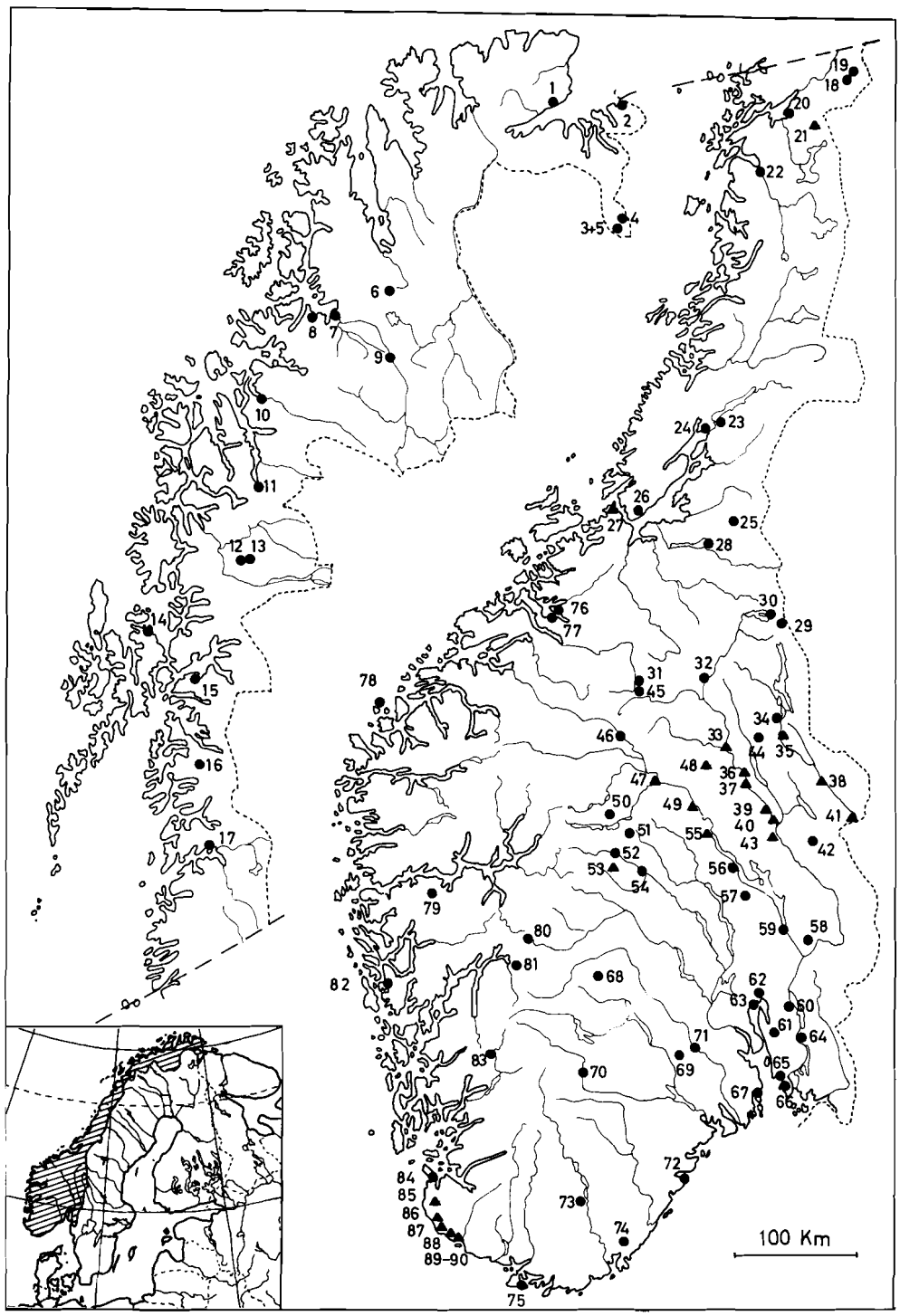

Fig. 1. Norway with the collecting localities. ● = Norwegian investigation, ▲ = Swedish investigation.

16. Kråkmoen, Hammaröy 9 June 1970, 80 m, *C. glareolus* and *M. agrestis.*
17. Fauske 22–23 June 1968, 50 m, *S. araneus* and *C. glareolus.*
18. Virvassdalen, Rana 20 July 1969, 400 m, *C. glareolus* and *M. agrestis.*
19. Andfjell, Rana 20 July 1969, *M. agrestis.*
20. Fagermoen, Rana 19 July 1969, 50 m, *C. glareolus.*
21. Oksfjellelven, the river outlet in Grasvatn, Hemnes 30 June 1964, 585 m. *M. agrestis.*
22. Mosjöen, Vefsn 21 June 1968, 20 m, *S. minutus* and *C. glareolus.*

Nord-Tröndelag

23. Vanderås near Snåsavatnet, Steinkjer 18 June 1970, 50 m, *S. araneus*, *M. agrestis* and *M. musculus.*
24. Vassaunet, Steinkjer 23–26 July 1970, *S. araneus* and *C. glareolus.*
25. Meråker 27 June and 6 July 1967, *C. glareolus* and *C. rufocanus.*
26. Kvernsjö, Leksvik 19 June 1970, 250 m, *S. araneus* and *C. glareolus.*

Sör-Tröndelag

27. Hambåra, Agdenes 5–14 July 1967 and 6 July 1968, *S. araneus*, *N. fodiens*, *C. glareolus* and *M. agrestis*

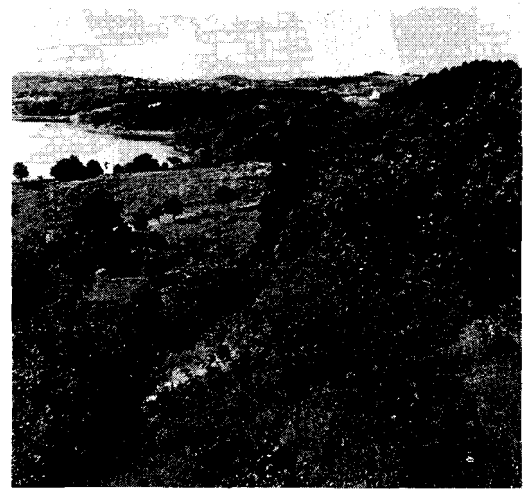

Fig. 2. Locality No. 84, Stavanger, with meadows and deciduous trees as oak, maple, willow and birch. Similar vegetation in loc. No. 87, 88, and 90.

28. Eidem, Selbu 17 June 1970, 160 m, *C. glareolus*
29. Riksgrensa, Röros 25 May 1964, ca. 800 m, *L. lemmus.*
30. Brekken, Röros 25 May 1964, ca. 700 m, *L. lemmus.*
31. Kongsvoll, Oppdal 10–12 Sept. 1963, 1000 m, *S. araneus*, *L. lemmus*, *C. glareolus*, *M. oeconomus* and *M. musculus.*

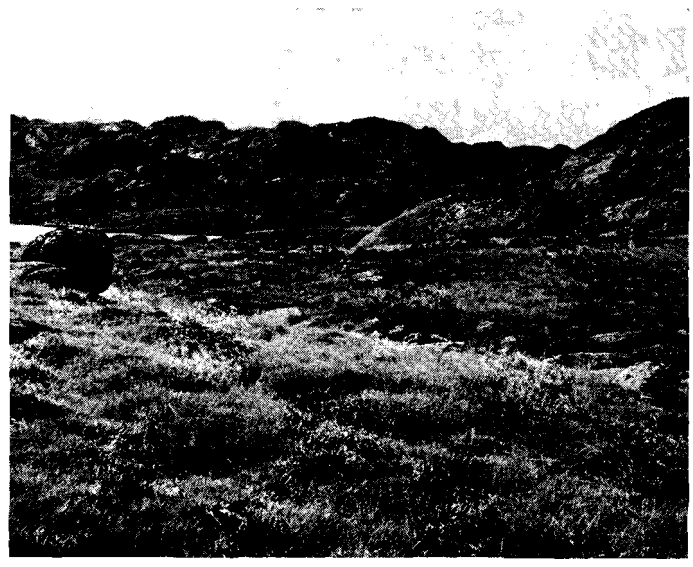

Fig. 3. Heath, a common type of vegetation, on Jaeren, Rogaland County, loc. No. 89. Photo A. Edler.

Hedmark

32. Tynset 18 June 1967, 500 m, *M. oeconomus* and *M. musculus.*
33. Kjölsberget and by the river Glomma, Atna, Rendalen July 1967, 1968 and 1969, 350–450 m, *C. glareolus, C. rufocanus, M. agrestis* and *M. musculus.*
34. Isterfoss, Engerdal 16 June 1970, 650 m, *C. glareolus.*
35. Myrvang, Engerdal July 1967, 1968 and 1969, 650 m, *S. minutus, S. araneus, L. lemmus, C. glareolus, C. rufocanus* and *M. musculus.*
36. Koppang, Stor-Elvdal July 1967, 1968 and 1969, 340 m, *S. araneus, N. fodiens* and *C. glareolus.*
37. Sagstua, Stor-Elvdal, July 1967, 1968, and 1969, 300 m, *S. araneus, N. fodiens* and *C. glareolus.*
38. Jordet, Trysil July 1967, 1968, and 1969, 400 m, *S. minutus, S. araneus, S. isodon, C. glareolus, C. rufocanus* and *C. glareolus/C. rufocanus* hybrid.
39. Kvernmo, Stor-Elvdal July 1967, 1968 and 1969, 220 m, *S. araneus* and *C. glareolus.*
40. Alme, Rena, Åmot July 1967, 1968 and 1969, 250–300 m, *S. minutus, S. araneus* and *C. glareolus.*
41. Sandkilfossen, Trysil July 1967, 1968 and 1969, 320 m, *S. minutus, S. araneus, S. isodon, C. glareolus, C. rufocanus* and *M. agrestis.*
42. Kynnberget, Elverum 19 Oct. 1969, Ca. 450 m, *A. flavicollis.*
43. Åsta, Åmot July 1967, 1968 and 1969, 300 m, *S. minutus, S. araneus, C. glareolus, M. agrestis, M. oeconomus.*
44. Misterosen, Misterlia and Misterlibekken, Rendalen 8–9 Dec. 1963, 15 Oct. and 2 Nov. 1969, 260–700 m, *L. lemmus, C. glareolus* and *C. rufocanus.*

Oppland

45. Hjerkinhö, Dovre 10–14 Aug. 1967, ca. 1100 m
46. Dovre 8 Dec. 1929, (ZMO) *L. lemmus.*
47. Vinstra July 1967, 1968 and 1969, 300 m, *S. minutus, S. araneus, C. glareolus, C. rufocanus, M. agrestis, A. flavicollis.*
48. Skjæringfjell, Ringebu July 1967, 1968 and 1969, 800 m, *S. minutus, S. araneus, L. lemmus, C. glareolus, M. oeconomus.*
49. Midtstrand, Fåvang, Ringebu July 1967, 1968 and 1969, 300 m, *S. araneus, C. glareolus, A. flavicollis, M. musculus.*
50. Övre Heimdalsvann, Ostre Slidre 9–10 Sept. 1969, 21–22 Aug. 1969, 1100 m, *C. glareolus C. rufocanus, M. oeconomus, S. araneus,* Fig. 4.
51. a) Murkhögd (929 m), b) Kjölaåmi (990 m), c) Robölstöl (850 m) and d) Store Skogseter (1127 m), Östre Slidre 8 Aug. 1966, 30 July – 2 Aug. 1969, 8–10 Sept. 1969 and 20–21 Sept. 1969. *C. glareolus, C. rufocanus, M. agrestis, M. oeconomus, S. araneus.*
52. Heggenes, Östre Slidre 6–9 Sept. 1969, 550 m, *C. glareolus* (Fig. 5).
53. Vestre Slidre 8 Aug. 1956, *L. lemmus.*
54. Leira, Nord Aurdal 19–20 Aug. 1969, 350 m, *C. glareolus, A. sylvaticus, S. araneus.*
55. Gaustom, Gausdal July 1967, 1968, 1969, 150 m, *S. minutus, S. araneus, N. fodiens, C. glareolus, M. agrestis, Al flavicollis, M. musculus.*
56. Svennes, Biri Gjövik 18 Sept. 1970, 150 m, *C. glareolus, M. agrestis, A. flavicollis.*
57. Stenberg, Ostre Toten 11 June 1967, 400 m, *C. glareolus.*

Akershus

58. Skogsbygda, Nes in spring 1969, 180 m, *M. agrestis.*
59. Minnesund, Eidsvoll 22 May 1970, 130 m, *C. glareolus*
60. Flateby, Enebakk 6 and 13 Nov. 1966, 100 m, *A. sylvaticus.*
61. Årungen, Ås 25–28 March 1969, 50 m, *C. glareolus, A. sylvaticus.*
    Kroer, Ås 25 Nov. 1968, 100 m, *A. sylvaticus.*
    Brekke, Ås 26 Oct. and 27 Dec. 1971 *A. sylvaticus, M. musculus.*
62. Sogn, Oslo 3 and 17 March 1968, 3–6 Apr. 1969, October 1968, 180 m, *S. araneus, C. glareolus, M. agrestis, A. sylvaticus.*
    Töyen, Oslo 20 March 1931, (ZMO), 30 m, *A. sylvaticus.*
63. Ostöya, Bærum 4–6 June 1967, 10 m, *M. agrestis, A. sylvaticus, S. araneus.*

Fig. 4. Locality No. 50, Övre-Heimdalsvann, 1100 m a.s.l. with a narrow belt of sub-alpine birch near the alpine zone. Sub-alpine birch forest also on localities No. 31, 79 and 81, and similar birch forest in North Norway, loc. No. 2, 14, 15 and 17, 50 m a.s.l. Photo R. Mehl.

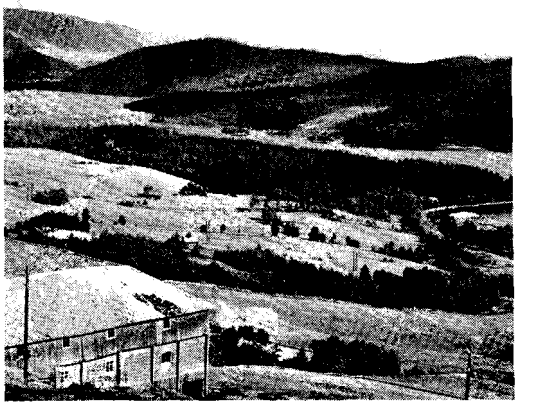

Fig. 5. Locality No. 52, Heggenes, shows common vegetation type in the valleys of eastern Norway, with spruce forest and deciduous trees along streams, lakes, meadows and fields. Similar vegetation on loc. No. 54, 57, 59, 61, and 62 a. Photo R. Mehl.

Östfold

64. Sand, Askim 10 Nov. 1968, 100 m. *A. sylvaticus.*
65. Åven, Råde 31 May 1969, 20 m. *A. sylvaticus.*
66. Okserödkilen, Onsöy 3–17 Dec. 1967, 28 Dec. 1967, 13 Jan. 1968, 1 Apr. 1968 and 8–18 Dec. 1968, 20 m, *S. minutus, S. araneus, S. glareolus, M. agrestis* and *A. sylvaticus.*

Vestfold

67. Presterödkilen, Tönsberg 10 July 1968, 15–16 Aug. 1968, 14–15 Sept. 1968 and 5–10 Dec. 1968, 1–5 m, *S. araneus, M. agrestis, A. sylvaticus.*

Telemark

68. Kongsbergseter, Sandsetdalen, Tinn 4 Oct. 1970, 950 m, *M. oeconomus.*
69. Elgsjö 6 Oct. 1968 and Lislestul 7 July and 6 Oct. 1968, ca. 300 m, *C. glareolus, A. sylvaticus.*
70. Vinje 1966.

Buskerud

71. Svartås, Kongsberg 12–23 Jan. 1969, ca. 200 m, *A. sylvaticus.*

Aust-Agder

72. Risör, 17–20 July 1968, 10–100 m, *C. glareolus, A. sylvaticus.*
73. Uleberg, Evje og Hornnes, 16 Apr. 1971, ca. 200 m, *A. sylvaticus.*
74. Birkenes, 22–24 Oct. 1970, 100 m, *M. agrestis.*

Vest-Agder

75. Farsund 12 Apr. 1971, 50 m, *C. glareolus, A. sylvaticus.*

Möre and Romsdal

76. Kvanne and Lykkjebygda, Surnadal 26 July 1967 and 16 Apr. 1968, 50–150 m, *S. araneus, M. agrestis.*
77. Nes, Sunndalen 11–19 Aug. 1966, 15–22 July 1967, 10–50 m, *S. araneus, C. glareolus, C. rufocanus, M. agrestis, M. musculus.*
78. Runde, Heröy 29 July – 1 Aug. 1969. 20 m, *S. araneus, N. fodiens.*

Sogn and Fjordane

79. Solrenningen, Stölsvatn, Vik 28 June 1969, 600 m, *C. glareolus*.

Hordaland

80. Finse, Ulvik 24 Aug. 1962, 18 Dec. 1966, 9 July 1969, 1200 m, *L. lemmus*, *C. rufocanus*, *M. oeconomus*.
81. Liset, Vöringsfossen, Ullensvang 1 July 1967, 800 m, *S. araneus*, *C. glareolus*.
82. Ulriken, Bergen 25 Sept. 1970, 100 m, *A. sylvaticus*.
83. Röldal, Odda 1–2 Sept. 1967, 400 m, *C. glareolus*.

Rogaland

84. Byhaugen, Stavanger 22–31 July 1968 and 31 June 1971, 50 m, *S. araneus*, *M. agrestis*, *A. sylvaticus*, Fig. 2.
85. Njå and Serikstad, Time 6–10 Sept. 1970, 60 m, *S. araneus*, *C. glareolus*, *A. sylvaticus*.
86. Tvihaugsbekken, Nærbö 6–10 Sept. 1970, 150 m, *S. minutus*, *S. araneus*, *M. agrestis*, *A. sylvaticus*.
87. Hogstad, Varhaug 6–10 Sept. 1970, 50 m, *S. araneus*, *A. sylvaticus*.
88. Hetland, Ogna 6–10 Sept. 1970, 50 m, *S. araneus*, *C. glareolus*, *M. agrestis*, *A. sylvaticus*.
89. Gjermestad, Eigersund 6–10 Sept. 1970, 65–85 m, *S. araneus*, *M. agrestis*, *A. sylvaticus*. Fig. 3.
90. Tengs and Vardåsen, Eigersund 6–10 Sept. 1970, 25–55 m, *S. araneus*, *C. glareolus*, *M. agrestis*, *A. sylvaticus*.

Table I. Frequency of infestation of the small mammals collected. * = too small material

	Specimens examined	Specimens infested	Infestation frequency (%)
Insectivora			
Sorex minutus L.	21	1	5
S. araneus L.	489	113	23
S. isodon Turov	6	2	*
S. caecutiens Laxmann	3	0	–
Neomys fodiens (Pennant)	7	3	*
Rodentia			
Lemmus lemmus (L.)	40	20	50
Clethrionomys rutilus (Pallas)	36	12	33
C. glareolus (Schreber)	606	159	26
C. rufocanus (Sundevall)	69	40	58
C. glareolus/ rufocanus, hybrid	1	1	*
Microtus agrestis (L.)	127	93	73
M. oeconomus (Pallas)	63	53	84
Apodemus flavicollis Melchior	21	14	67
A. sylvaticus L.	207	143	69
Mus musculus L.	28	2	7
Σ	1724	656	38

MATERIAL AND METHODS

1724 small mammals of 14 species and one hybrid were collected (Table I). 656 specimens were infested by 3747 gamasid mites of 27 identified species (Table II). 833 mammals and 2641 mites were collected by Mehl and his collaborators in all parts of Norway in 1966–1971. The Swedish material, 886 mammals and 1086 mites, was collected by A. Nilsson, Lund, during his tick investigation in southeastern Norway in 1967–1969, and by A. Edler in 1970 in southwestern Norway on the Jæren peninsula, Rogaland. 20 mites from 5 rodents are older collections from the Zoological Museum in Oslo. The Norwegian material is kept at the Zoological Museum in Oslo, the Swedish at the Zoological institute, University of Lund.

Most mammals were collected in live net cage traps (Edler & Nilsson 1973). Part of Mehl's material was collected in snap traps. The mammals were killed in plastic bags by ether or chloroform. The mites were removed from the preserved hosts in the Laboratory. In Lund this was done by hand, whereas Mehl shook the host animals in a glass jar containing 80 % ethanol.

RESULTS

27 species of mites were identified, all new to Norway (Table II). Great differences in host speci-

ficity and infestation rate between the mite species were found. This will be commented upon in the species list. No species found was endemic to Norway. The mite species listed below are arranged according to Evans & Till (1966), Johnston (1968), and Karg (1971). Previously Edler (1968, 1969, 1972 a, b) used Bregetova's (1956) system. Names suggested by her are also given.

Family Eugamasidae Hirschmann, 1962
Subfamily Parasitinae Oudemans, 1901

Pergamasus sp.

The genus *Pergamasus* contains numerous species, which are usually free-living (Karg 1971). There are some records from nests and furs (Mrciak et al. 1966, Edler 1969).

Parasitus kraepelini (Berlese, 1905)

(*Eugamasus kraepelini* Berlese, 1903 teste Bregetova 1956). Localities No. 1, 4, 8, 23, 24, 29, 40, 41, 47, 51, 55, 56, 77, 86. Known from most parts of Europe as a free-living species (Micherdzinski 1969).

Parasitus remberti (Oudemans, 1912)

(*Eugamasus remberti* Oudemans, 1912 teste Bregetova 1956). Loc. No. 3, 8, 21, 24, 27, 37, 48, 49, 50, 51. Known from central and northern Europe, Mostly in nests of small mammals and in litter (Sellnick 1940, Edler 1968, Karg 1971).

Poecilochirus necrophori Vitzthum, 1930
Loc. No. 66, 77.

Adult specimens are found in the soil. However, beetles, especially *Geotrupes* and *Necrophorus*, are used as carriers. Known from Europe and Asia (Edler 1968, Karg 1971).

Subfamily Gamasellinae Hirschmann, 1962

Euryparasitus emarginatus (C. L. Koch, 1839)
Loc. No. 35, 36, 39, 55, 56, 86, 87, 90.

The nymphs are sometimes found on small mammals. The species is a predator common in soil and in rodents' nests (Karg 1971). Known from central and northern Europe.

Cyrtolaelaps mucronatus (G. & R. Canestrini, 1881)
Loc. No. 3, 21, 24, 35, 36, 40, 41, 43, 47, 49, 50, 57, 66, 76, 77, 78, 79, 81.

Previously recorded in Scandinavia as free-living and from small rodents and shrews (Edler 1972 a). Mahnert (1971) recorded it from the bat *Nyctalus noctula* (Schreber), in Austria.

Cyrtolaelaps minor Willman, 1952
Loc. No. 66.

This rare species is known from small mammals and their nests in central and northern Europe (Karg 1971, Edler 1972 a).

Family Ameroseiidae Evans, 1963

Proctolaelaps pygmaeus (Müller, 1860)
Loc. No. 61, 78.

Found in most parts of the world mainly in stored plant material (Mrciak & Brander 1965, Karg 1971).

Family Eviphididae Berlese, 1913

Eviphis ostrinus (C. L. Koch, 1836)
Loc. No. 55.

Common in soil in Europe (Willmann 1943, Karg 1971). A few records from small mammals (Mrciak 1959 a, Mahnert 1971).

Family Laelapidae Berlese, 1892
Subfamily Laelapinae Berlese, 1892

Hypoaspis sardoa (Berlese, 1911)
(*Androlaelaps sardous* Berlese, 1911 teste Bregetova 1956)
Loc. No. 54.

Mostly found in nests and litter and only rarely on small mammals (Evans & Till 1966).

Table II. Distribution of mite species between the host species

	S. minutus	*S. araneus*	*S. isodon*	*N. fodiens*	*L. lemmus*	*C. rutilus*	*C. glareolus*	*C. rufocanus*	*C. glareolus/ rufocanus*	*M. agrestis*	*M. oeconomus*	*A. flavicollis*	*A. sylvaticus*	*M. musculus*	Protonymph	Deutonymph	♂	♀	Σ
Pergamasus sp.	–	–	–	–	1	1	–	2	–	1	–	–	–	–	–	3	2	–	5
Parasitus kraepelini	–	5	–	–	1	–	6	2	–	3	2	–	–	–	–	19	–	–	19
P. remberti	–	6	–	–	–	1	1	1	–	1	1	–	–	–	–	11	–	–	11
Parasitus sp.	–	8	–	–	–	–	4	–	–	2	2	–	1	–	–	17	–	–	17
Poecilochirus necrophori	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	2
Eugamasidae non det.	–	2	–	–	1	1	1	–	–	3	3	–	2	–	–	10	–	3	13
Euryparasitus emarginatus	–	8	–	–	–	–	1	–	–	–	–	–	1	–	–	10	–	–	10
Cyrtolaelaps mucronatus	–	8	–	1	–	4	8	–	–	3	1	–	–	–	–	25	–	–	25
C. minor	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	1
Proctolaelaps pygmaeus	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	2	2
Eviphis ostrinus	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	1
Hypoaspis sardoa	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	1
Androlaelaps fahrenholzi	–	1	–	–	–	–	–	–	–	1	–	–	1	–	–	1	–	2	3
A. casalis casalis	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	2	2
Laelaps lemmi	–	–	–	–	32	–	–	–	–	–	–	–	–	–	–	3	–	29	32
L. clethrionomydis	–	–	–	–	1	1	37	66	4	–	–	–	–	–	–	2	7	100	109
L. hilaris	–	6	–	–	3	24	7	–	–	581	119	–	2	–	12	11	19	700	742
L. agilis	–	3	–	–	–	–	3	–	–	–	–	92	674	–	8	8	86	670	772
Hyperlaelaps microti	–	5	–	–	1	1	5	–	–	279	116	–	1	–	1	24	76	307	403
Eulaelaps stabularis	–	16	1	3	2	3	53	5	–	8	10	4	173	1	–	–	5	274	279
Haemogamasus horridus	–	13	1	4	–	–	14	–	–	1	–	–	–	–	–	25	7	1	33
H. nidi	–	13	–	3	13	1	114	17	–	50	15	–	20	–	1	26	20	200	247
H. nidiformis	1	1	–	–	6	1	10	–	–	4	6	–	1	–	–	–	3	26	29
H. hirsutus	–	4	–	–	–	–	–	–	–	17	–	–	5	–	2	15	3	6	26
H. ambulans	–	6	–	–	13	13	47	10	–	15	46	2	1	–	–	1	18	134	153
Myonyssus ingricus	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Hirstionyssus isabellinus	–	18	–	–	32	18	252	27	–	82	59	1	9	–	1	13	11	473	498
H. soricis	–	231	–	–	–	–	–	–	–	–	–	–	–	–	1	–	7	223	231
H. latiscutatus	–	14	–	–	–	–	6	–	–	–	–	–	54	–	–	12	1	61	74
H. tatricus	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	1
	1	372	2	11	106	69	572	130	4	1051	381	99	947	2	26	241	265	3222	3747

Androlaelaps fahrenholzi (Berlese, 1911)
(*Haemolaelaps glasgowi* (Ewing, 1925) teste Bregetova 1956)
Loc. No. 63, 67, 84.

On small mammals and birds and often abundant in their nests (Evans & Till 1966, Karg 1971). Known as reservoir for certain diseases (Mrciak & Tovornik 1966).

Androlaelaps casalis casalis (Berlese, 1887)
(*Haemolaelaps casalis* (Berlese, 1887) teste Bregetova 1956)
Loc. No. 69, 76, 88.

Mostly found in Birds' nests, and only rarely on small mammals and in soil (Evans & Till 1966, Karg 1971). It can attack man (Sellnick 1956).

Laelaps lemmi Grube, 1851
Distribution map, Fig. 6a.

So far found only on *Lemmus lemmus* (Bregetova 1956, Mrciak & Brander 1965, Edler 1968). Bregetova (1956) recorded it from *Lemnus obensis* (sub. nom. *Lemmus lemmus sibiricus* (Kerr, 1792) teste Sidorowicz 1960) in the USSR, and Mrciak & Brander (1965) from *Lemmus lemmus* in Finland, as did Edler (1968) from Sweden. There is a previous record of a species of *Laelaps* from *Lemmus lemmus* in Sweden. In the Sarek mountains in northern Sweden, Trägårdh (1910) found *Laelaps semitectus* (C. L. Koch, 1878) on *Lemmus lemmus*, also listing it from Siberia, Novaja Semlja and eastern Greenland. Trägårdh's *Laelaps semitectus* does not represent *L. lemmi* according to Tipton (1960). Evidently Tipton did not see Trägårdh's paper of 1910, where details were described and figures added. We have not seen Trägårdh's specimens. but according to his description it might well be *L. lemmi*.

Laelaps clethrionomydis Lange, 1955
Distribution map, Fig. 6b.

This mite is found almost exclusively on *Clethrionomys* sp.(cf. Table II) (Edler 1969, Mahnert 1971) but prefers various species in different areas. On the European continent, *Clethrionomys glareolus* is the main host (Mrciak 1959a, Mahnert 1971). In northern Sweden *Clethrionomys rufocanus* was found to be the main host (Edler 1969). It prevails in forest and mountain areas (Mrciak 1959b, Mahnert op.cit., Edler 1972a). In the present material it occurs also at low altitudes near the coast.

Fig. 6. The distribution of *Laelaps lemmi* (a) and *Laelaps clethrionomydis* (b) in Norway.

Laelaps hilaris C. L. Koch, 1836
Distribution map, Fig. 7a.

This species is one of the most common in mite material from Scandinavia. The main hosts are species of *Pitymys* and *Microtus* (Mrciak 1959b). The former do not occur in northern Europe, the latter are found in Scandinavia, where *Micro-*

Fig. 7. The distribution of *Laelaps hilaris* (a) and *Laelaps agilis* (b) in Norway.

tus agrestis is common and widespread, while *Microtus oeconomus* is distributed mainly in the northern parts and the mountain areas. The infestation frequency of *Microtus agrestis* was 78.3% in the present study. This agrees with other Scandinavian investigations, where frequencies from 63.6–83.0 % have been found (Mrciak & Brander 1965, Edler 1968, 1969, 1972 a). Known from Europe and Asia.

Laelaps agilis C. L. Koch, 1836
Distribution map, Fig. 7 b.

This is the most abundant mite in the present material. It is specific to *Apodemus* spp., which do not occur north of 64° N in Norway. In other investigations *Apodemus flavicollis* has been shown to be significantly more infested than *Apodemus sylvaticus* (Pirjanik 1962, Edler 1973). Also, the mean number of mites per infested host was higher. In the present material there were only a few specimens of *Apodemus flavicollis*. Known from Europe and Asia.

Hyperlaelaps microti (Ewing, 1933)
(*Hyperlaelaps arvalis* Zachvatkin, 1948 teste Bregetova 1956)
Distribution map, Fig. 8 a.

This is a fairly common species in the present material. 68.4 % of the specimens are from *Microtus agrestis* and 28.4 % from *Microtus oeconomus*. In Scandinavia, the main hosts are *Microtus* spp. (Edler 1969). On the European continent, however, *Microtus arvalis* (not found in northernmost Europe) and *Pitymys* spp. are usually heavily infested by this species (Mrciak 1959b). It was recorded from Finland by Mrciak & Brander (1965). Known from Europe and U.S.A

Subfamily Haemogamasinae Oudemans, 1926

Eulaelaps stabularis (C. L. Koch, 1836)
Distribution map, Fig. 8 b.

This mite has a wide ecological amplitude. It is found on a variety of hosts, both birds and mammals, including man (Mahnert 1971, Edler 1973 a, Mehl 1972). In the present investigation it was recorded on twelve of fourteen host species. Also abundant in nests (Blaszak 1969). It is not dependent on the microclimate of the nest, but may be found in nests under the ground as well as on the ground or above the ground (Daniel 1969). In the present investigation this species composes 7.4 % of the gamasid mites. However, of the mites from the Jaeren peninsula, Rogaland county, almost one fourth, 24.0 %, were *E. stabularis*, whereas elsewhere in Scandinavia and Finland this species was less frequent (Table III). The host material from Jaeren did not differ from that of other parts of Norway, Sweden, and Finland, except that some host species occur only in the southern parts of the countries, others only in

Fig. 8. The distribution of *Hyperlaelaps microti* (a) and *Eulaelaps stabularis* (b) in Norway.

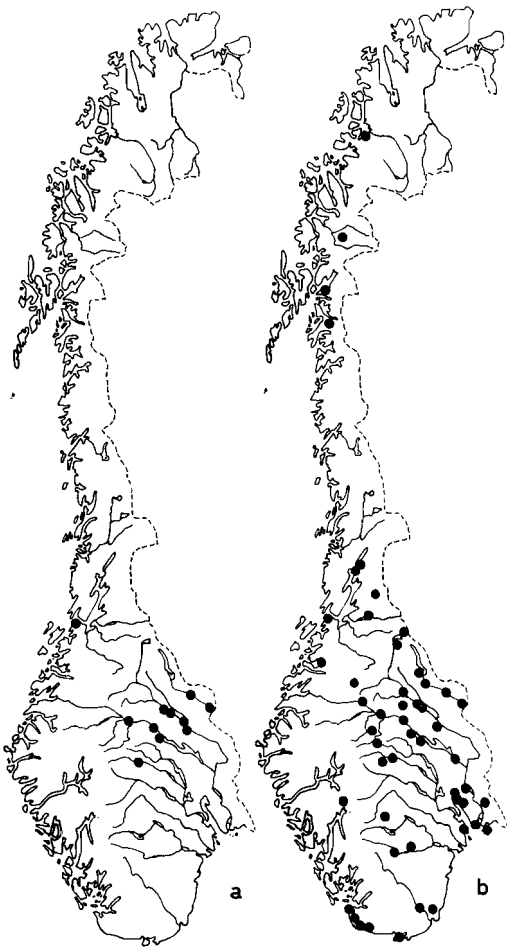

Fig. 9. The distribution of *Haemogamasus horridus* (a) and *Haemogamasus* nidi (b) in Norway.

the northern parts. The reason for this seems to be the special character and previous history of Jaeren. It is a small flat lowland area, quite different from its surroundings (Figs. 2 and 3). It has a mild atlantic climate with little snow and frost. Jaeren was free from ice very early after the glacial period, and has several other faunal and floral pecularities.

Haemogamasus horridus Michael, 1892
Distribution map, Fig. 9 a.

Mostly found as deutonymphs on various small mammals. The adults are found mainly in the nests (Mrciak & Brander 1965, Edler 1969, Mahnert 1971). Known from Europe.

Haemogamasus nidi Michael, 1892
Distribution map, Fig. 9 b.

46.2 % of the specimens were collected on *Clethrionomys glareolus*. Also in Sweden this rodent species was found to be the main host, especially in forest and mountain areas (Edler 1968, 1969, 1972 a). In eastern Europe species of *Microtus* are the preferred hosts, but in Austria it is *Apodemus flavicollis* (Mrciak 1958, Mrciak & Tovornik 1959, Mahnert 1971). Also abundant in the nests of small mammals (Edler 1972 a). It is a vector of

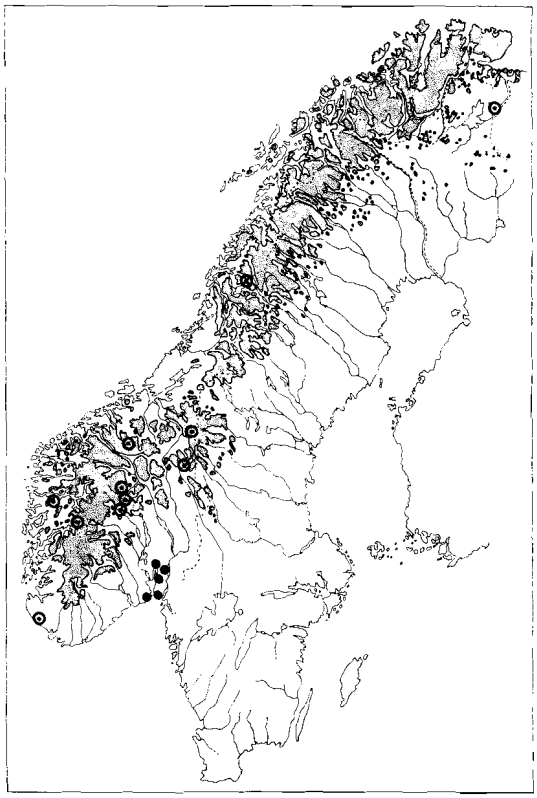

Fig. 10. The distribution of *Haemogamasus nidiformis* ⊙ and *Haemogamasus hirsutus* (●) in Norway. The Arctic Region is stippled.

Table III. Frequency of *E. stabularis* in different parts of Scandinavia and Finland. 100 % = all gamasid mites in the investigation cited.

	E. stabularis %	No. of all gamasid mites
Southern Sweden (Edler 1972 a)	5.7	7334
Central Sweden (Edler 1969)	3.5	1476
Northern Sweden (Edler 1968)	2.8	2688
Northern Sweden, Finland and Norway (in litt.)	2.2	20,403
Finland (Mrciak & Brander 1965)	0.3	2370
Norway excl. Jaeren (Present paper)	4.6	3201
Jaeren, Norway (Present paper)	24.0	546

tick-borne encephalitis (Mrciak 1960). Known from Europe, Greenland, U.S.A. and Japan.

Haemogamasus nidiformis Bregetova, 1955
Distribution map, Fig. 10.

Found rarely on the European continent at high altitudes, mostly on *Microtus nivalis* (Martins) (Mrciak 1959 b, Mahnert 1971). In Sweden it was recorded from a variety of hosts. It becomes relatively more common further north in Sweden (Edler 1968, 1972 b). In Norway it was also found near the coast (Fig. 3 and 4).

Haemogamasus hirsutus Berlese, 1889
Distribution map, Fig. 10.

Mostly found as deutonymphs on small mammals. The adults prefer the nests (Edler 1972 a). Found in most of Europe on a variety of hosts. It may be a vector of tick-borne encephalitis (Mrciak 1960 a).

Haemogamasus ambulans (Thorell, 1872)
Distribution map, Fig. 11 a.

Mostly found in nests of birds, and on small mammals and bats. Known from the Northern Hemisphere (Evans & Till 1966, Edler 1969).

Subfamily Myonyssinae Bregetova, 1956

Myonyssus ingricus Bregetova, 1956
Loc. No. 51.

Reported in low numbers from a variety of host species but more common in their nests (Mrciak & Tovornik 1959, Mrciak et al. 1966).

Subfamily Hirstionyssinae Evans & Till, 1966

Hirstionyssus isabellinus Oudemans, 1913
Distribution map, Fig. 11 b.

The present results agree with earlier investigations that species of Microtidae are the main hosts (Edler 1969, 1972 a). It is also common in nests. Known from the Northern Hemisphere. Vector of tularemia (Mrciak 1960).

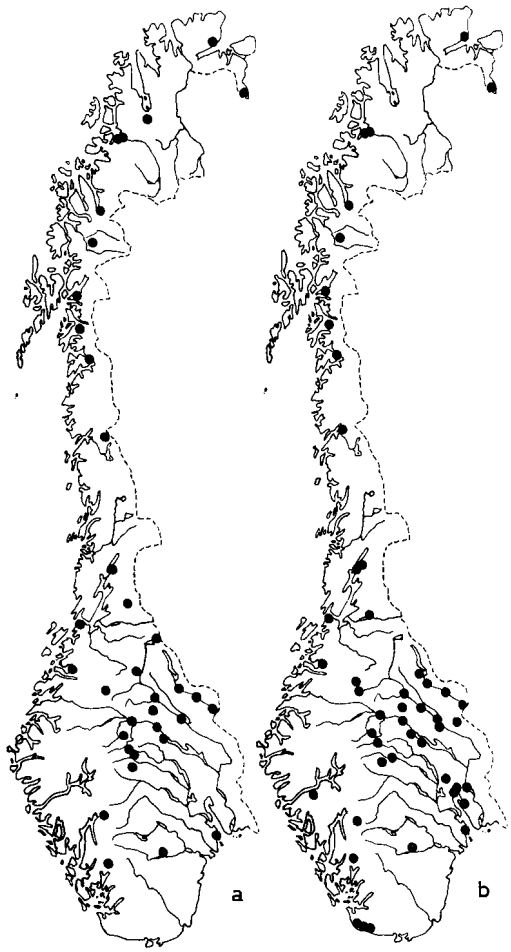

Fig. 11. The distribution of *Haemogamasus ambulans* (a) and *Hirstionyssus isabellinus* (b) in Norway.

Fig. 12. The distribution of *Hirstionyssus soricis* (a. ●), *Hirstionyssus tatricus* (a ○), and *Hirstionyssus latiscutatus* (b) in Norway.

Hirstionyssus soricis (Turk, 1945)
(*Hirstionyssus eusoricis* Bregetova, 1956 teste Bregetova 1956)
Distribution map, Fig. 12 a.

Specific to Soricidae, as was confirmed by the present investigation. The species is rare and known only from a few countries in Europe (Edler 1972 a). In Norway, it occurs in all parts of the country.

Hirstionyssus latiscutatus (de Meillon & Lavoipierre, 1944)
(*Hirstionyssus musculi* (Johnston, 1849) teste Bregetova 1956)
Distribution map, Fig. 12 b.

Mostly found on Muridae. In some of the areas, where these mammals are not found, Microtidae are reported as hosts (Edler 1968). Vector of tularemia (Mrciak 1960).

Hirstionyssus tatricus Mrciak, 1958
Distribution map, Fig. 12 a.

The main host of this rare mite on the European continent is *Microtus nivalis* (Mrciak 1958). In Sweden, it has been reported from *Clethrionomys*

rufocanus, Microtis agrestis, and Lemmus lemmus (Edler 1968). It was collected in a mountainous area (Fig. 4).

VERTICAL DISTRIBUTION

Three mite species, so far known as mountain species, were found in the Norwegian material. Two of them were collected at low altitudes near the sea. *Laelaps clethrionomydis, Haemogamasus nidiformis*, and *Hirstionyssus tatricus* were reported only from subalpine regions in the European continent (Mrciak 1958, Mahnert 1971). It seems that in Scandinavia these species occur at lower altitudes with increasing latitude. In Sweden, *L. clethrionomydis* was found at 620–830 m at 61° – 63° N, at 390–800 m at 66° N, and at 400–600 m at 67° N (Edler 1968, 1969, 1972 b). In Norway, it was collected at altitudes from 20–1200 m. In Sweden, *H. nidiformis* was collected at 400–800 m at 61°–63° N, at 390–800 m at 66° N, and at 400–600 m at 67° N (Edler op. cit.). In Norway, it was found at 85–1200 m. The specimen from 85 m was collected in Jaeren, Rogaland (Fig. 3). *H. tatricus* was found in Sweden at 390–780 m, 66° N, and at 400–600 m, 67° N (Edler 1968, and in litt.). In Norway, only one specimen was collected; viz, at 1100 m. Fig. 4.

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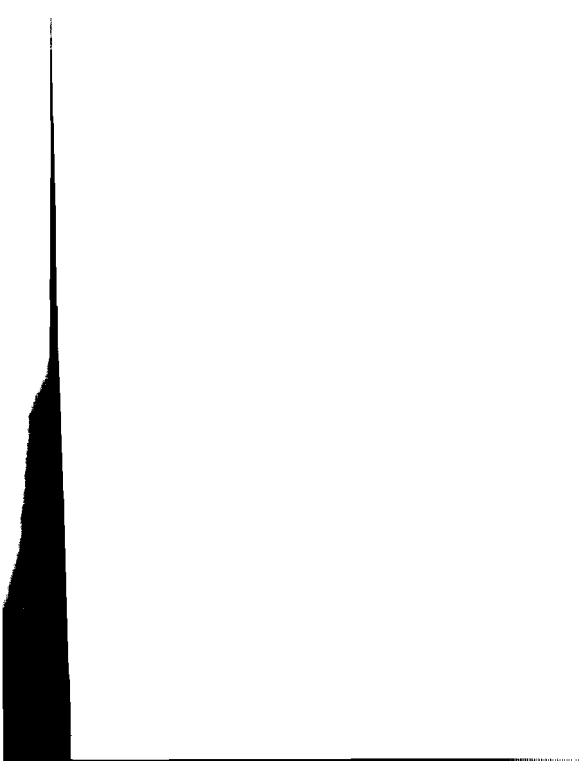

New Records of Norwegian Syrphid Flies (Dipt., Syrphidae)

TORE RANDULFF NIELSEN

Nielsen, T. R. 1972. New Records of Norwegian Syrphid Flies (Dipt., Syrphidae). *Norsk ent. Tidsskr. 19,* 149–151.

The article presents material from different parts of southern Norway, showing four Syrphid species new to the fauna: *Sphaerophoria loewi* Zett., *Melangyna barbifrons* (Fall.), *Orthoneura intermedia* Lundb. and *Helophilus versicolor* (Fabr.). It also reports new finds of *Pyrophaena rosarum* (Fabr.), *Melangyna triangulifera* (Zett.), *Volucella inanis* (L.), *Arctophila bombiformis* (Fall.), *Helophilus transfugus* (L.), *Xylota florum* (Fabr.) and *X. sylvarum* (L.), species which are poorly known in Norway.

T. R. Nielsen, Sandnes Gymnas, N-4301 Sandnes, Norway

Two of the species, *Sphaerophoria loewi* Zett. and *Melangyna barbifrons* (Fall.), were collected on Jæren, SW Norway, and should be added to the list from that area (Nielsen 1971, 1972). The remaining species are from the Sörlandet and Östlandet regions.

Pyrophaena rosarum (Fabr.) 1787

Lake Östensjövann, AK: Oslo 19 July 1970 (1 ♂), on flowering *Comarum palustre* L. Siebke (1877) and Storm (1907) reported it from near Trondheim.

Sphaerophoria loewi Zett. 1843

New to Norway. Öksnevad, Ry: Klepp 10 June 1972 (1 ♀). As opposed to other Norwegian species of this genus, *S. loewi* is tied to humid biotopes, like bogs and borders of lakes. It is easily recognized from the other species by its distinctly black antennae, glittering black mesonotum, and its lateral yellow thorax stripe, which extends from humerus and only back to transverse suture.

Melangyna barbifrons (Fall.) 1817

New to Norway. Gramstad, Ry: Sandnes 18 April 1972 (1 ♂). The specimen was collected on flowering *Salix caprea* L., together with *M. quadrimaculata* Verr. A rare spring species.

Melangyna triangulifera (Zett.) 1843

Lindelia, Bö: Ringerike 12 Aug. 1972 (1 ♀). According to Siebke (1877) found at Oslo, Vang in Valdres, Åmot and Rendalen, all in the Östlandet region.

Orthoneura intermedia Lundb. 1916

New to Norway, Björnestad, VAy: Randesund 14 July 1972 (1 ♂), on swampy bog close to deciduous forest. Until now, this is the third known Norwegian *Orthoneura* species.

Volucella inanis (L.) 1758

Tjöme, VE: Tjöme 8 Aug. 1965 (1 ♂), Arne Fjellberg leg.; Kjære, VE: Tjöme 8 Aug. 1972 (1 ♂, 3 ♀♀), A. Fjellberg and author leg.; Boröy, AAy: Tvedestrand 22 July 1968 (2 ♀♀), Arild Fjeldså leg.; near Gaustad Sykehus, AK: Oslo 11 Aug. 1972 (in numbers, 10 ♂♂, 3 ♀♀!.

Previously recorded (Siebke 1877) from Oslo and Sarpsborg.

Arctophila bombiformis (Fall.) 1810

Near Gaustad Sykehus, AK: Oslo 11 Aug. 1972 (1 ♂), in glade of spruce forest. The first Norwegian finds were reported from Helgöya (in Lake Mjösa) and Bærum near Oslo by Schöyen (1889). These specimens are situated in the collections of Zoological Museum, Oslo.

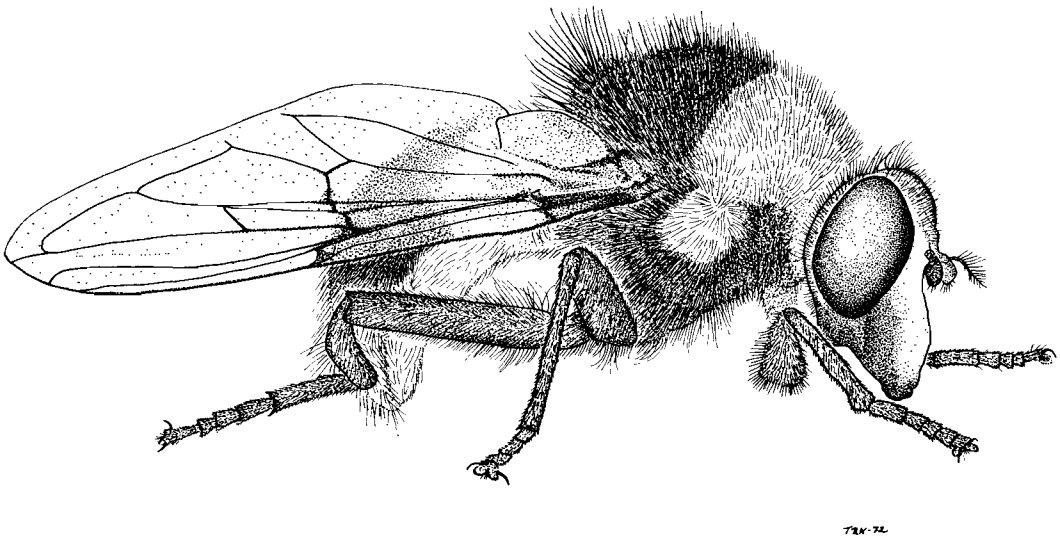

Fig. 1. *Arctophila bombiformis* (Fall.). Orig.

Later it was found quite frequently by Storm (1895 and 1907) in the surroundings of Trondheim.

With its large size and dense pile in bright colours of black, white, and yellow, *Arctophila bombiformis* is a beautiful and easily recognizable species (Fig. 1). In the field, however, it may quite closely resemble a *Bombus* species, or the other Syrphid species *Volucella bombylans* (L.).

Helophilus transfugus (L.) 1758

Lake Östensjövann, AK: Oslo 21 July 1970 (6 ♂♂, 4 ♀♀), at shore on flowering *Comarum palustre* L. A hygrophilous species tied to bogs and borders of lakes.

Siebke (1877) reports it (as synonym *H. transfugus* Meig.) from Åset, Åmot 26 July 1870.

Helophilus versicolor (Fabr.) 1794

New to Norway. Lake Östensjøvann, AK: Oslo 21 July (1 ♂, 2 ♀♀). The one female was caught on male flower of *Typha latifolia* L.

Xylota florum (Fabr.) 1805

Trosterud, AK: Frogn 17 July 1970 (1 ♂); Sandnes, AAy: Gjerstad 22 July 1970 (2 ♂♂, 2 ♀♀).

Reported from the vicinity of Trondheim by Storm (1907). It much resembles the related *X. coeruleiventris* Zett., but differs considerably in the males by having rather long and slender styli of the genitalia.

Xylota sylvarum (L.) 1758

Sandnes, AAy: Gjerstad 22 July 1970 (1 ♀). Previously published from Trondheim (Storm 1907).

ACKNOWLEDGEMENTS

I wish to thank Curator Albert Lillehammer, Zoological Museum, Oslo, for information on material of *Arctophila bombiformis,* and cand. mag. Arild Fjeldså and cand. mag. Arne Fjellberg, Bergen, for contributing some material of *Volucella inanis.*

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Notes on the Stonefly *Capnia vidua* Klapalék from Fennoscandia

ALBERT LILLEHAMMER

Lillehammer, A. 1972. Notes on the Stonefly *Capnia vidua* Klapalék from Fennoscandia. *Norsk ent. Tidsskr. 19,* 153–156.

Capnia vidua Klapalék is new to Norway and Sweden. In Norway the species has been taken in the counties of Finnmark, Troms, and Nordland. In Sweden it was taken at Messaure in Lule Lappmark. The taxonomy of the species is discussed and the variation is analysed.

A. Lillehammer, Zoological Museum, University of Oslo, Sars gt. 1, Oslo 5, Norway

Capnia vidua Klapalék was recorded from Troms and Finnmark in 1968. In 1971 the species was also taken in Nordland. In Lule Lappmark, Sweden, the species was taken in 1971. Professor Carl Müller has kindly given me the Swedish specimens which are used here.

There are variations in the taxonomical characters of the Scandinavian material, both between specimens taken at the same locality and between specimens from different localities. This made it necessary to analyse the variations and to make comparison with the types of some of the subspecies. This is made in the presentation of the material and in Figs. 3–7.

Capnia vidua has mainly European distribution. The populations seem to be geographically isolated and can be expected to form geographic races. Until now, *Capnia vidua* has been recorded from Austria, Bulgaria, Czechoslovakia, England, France, Germany, Italy, Poland, Romania, Switzerland (Illies 1966), from Finland (Meinander 1965), and now also from Norway and Sweden. The only record from outside Europe is from Siberia. The known distribution in Fennoscandia is given in Fig. 1.

The first descriptions of subspecies were given by Aubert (1950). He described *Capnia vidua vidua* from the Alps, Tyrol, and Czechoslovakia, *C. vidua collarti* from Belgium and *C. vidua anglica* from Great Britain. Hynes (1955) described *C. vidua brachyptera* from Iceland. Rauser (1962) described *C. vidua rilensis* from Bulgaria. Zapekina-Dul'keit (1955) described *C. vidua altaica,* but these specimens have been shown to be the variable species *C. variabilis* Klap (Zapekina-Dul'keit 1970). However, *C. vidua* has been taken in the Bolskoj Sliznva basin in Siberia.

The characters used in the descriptions of the subspecies are, for the male: The shape of the anterior end of the seventh tergite, with the dorsal incurvation. The form of the spinose knob of the eighth tergite. The form of the supra-anal lobe and the wing length. The females are difficult to separate, and only wing lengths are given.

The morphological differences separating the subspecies are slight (Fig. 2), and the males of *Capnia vidua vidua* are both macropterous and micropterous. In the other subspecies there are only micropterous males. The females of *C. vidua anglica* are micropterous. They are slightly brachypterous in *C. vidua collarti,* and macropterous (Alps or submicropterous (Czechoslovakia) in *C. vidua vidua.*

MATERIAL

Norway: 5 ♂♂, 8 ♀♀ from Kautokeino, Finnmark; 1 ♀ Kvænangen and 1 ♀ Storfjord, Troms; 1 ♀ Rombak, Nordland.

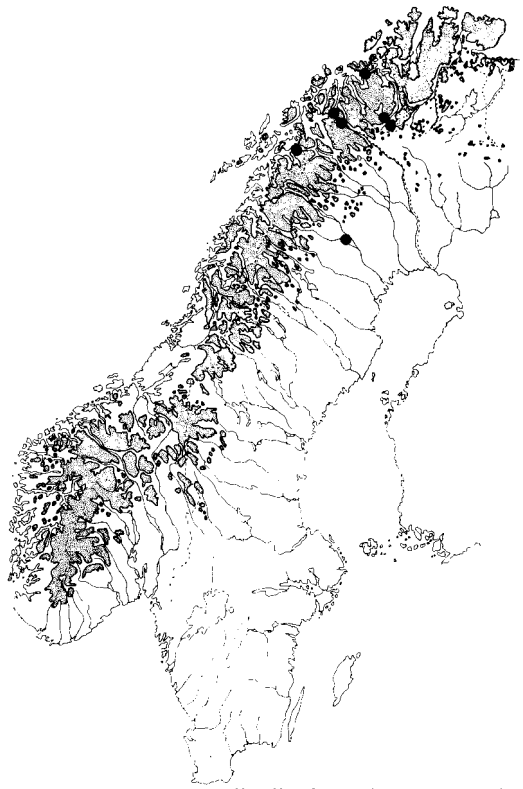

Fig. 1. The known distribution of *Capnia vidua* in Fennoscandia. The alpine areas are dotted.

Sweden: 10 ♂♂ from Messaure, Lule Lappmark.

Variation in the material

a) Males

Norway: Length: 4.5–5.5 mm., mean 5.07 mm. Wing length: 0.96–1.04 mm., mean 1.00 mm.

Sweden: Length: 4.83–7.00 mm., mean 6.16 mm. Wing length: 1.04–1.32 mm., mean 1.15 mm.

The variations in the shape of the seventh tergum and the spinose knob of the eighth tergum are shown in Fig. 3, the incurvation of the seventh tergum in Fig. 4, and the supra-anal lobe in Fig. 5.

b) Females

Norway: Length: 5.83–7.67 mm., mean 6.41 mm. Wing length: 4.17–6.00 mm., mean 5.40 mm.

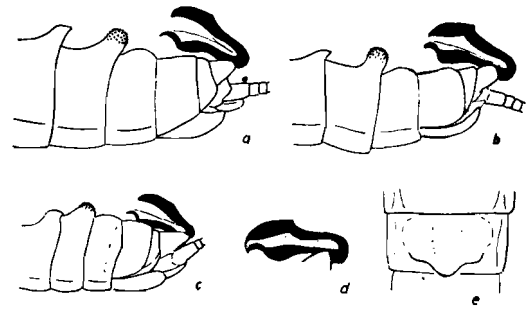

Fig. 2. Drawings of: (a) *Capnia vidua collarti* ♂, (b) *C. vidua vidua* ♂, (c) *C. vidua anglica* ♂, (d) *C. vidua vidua,* supra-anal lobe ♂, (e) *C. vidua vidua* subgenital plate ♀ (After Aubert 1950).

The variation in the subgenital plate is given in Fig. 6.

The types

Iceland. 1 ♂ type, length: 6.8 mm., wing length: 1.00 mm.

Great Britain: 1 ♂ type, length: 6.67 mm., wing length: 0,92 mm.

The Icelandic female: Length: 7.17 mm., wing length: 3.08 mm.

DISCUSSION

The male

The Norwegian specimens show clear differences in the shape of the dorsal parts of the

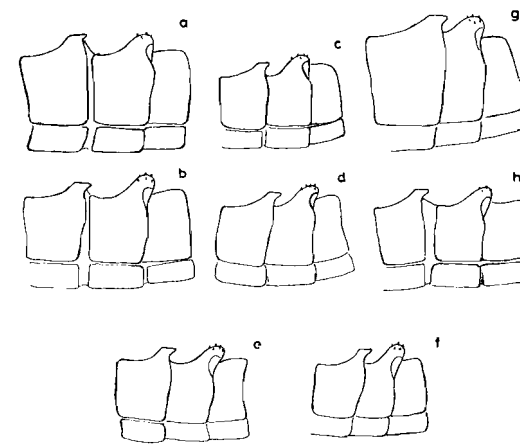

Fig. 3. Drawings of the seventh, eighth, and ninth segments of *Capnia vidua* ♂♂: (a-b) Swedish specimens, (c-f) Norwegian specimens, (g) type *Capnia vidua brachyptera* ♂, (h) type *Capnia vidua anglica* ♂.

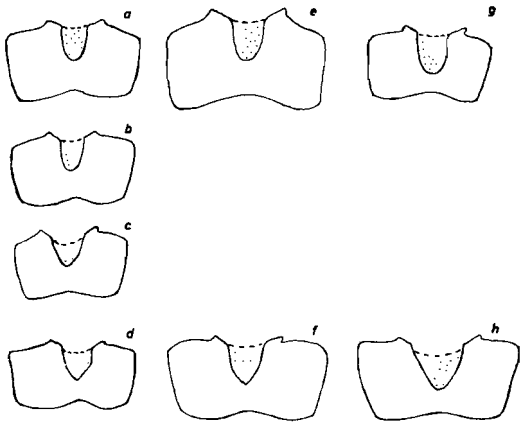

Fig. 4. Drawings of the seventh terga of ♂ with incurvations. (a-d) Norwegian specimens, (e-f) Swedish specimens, (g) type, *Capnia vidua anglica*, (h) type, *Capnia vidua brachyptera*.

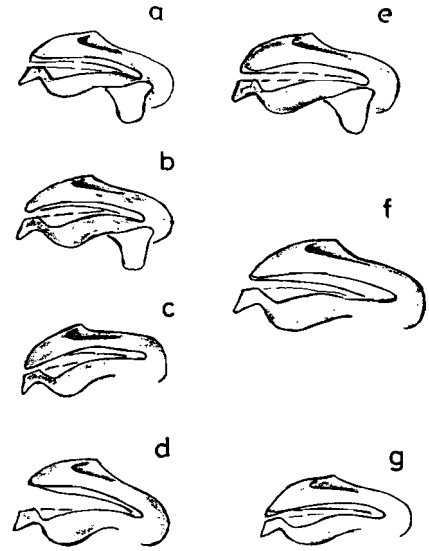

Fig. 5. Drawings of the supra-anal lobe ♂ of: (a-d) the Norwegian specimens, (e) Swedish specimens, (f) typestet *Capnia vidua brachyptera*, (g) type *Capnia vidua anglica*.

seventh and eighth segments (Fig. 3). Notably, the form of the spinose knob varies to such a degree that it is difficult to use this character in determination. Comparison with the Swedish specimens, the types of *C. v. brachyptera* and *C. v. anglica*, shows that they fall well within the variation of the Norwegian specimens.

The incurvation of the seventh terga also varies in the Norwegian material, and in the specimens from Sweden (Fig. 4). Compared with the types there are some small differences between the Icelandic and the English specimens on the one hand and the Scandinavian material on the other in a somewhat deeper incurvation in the former, though there are Norwegian and Swedish specimens with quite deep incurvations. Neither of these characters seems clear enough to be used in determination.

The shape of the supra-anal lobe seems to be fairly constant (Fig. 5). In the Scandinavian material there are only small differences between the specimens. The differences arise from a dissimilar sclerotization of the dorsal and the ventral parts of the lobe. In the Norwegian material these differences can easily be seen. Compared with the types there seems to be no reason to separate the Scandinavian material from any of the types on the supra-anal lobe. There is also no valid character separating these two subspecies on the form of the supra-anal lobe.

The female

There are marked variations in the shape of the subgenital plate within the Norwegian material (Fig 6). Some are near the shape of the *C. vidua vidua* and the female from Iceland has a subgenital plate that is nearly identical with one of them. There are also great variations in the wing length in the Norwegian

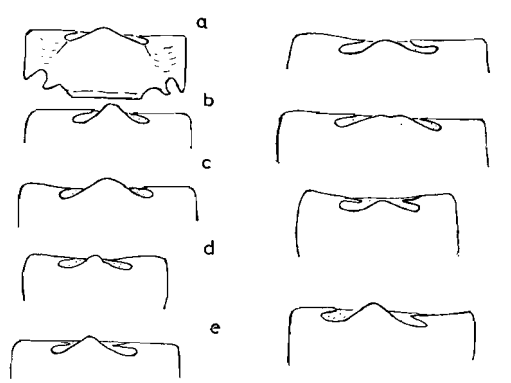

Fig. 6. Drawings of the subgenital plate of *Capnia vidua* ♀ (a-h) Norwegian specimens, (i) Icelandic female.

material. One specimen is brachypterous while the others are macropterous. The wing venation also varies to some degree.

CONCLUSION

The material analysed shows that there are marked variations in taxonomical characters within the Scandinavian material, both in males and females, and therefor it is difficult to say if the specimens belong to one or other of the subspecies or to none of them. Differences are so small between the two subspecies examined here that there is no valid reason to separate them on morphological characters, and it will be of use to analyse the variations inside and between populations of the subspecies. It will also be useful to include the subspecies *C. vidua vidua* and *C. vidua collarti* in this analysis.

The Norwegian material will be dealt with in a later paper 'Norwegian stoneflies' (in preparation), where the wing length and other morphological characters of this species are analysed together with the other members of the genus.

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ACKNOWLEDGEMENTS

I am grateful to the British Museum for the loan of the type *Capnia vidua anglica,* and to the Zoological Museum of Copenhagen for the loan of the type *C. vidua brachyptera* and the female of the same subspecies.

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Notes on the Stonefly *Nemoura sahlbergi* Morton with a Description of the Nymph

ALBERT LILLEHAMMER

Lillehammer, A. 1972. Notes on the Stonefly *Nemoura sahlbergi* Morton, with a Description of the Nymph. *Norsk ent. Tidsskr. 19,* 157–159.

The hitherto unknown nymph of the arctic species of *Nemoura sahlbergi* Morton is described. Analyses of both males and females show that there exist marked morphological variations.

A. Lillehammer, Zoological Museum, University of Oslo, Sars gt. 1, Oslo 5, Norway

Nemoura sahlbergi Morton is an arctic species which has been recorded from Fennoscandia (Brinck 1949, Brinck & Froehlich 1960, Meinander 1965, Thomas 1969), the European territory of the USSR and Polar Urals (Zhiltzowa 1966) and Mongolia (Rauser 1966). Jewett (1971) described a species from northern America, *N. richeri,* which is similar to *N. sahlbergi* and may be the same species. The distribution of *N. sahlbergi* in Fennoscandia is given in Fig. 1. In Norway the distribution is mainly based on own records. Earlier, the species was known only from the Skibotn area in Troms.

Until now the nymph of *N. sahlbergi* has been unknown. A description is given of male nymphs ready for emergence.

MATERIAL

23 ♂♂, 15 ♀♀, 149 nymphs. All were taken in the countries of Troms, Finnmark and Nordland in northern Norway. The material was taken between 26 June and 4 July. The determination of the nymphs was carried out on specimens ready for emergence and with the male genitalia fully developed.

DESCRIPTION

The male

The characters mostly agree with the description given by Brinck (1952). There is, however, some variation in the form of the cerci and of the sub-anal lobe (Fig. 2).

The female

Most of the females agree very well with the description given by Meinander (1965). There is, however, some variation in the subgenital plate (Fig. 3).

The nymph

Size of the full-grown nymph is 6.2–7.0 mm. General colour: ochre brown to dark brown on the dorsal side, and pale brown to yellow brown on the ventral side.

The head (Fig. 4.1) has marked triangular dark spots, just behind the antennae. The antennae are long and slender, the first three antennae joints being darker than the remainder. Ocelli are not visible.

Pronotum quadrate with a well-developed fringe of stout bristles (Fig. 4.2).

Abdomen cylindrical, covered with short clothing hairs. On the ventral side, segments 8, 9 and 10 have complete and sclerotised rings (Fig. 4.3).

The cerci (Fig. 4.3 and 4.4) are long, with dark bands at the base of the segments and with an apical whorl of stout bristle. The segments rapidly become longer and from the 3rd, 4th, and the 5th onwards they are as long

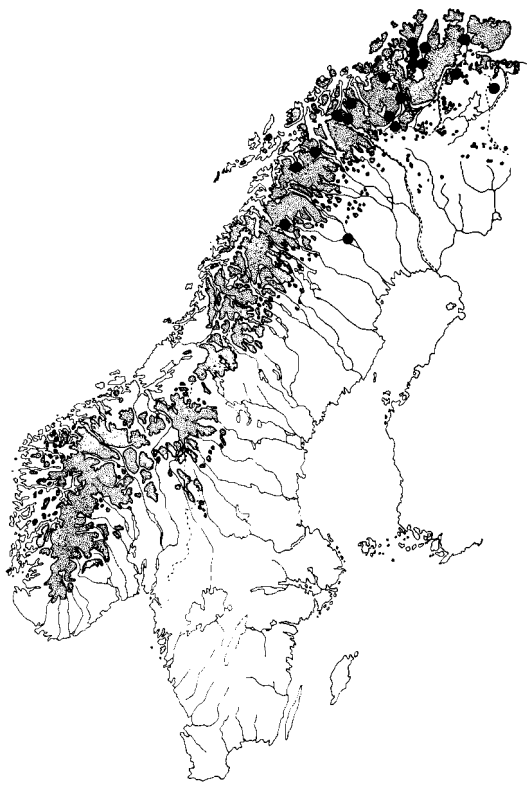

Fig. 1. The Fennoscandian distribution of *Nemoura sahlbergi*. The alpine areas are dotted.

as broad. The legs are slender and covered with stout bristles which are evenly scattered on the femur (Fig. 5). The bristles are longer in the distal half, gradually diminishing towards the base. They never form a fringe of long hairs.

VARIATION

The head: In a small percentage of the material the triangular spots are not clearly visible.

The antennae: In a small section of the material the darkening of the three basal joints is unclear.

The cerci: The form of the basal segments varies to some degree as the 3rd segment may be as long as broad in some specimens. In other specimens this is not so before the 5th segment.

SYSTEMATIC POSITION

The nymph is related to *Nemourca cinerea*, but can be separated on the following characters: The spots on the dorsal side of the head of *N. sahlbergi* are triangular, while in *N. cinerea* they are more like a half moon. The form of the basal segments of the cerci, where the

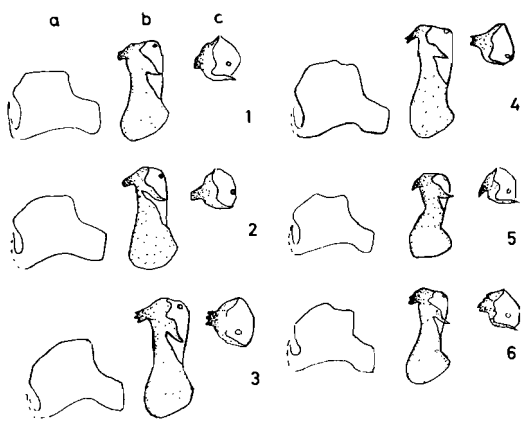

Fig. 2. The variation in the cercies and the subanal plate of the male. a The right subanal plate. b The cercie seen from the right side. c The cercie, dorsal view. 1–3 from Igaldas, Porsanger. 4 from Valdak, Kistrand. 5 and 6 from Bibaktad, Porsanger.

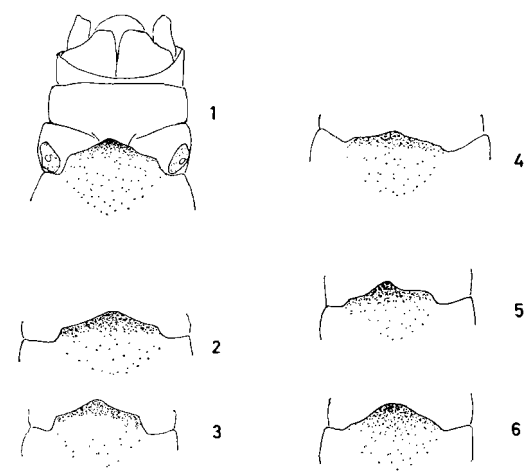

Fig. 3. The variation of the subgenital plate of the female. 1–4 from Valdak, Kistrand. 5 Kautokeino. 6 Bibaktad, Porsanger.

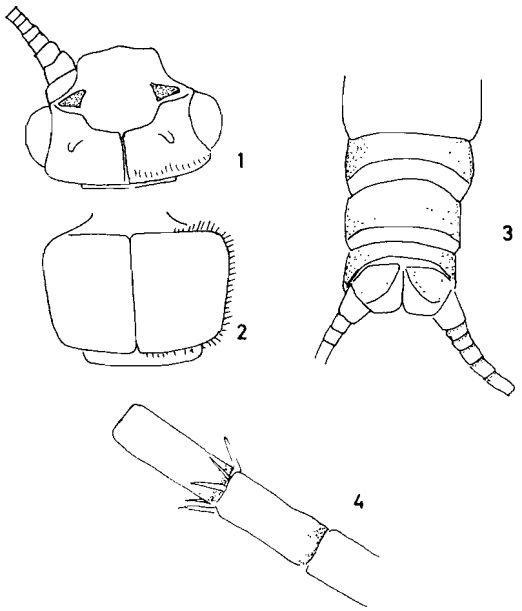

Fig. 4. The nymph of *N. sahlbergi*. 1 The head. 2 The pronotum. 3 The last segments of the abdomen and the basal parts of the cercies. 4 The cercies enlarged.

specimens of *N. sahlbergi* have segments as long as broad from the 3rd, 4th, or the 5th, while in *N. cinerea* the same does not apply before the 7th or the 10th segment.

The variation in the texonomic characteristics of *N. sahlbergi* and a further comparison between the species of *Nemoura* will be dealt with in a future paper 'Norwegian stoneflies'.

Received 25 August 1972

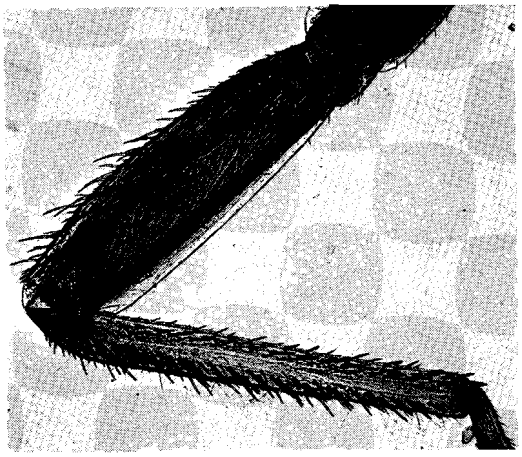

Fig. 5. The right hind femur and tibia of the nymph.

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A New Species of the Genus *Nemoura* (Plecoptera), from Finnmark, North Norway

ALBERT LILLEHAMMER

Lillehammer, A. 1972. A New Species of the Genus *Nemoura* (Plecoptera), from Finnmark, North Norway. *Norsk ent. Tidsskr. 19,* 161–163.

The species is described from a material of 20 ♂♂ and 23 ♀♀ collected in North Norway. The species is compared with the related species of *Nemoura arctica* Esben-Petersen, *N. sahlbergi* Morton and *N. trispinosa* Claasson.

A. Lillehammer, Zoological Museum, University of Oslo, Sars gt. 1, Oslo 5, Norway

In 1966, during an expedition made by the Zoological Museum of Oslo in south-eastern Finnmark, a new species of Nemoura was found at Pasvik and Tana. Later the species was also captured near Kautokeino.

Its known distribution is given in Fig. 1. The specimens were taken in the vegetation near ponds, or in slowly flowing streams. Fig 2 shows a typical locality.

MATERIAL

Altogether 20 ♂♂ and 24 ♀♀ were collected at the following localities: Holotype 1 ♂, Allotype 1 ♀, Paratypes 14 ♂♂, 15♀♀, Rustifjelbma, Tana, 6 July 1966. 3 ♂♂, 1 ♀ Skjellbekken, Pasvik, Sör-Varanger 14 July 1966. 3 ♀♀ Storkilden, Pasvik, Sör-Varanger 13 July 1966. 2 ♂♂, 5 ♀♀ Oskal, Kautokeino, 29 June 1968.

The species is named after Dr. Rolf Vik, the director of the Zoologial Museum of Oslo, who led the expedition.

The types and the other material are deposited in the Zoological Museum, Oslo.

Nemoura viki, new species.

Description: Body length: ♂ 4.7 to 7.0 mm., ♀ 6.6–7.8 mm. Wing length: ♂ 4.7–6.2 mm., ♀ 6.5–7.2 mm.

The head and thorax are dark brown. The abdomen is light brown. The legs are long, slender, and light brown. The wings are clear and the venation is weakly pigmented, their

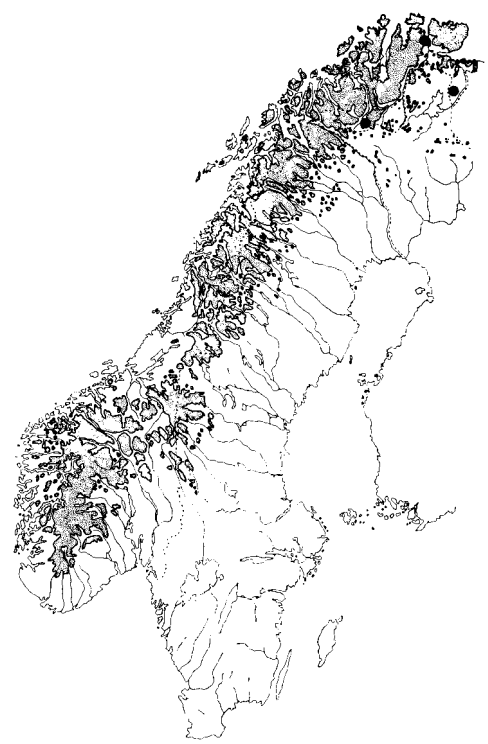

Fig. 1. The known distribution of *Nemoura viki.* The alpine areas are dotted.

Fig. 2. A small slowly flowing stream with muddy bottom at Kautokeino, Finnmark.

colour being light brown to yellow. Pronotum shiny and non-punctate.

♂ Segments 9 and 10 are chitinised and pigmented dark brown (Fig. 3, a and b). The subgenital plate is broad, about as broad as long.

The subanal plates are unpigmented at the tips. The chitinised part forms two points (Fig. 3a). The cerci (Fig. 3c) are chitinised and only pigmented on the outer side with a narrow pigmented ring near the base. The dorsal part has two distinct points. The supra-anal lobe has a well-pigmented chitinal structure inside, which can be clearly seen in alcohol-preserved material (Fig 3 d–g).

♀ The subanal plate is pigmented dark brown, chitinised, and occupies more than half the width of the 7th sternum. Usually the subgenital plate meets the chinised broad point of the 9th sternite (Fig. 4). The cerci are small and simple. They are pigmented dark brown.

The nymph is unknown.

Variation

♂ The dorsal points of the cerci vary in form to some degree. The chitinsed parts of the subanal plate also show some variation as the two pointed tips are of unequal size in different specimens. This variation also applies to the related species, *N. sahlbergi* (Lillehammer 1972).

♀ The form of the subgenital plate varies to some degree and the anterior margin may be more rounded than is shown in Fig. 3h.

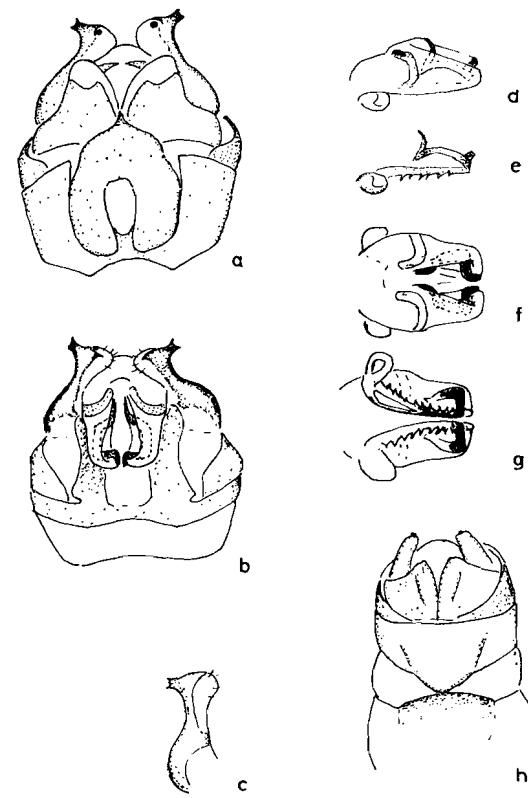

Fig. 3. *Nemoura viki.* a. Segment 9 and 10, ventral view. b. Segment 9 and 10, dorsal view. c. The left cercie. d-g. The supra-anal lobus: d. From the right side. e. The kinised interior structures, seen from the right side. f. dorsal view. g. ventral view. h. segment 8, 9 and 10 of the female, ventral view.

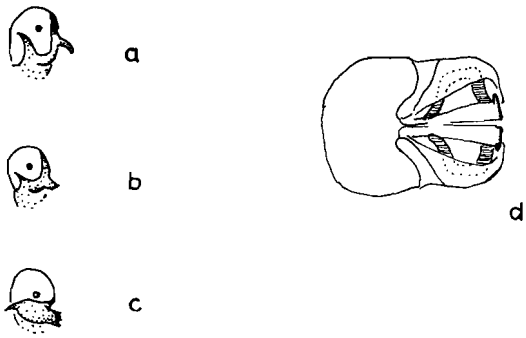

Fig. 4. a-c. The cercies of: a. *N. trispinosa*, b. *N. arctica* and c. *N. viki*, seen from above. d. The supra-anal lobus of *N. arctica* seen from above. (All drawings are made on specimens in the authors collection.)

Systematic position

The species is related to the other arctic species of *Nemoura, N. artica, N. sahlbergi*, and the North American *N. trispinosa.*

♂ The cerci of *N. viki, N. arctica* and *N. trispinosa* are very similar and all of them have a more or less complete narrow chitinised band (Fig. 3c). The dorsal view, however, clearly shows the marked differences between *N. viki* and the other two species (Fig 4 a-c). The greatest difference, however, is in the form of the supra-anal lobe with its chitinised interior structures (Figs. 3f and 4d). The subanal plates are very similar in the three species.

♀ The females are difficult to separate, the subgenital plates of *N. arctica* and *N. viki* being alike. The clearest difference between these two species is the two chitinised and brown pigmented spots of segment 8 in *N. arctica,* which are absent in *N. viki.* This character is valid for the material in the author's collection.

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The Overwintering of *Pelophila borealis* Payk. I. Survival Rates and Cold-Hardiness

EIVIND ÖSTBYE & LAURITZ SÖMME

Östbye, E. & Sömme, L. 1972. The Overwintering of *Pelophila borealis* Payk. I. Survival Rates and Cold-Hardiness. *Norsk ent. Tidsskr. 19*, 165–168.

Survival rates and cold-hardiness of overwintering *Pelophila borealis* Payk. (Col., Carabidae) were studied at Finse, Hardangervidda, South Norway. Between 30 and 50 per cent of the beetles survived the winter in plastic boxes filled with soil and placed at the normal overwintering sites of the beetles in a sedimentation flat at 1200 m a.s.l. Average supercooling points of the beetles were always lower than the temperature of their surroundings, and lowest in the middle of the winter. Field observation and laboratory data indicate that *P. borealis* may survive freezing, at least at temperatures above –10 °C.

Eivind Östbye & Lauritz Sömme, Zoological Laboratory, University of Oslo, Blindern, Oslo 3, Norway

On the mountain plateau of Hardangervidda in South Norway *Pelophila borealis* Payk. (Col., Carabidae) is commonly found at a large sedimentation flat in the Finse area (60°36′ N–7°30′ E) (Östbye 1969). This flat, called Finsefetene, is located at 1200 m a.s.l. in the transition zone between the low-alpine and the mid-alpine zones in this area. Sociologically, the vegetation cover of the habitat is described by K. M. & P. S. Haande (unpubl.) as a *Caricion canescentis-nigrae* NORDH. 1943 alliance according to Nordhagen (1943). This is characterised by an oligotrophic-mesotrophic geogenous bog vegetation with permanent support of water rich in oxygen. The bottom layer is open or covered with *Drepanocladus* sp. and *Calliergona* sp. In the field layer *Eriophorum angustifolium, Carex saxatilis, C. juncella, Equisetum palustre,* and *E. fluviatile* occur as typical species. *Salix lapponum* is dominant in the shrub layer. The habitat borders the Ustekveikja River and is usually exposed to flooding during the snow-melting period in the spring and after heavy rains in the snow-free season. Flooding in late autumn may result in a thick layer of ice covering the ground. This may also occur in the early winter when the snow cover is exposed to sudden mild periods with rain followed by cold. The cover of ice then normally subsists for the whole winter. The area is normally covered by snow and ice for approximately nine months of the year. In this habitat large numbers of *P. borealis* overwinter in the adult stage. Small cavities in the soil are dug by the beetles 5–10 cm below the surface. Overwintering takes place in the cavities, which are sometimes filled with water during autumn flooding. The purpose of the present study was to investigate survival rates of overwintering *P. borealis* under these conditions, and the cold-hardiness of beetles at various times of the year.

MATERIALS AND METHODS

Preliminary observations on cold-hardiness were made on beetles collected from August to October 1969. In September 1971 about 120 specimens were collected, and placed in perforated plastic boxes for overwintering in their natural habitat. Each box, 5 cm high and 6.5 cm i diameter, contained 8 beetles. The boxes were filled with soil and grass turfs from their overwintering sites, dug a few centimetres be-

low the surface, and covered with soil and turf. From each box a string led to a pole, about 2 m high, to facilitate recovery during the winter.

For temperature recordings, thermocouple sensors were placed at the same depth as the boxes. Temperatures were measured once a month with a portable light-spot galvanometer. At the same time snow depths were measured.

Boxes were removed two at a time from the overwintering sites at different intervals between October 1971 and July 1972. The boxes were placed in thermos bottles filled with snow, and transported to the authors' laboratory in Oslo. Here their contents were removed, thawed, and examined for live and dead beetles during a 2 hr period. Following this, all beetles were stored on moist filter paper in Petri dishes for 3–4 days at 1 °C. Numbers of survivors were reexamined at this temperature, where the beetles are active, and in doubtful cases this was followed by exposure at room temperature.

Supercooling points were measured with copper-constantan thermocouples connected to a recording potentiometer at a cooling rate of 1° to 3 °C per min. Only beetles stored for 3–4 days at 1 °C were used for determination of supercooling points. For studies on freezing tolerance, the freezing curve, as described by Asahina (1966), was carefully observed for each beetle. Following freezing at the supercooling point, each beetle was cooled at least to the same temperature for a second time, immediately removed, and examined for survival at room temperature.

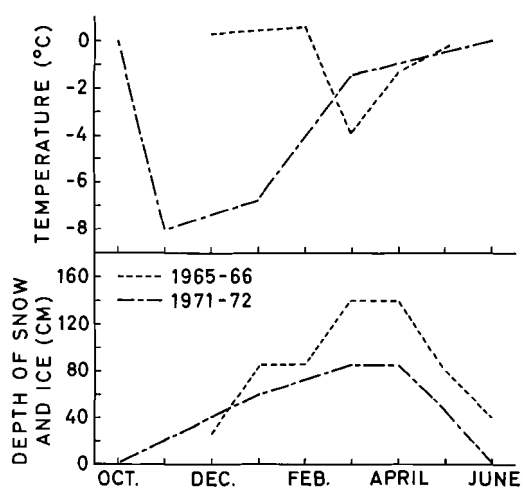

Fig. 1. Depth of snow and soil temperatures at the experimental site.

RESULTS AND DISCUSSION

In the autumn of 1971 periods of frost set in at Finse before the ground was covered by deep snow. For this reason low soil temperatures were recorded at the experimental site in November (Fig. 1). Following later snowfalls the temperature increased and remained fairly constant during the late winter.

Sudden mild periods accompanied by heavy rain, immediately followed by cold weather, occurred at least twice during this winter, in October-November and in December-January.

This created a 15–25 cm thick layer of ice covering the ground for the rest of the winter; it did not melt away before all snow had disappeared. The temperature conditions in the overwintering sites thus remained below zero throughout the winter. For comparison, data from the winter of 1965–66 show the conditions of what could be called a 'normal' winter, a fairly thick snow cover which acted as a good insulative carpet against low temperatures. The mid-winter drop in temperature was caused by a long and permanent low temperature period. During the winter 1965–66 the overwintering sites had long periods with temperatures around zero, a condition not uncommon even in mountain areas. This is usually the case when good sub-nivean air-spaces are formed (Sömme & Östbye 1969 and unpubl. data). Surveys after the winter 1965–66 showed high overwintering rates of *P. borealis*.

During May-June 1972 the sedimentation flat was flooded by water from melting snow, but it was covered by snow until the latter part of June. The experimental site, however, was free of snow on 10 June, when two boxes were removed. No snow remained on any part of the sedimentation flat when the last sample was taken on 2 July.

During the examination of the boxes it was

Table I. Survival rates of *P. borealis* during overwintering at Finse

Date		All beetles n	All beetles percent survivors	Beetles enclosed by ice n	Beetles enclosed by ice percent survivors
21 Oct.	1971	8	100	-	-
18 Nov.	1971	15	60	8	50
21 Jan.	1972	16	63	8	50
18 March	1972	16	56	8	38
10 June	1972	16	31	-	-
2 July	1972	17	53	-	-

found that, as under natural conditions, cavities for overwintering had been dug by the beetles in the soil. In samples removed in November, January, and March it appeared that about half of the boxes had been filled with water, and the beetles enclosed by ice in their cavities.

The survival rate of all beetles, removed at various times from the experimental site, including those enclosed by ice, for which separate figures are given, are shown in Table I. During the winter months about 60 percent of the beetles remained alive, and 31 and 53 percent respectively survived until June and July the following summer. Beetles that were found enclosed by ice upon removal had slightly lower survival rates.

As shown by Salt (1963), inoculative freezing occurs in insects placed in contact with ice. In our laboratory the ability of *P. borealis* to supercool was greatly reduced when the beetles were cooled in contact with ice. Under these conditions freezing could, for instance, be induced at –5 °C. For this reason inoculative freezing may be expected to occur in the field. Survival of beetles enclosed by ice during the winter (Table I) thus shows that *P. borealis* is

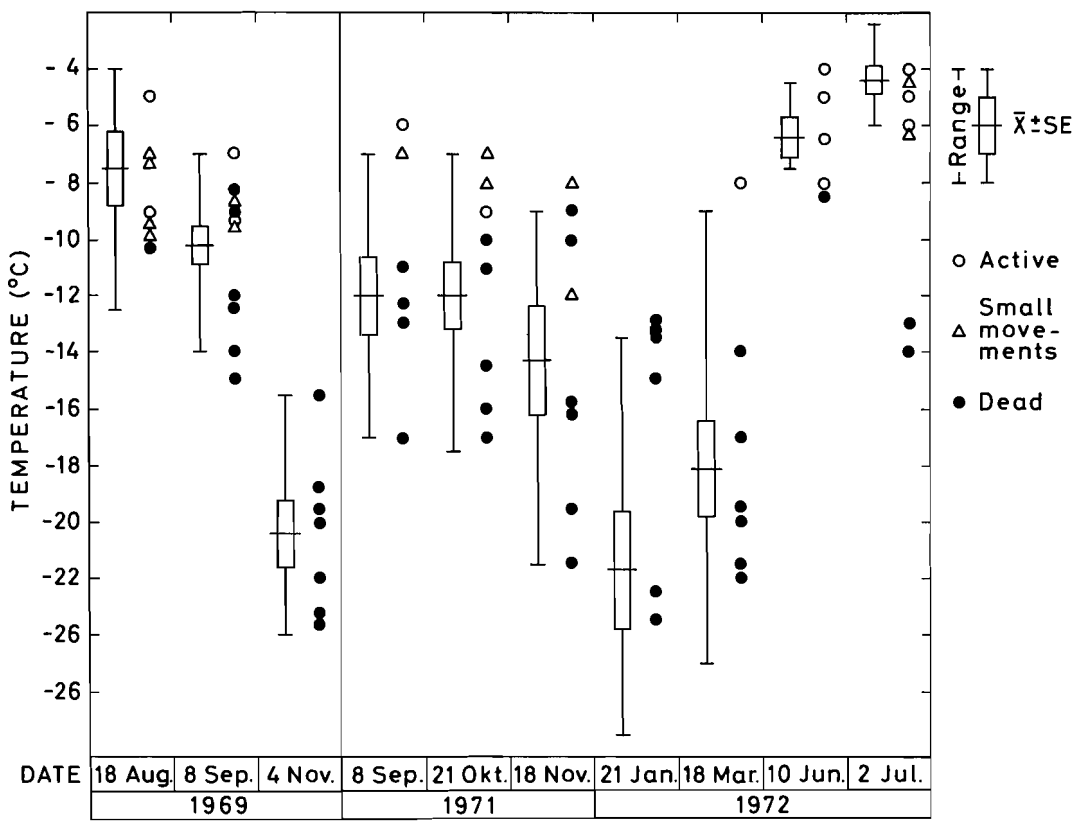

Fig. 2. Seasonal variation in supercooling points (with range and SE) of *Pelophila borealis*. Degrees of activity following freezing of individual beetles at various temperatures are indicated. For further explanation see text.

partly freezing-tolerant at temperatures prevailing in their winter habitat.

Average supercooling points of beetles collected in 1969 or removed from the experimental site during 1971/1972 are presented in Fig. 2. Each average is based on 7 to 10 beetles, except for June, when only 4 beetles were used. In both years supercooling points decreased during the fall, but more rapidly in 1969 than in 1971. Although the reason for this difference is not clear, the results show that *P. borealis* may usually be supercooled far below the temperatures of its winter surroundings (Fig. 1), thus increasing the chances of survival. In June and July supercooling points were greatly increased. This may be due to renewed feeding activity, since the ability to supercool may be reduced by the presence of gut content (Salt 1968).

As described above, by observing the freezing curve, the beetles could be removed from the apparatus at temperatures corresponding to their supercooling points when these were reached for the second time. Data on activity of individual beetles frozen at temperatures as low, or lower, than their supercooling points, are also shown in Fig. 2. In general, beetles frozen to temperatures below −10 °C were dead, while those removed at higher temperatures usually showed some degree of activity. Some of the beetles described as active appeared to be quite normal, while the ability to walk was slightly disturbed in some specimens. Supercooling points were usually measured twice for each beetle, and the lowest value used for calculation of the mean. For this reason some data on individual activity in Fig. 2 fall above the range of supercooling points.

As pointed out by Asahina (1966), freezing-susceptible insects are killed when frozen at temperatures corresponding to their supercooling points. The results of the present experiments agree with our field observations, and indicate some freezing tolerance in *P. borealis*. They also agree with the results of Ohyama & Asahina (1972), who found that two species of carabid beetles survived freezing at temperatures down to −10 °C, but not lower. Other species of carabid beetles may be more freezing-tolerant. As shown by Miller (1969), winter acclimated *Pterostichus brevicornis* have lower lethal temperatures (LD50) near −87 °C. Further investigations will be carried out for a more accurate description of freezing tolerance in *P. borealis* in relation to temperature and time.

ACKNOWLEDGEMENTS

We are indebted to cand.mag. A. Hagen, cand.real. S. Hågvar, cand.real. H.-J. Skar, and Mr. D. Svalastog for contributions to the field work. The investigations have been supported by grants from the Norwegian Research Council for Science and the Humanities (NAVF) (D. 600-17, D. 60. 46-04), The University of Oslo, and the Norwegian IBP.

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Notes on Distribution of Coleoptera in Norway

Karl Erik Zachariassen

Zachariassen, K. E. 1972. Notes on Distribution of Coleoptera in Norway. *Norsk ent. Tidsskr. 19,* 169–170.

This paper presents a list of 51 species of Coleoptera which are new to parts of Norwegian counties. One species, *Osphya bipunctata* F., is new to Norway.

Karl Erik Zachariassen, Institute of Zoophysiology, University of Oslo, Blindern, Oslo 3, Norway

This article reports 51 finds of species of Coleoptera which, according to Strand (1943) and Lindroth (1960), have not been previously reported from their respective parts of the Norwegian counties. The finds were made by the author during the period 1965 to 1972, and the material is kept in the author's collection. Most of the species have been identified or checked by Dr. phil. h. c. Andreas Strand.

Many of the species are known to be widely distributed and appeared in great numbers at the finding places. This shows that several Norwegian counties are poorly investigated with respect to the Coleopter fauna.

District abbreviations are according to Strand (1943).

CARABOIDEA

Trechus rubens F. AAy: Ytre Söndeled, 2 June 1968.

Trichocellus cognatus Gyll. HEn: Alvdal, 15 July 1969. Under stone at river bank.

PALPICORNIA

Limnebius truncatellus Thbg. Bv: Mying, 12 October 1969. In moss at marsh pool.

STAPHYLINOIDEA

Catops morio F. HEs: Sör-Odal, 2 May 1971. Under plank at meadow.

Colon latum Kr. TEy: Kragerö, 24 June 1971. On decaying stub, evening.

Anisotoma axillaris Gyll. HEn: Dalsbygda, 18 July 1969. Under bark, pine stub.

Philonthus chalceus Steph. TRi: Målsnes, 23 July 1972. Under seaweed, washed up on beach.

Philonthus atratus Gr. HEn: Alvdal, 24 July 1970. On bank of river.

Staphylinus brunnipes F. TEy: Stathelle, 2 October 1965.

DIVERSICORNIA

Dasytes obscura Gyll. TEi: Seljord, 23 July 1968. On flowering Filipendula sp.

Thanasimus formicarius L. NTi: Snåsa, 29 June 1972. On pile of timber.

Elater ferrugatus Lac. TRi: Överbygd, Målselv, 16 July 1971. On pine timber.

Elater pomonae Steph. HEs: Finnskog, 21 June 1969. Under bark of old, dry pine stub.

Corymbites nigricornis Panz. VE: Vassbotn, 24 May 1969.

Agriotes sputator L. AK: Dröbak, 14 June 1969. On straw in meadow.

Melanophila acuminata DeG. HEs: Sör-Odal, 21 June 1970. On pile of spruce timber.

Melanophila cyanea F. VE: Vassbotn, 12 June 1971. In numbers on sun-exposed pine timber.

Chrysobothris affinis F. VE: Vassbotn, 12 June 1971. In numbers on sun-exposed oak timber.

Agrilus laticornis Ill. TEy: Kragerö 14 June 1970. On oak firewood.

Epuraea silacea Hbst. HEs: Finnskog, 21 June 1969. On fungus on dead birch stub.

Soronia grisea L. TEy: Kragerö, 15 June 1970. Swarming in evening.

Glischrochilus quadripunctatus L. Nnö: Hamaröy, 15 July 1971. On birch timber.

Antherophagus pallens F. HEn: Alvdal, 23 July 1970.

Mycetophagus multipunctatus F. On: Heidal, 6 April 1971. In great numbers on fungus under bark of dead birch.

HETEROMERA

Mordella maculosa Naez. On: Heidal, 17 July 1970. Under bark of pine stub.

Hallomenus binotatus Quens. TRi: Rundhaug, Målselv, 19 July 1971.

Xylita laevigata Hellen. STi: Meldal, 27 June 1972. On branch of pine.

Osphya bipunctata F. TEy: Kragerö, 13 June 1970. On flowering Crataegus sp.

Uloma rufa Pill. & Mitterp. Ö: Halden ca. 15 July 1970. In decaying wood in sawdust.

LAMELLICORNIA

Geotrupes stercorosus Scriba. Bv: Rollag, 13 August 1966. In cattle dung.

Aphodius fossor L. TEy: Jomfruland, 28 July 1970. In cattle dung.

Aphodius haemorrhoidalis L. HEs: Sör-Odal, 20 June 1970. In cattle dung.

Serica brunnea L. Bv: Rollag, ca. 15 July 1966.

PHYTOPHAGA

Criocephalus rusticus L. TEi: At Tinnsjö, 25 July 1968. Under bark of pine stub.

Acmaeops pratensis Laich. NTi: Snåsa, 29 June 1972. On Chamaenerium sp.

Grammoptera ruficornis F. TEy: Kragerö, 13 June 1970. On flowering Crataegus sp.

Leptura sanguinolenta L. Bv: Gol, 20 July 1969. On Filipendula sp.

Strangalia melanura L. Bv: Sigdal, 29 June 1968. On Chamaenerium sp.

Phymatodes testaceus L. TEy: Kragerö, 10 July 1972. Numerous specimens crawling on stack of firewood, evening.

Donacia impressa Payk. STi: At Målsjöen, 28 June 1972. On Phragmites sp.

Donacia versicolorea Brahm. TEy: Kragerö, 28 July 1967. In numbers on Potamogeton sp.

RHYNCOPHORA

Dissoleucas niveirostris F. VE: Vassbotn, 24 June 1971. On spruce timber.

Coenorrhinus tomentosus Gyll. AK: Lörenskog, 11 August 1971.

Apion violaceum Kby. TEi: Seljord, 23 July 1968. On birch.

Otiorrhynchus dubius Ström. TEy: Kragerö, 25 June 1971. In great numbers on new-built quay.

Sitona hispidulus F. TEy: Kragerö, 4 August 1968.

Notaris aethiops F. HEn: Dalsbygda, 18 July 1969.

Pissodes piniphilus Hbst. HEn: Alvdal, 11 July 1971. On pile of pine timber. TRi: Rundhaug, 16 July 1971. On pile of pine timber.

Phytonomus elongatus Payk. TEy: Kragerö, 22 July 1968.

Phytonomus arator L. STy: Agdenes 10 September 1971.

Scolytus ratzeburgi Jans. VE: Vassbotn. Hatched 10 June 1969 from bark of birch, found 24 May 1969.

ACKNOWLEDGEMENTS

I would like to thank Dr. phil. h. c. Andreas Strand for help with identifying the material.

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Norsk ent. Tidsskr. Vol. 19, No. 2, 1972

Short Communications

Brachycercus harrisella Curtis (Ephemeroptera) New to Norway

JOHN E. BRITTAIN

Brachycercus harrisella Curtis (Ephemeroptera) is recorded from Norway for the first time. Nymphs of the species were taken in the River Glomma about 12 km north of Sarpsborg in the county of Östfold.

J. E. Brittain, Zoological Museum, University of Oslo, Sars gt. 1, Oslo 5, Norway

On 25 July 1971 I collected Ephemeropteran nymphs from the River Glomma about 12 km north of Sarpsborg. Amongst a collection taken from the shore at Kongsrud in Varteig commune in the county of Östfold, were seven nymphs of the distinctive species *Brachycercus harrisella* Curtis. Their body lengths ranged from 3.3–6.7 mm, with a mean of 4.9 mm. The locality lies 24 m above sea level and has a silted, muddy substratum. In this region the River Glomma is about 400 m wide and slow flowing.

Neither this species nor genus has been previously recorded from Norway. For Sweden, there exists the old record of Bengtsson's (1917) from Bromölla in the south-east part of Skåne (about 400 km from the Norwegian locality). In Denmark, the species is restricted to the more westerly parts of Jutland (C. F. Jensen and B. L. Madsen, pers. comm.), the nearest locality to Norway being in a tributary of Limfjorden 15 km WSW of Ålborg.

Outside Scandinavia, *B. harrisella* is found sporadically throughout central and northern Europe from Britain in the west to the Urals in the east (Illies 1967, Landa 1957, 1969). Zoogeographically, Östfold county is situated at the north-west edge of the 'Zentral Flachland' (Illies 1967). Studies on the fish of the River Glomma and their associated parasites (Halvorsen 1971) reinforce this view. Thus *B. harrisella,* typical of silted localities especially in the larger, slow flowing continental rivers, might be expected to be present in the lower reaches of the Glomma.

Received 24 May 1972

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Notes on Distribution of *Halorates reprobus* (O. P. - Cambridge) (Araneae, Linyphiidae) in Norway

FINN ERIK KLAUSEN

Two more localities are given for *Halorates reprobus* (O.P.-Cambridge), which earlier has been found once in Norway.

Finn Erik Klausen, Zoological Museum, University of Bergen, N-5000 Bergen, Norway

The first record of *Halorates reprobus* (O.P.-Cambridge) in Norway was published by Tambs-Lyche (1964) after collecting two females on an islet near Måge in Sörfjorden, Hardanger in 1956 (coll. H. Brattström). About the occurrence in Scandinavia, see Kauri (1965).

In addition I can give information about two more recent records from the western part of Norway. The first is from 19 May 1968, and consists of two females (coll. A. Fjellberg). The specimens were caught at Bömlo, Espevær, Nautöy in SW Norway, during an expedition by the Museum of Zoology, Bergen.

The second is from 27 October 1971, and consists of two females and eight males collected by myself at Austevoll, Mökster in SW Norway. All specimens were taken in the high tide zone, among pebbles covered by seaweed, within a distance of some 40 metres.

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Received 15 April 1972

Contribution No. 103, Zoological Museum, University of Oslo

Night Activity of Black Flies (Diptera, Simuliidae) in Norway

JAN E. RAASTAD & REIDAR MEHL

Three species of black flies, *Prosimulium ferrugineum* (Wahlb.), *Cnephia fuscipes* (Fries), and *Eusimulium cryophilum* Rubzov, were collected at midnight in October from outdoor lamps. *E. cryophilum* is recorded from Fennoscandia for the first time. Night activity of black flies is suggested to be of significance to species feeding on night resting hosts.

J. E. Raastad & R. Mehl, Zoological Museum, University of Oslo, Sars gt. 1, Oslo 5, Norway

Adult black flies are normally considered diurnal insects, and there are few references to species caught after dark. Studies in Scotland, however, have given evidence that black flies exhibit an unexpectedly high degree of night activity: 17, 505 flies were captured by light traps during 51 months' trapping (Davies & Williams 1962). This paper reports black flies caught at night in Norway.

OBSERVATIONS

On 21 October 1968 three species of black flies were collected at midnight while swarming around outdoor lamps at Kvanne, Surnadal in Möre og Romsdal, at 63 ° N, 8 ° E, approx. 10 m a.s.l. The species were *Prosimulium ferrugineum* (Wahlb. 1844) 7 ♀♀, *Cnephia fuscipes* (Fries 1824) 1 ♀, and *Eusimulium cryophilum* Rubzov 1959

2 ♂♂ 29 ♀♀ (R. M. coll.), all determined by the senior author.

The three species are fairly common in Norway (Raastad, unpubl.) *Eusimulium cryophilum* is not previously recorded from Fennoscandia, though most probably included in *E. latipes* (Meigen 1804) *sensu* Carlsson (1962).

DISCUSSION

The present observations show more evidence that some black fly species are active during nighttime. As suggested by Davies & Williams (1962), this activity is probably an important factor in the dispersal and concentration movements of the adult fly.

However, other factors are also involved. Earlier captures, as well as the present, are dominated by females. This suggests a connection between night activity and the blood-sucking habit. Night feeding is likely to be of advantage to species feeding on night-resting hosts such as birds. This will explain why some species are more commonly trapped after dark than others.

Cnephia fuscipes and most *Eusimulium* spp. are known to feed on birds (Carlsson 1962, Golini 1970). Thus it is not surprising to find *C. fuscipes* and *E. cryophilum* in the present sample. *E. latipes* dominated the catches from Scotland (Davies & Williams 1962). This species has also been caught at night in Germany (Wenk 1965). *Cnephia* and *Eusimulium* spp. have shown night activity in Utah (Peterson 1956, 1959).

Less is known about the feeding habits of *Prosimulium ferrugineum*, but it is worth noting that this species was the only one caught by a light trap in Sweden (Kureck 1969).

Further study of the relation between night activity and feeding habits of female black flies will be needed before this problem can be fully understood.

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Received 28 August 1972

Østlig nattfly, *Poliobrya umovii* Ev. funnet i Norge

ALF BAKKE

Poliobrya umovii Ev. (Noctuidae, Lepidoptera) is recorded in Sör-Odal, South-Norway. The species is only known from Russia and Finland.

Alf Bakke, Det norske Skogforsöksvesen, 1432 Ås-NLH

Den 8. juli 1971 ble et eksemplar (♀) av *Poliobrya umovii* Ev. fanget i en kviksølvlampe, ved Det norske Skogforsøksvesens feltstasjon i Maarud skog i Sør-Odal.

Arten er tidligere funnet i Finland og Russland. Mikkola (1960) gjorde det første nord-europeiske funn i nord-Finland i 1955. Senere er arten tatt fire ganger i syd-vest-Finland (Nordstrøm et. al 1969). Den er ikke publisert fra noen av de andre nordiske land, og funnet i Sør-Odal er det vestligste i Norden. Ifølge Mikkola (1969) er arten ikke funnet i Vest-Europa.

Artens andre utviklingsstadier og biologi er ukjent. Feltstasjonen hvor arten ble funnet ligger i granskog, men i omkretsen innenfor 1 km finnes furuskog og myrområder.

Jeg skylder Ing. M. Opheim, Zool. Mus., Oslo takk for hjelp ved bestemmelse av arten.

Mottatt 12 september 1972

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Osphya bipunctata F. (Col., Serropalpidae) New to Norway

KARL ERIK ZACHARIASSEN

Osphya bipunctata F. is reported new to Norway. One adult specimen (♂) was found on a flowering *Crataegus* sp. near Kragerö, Telemark county, 13 June 1970.

K. E. Zachariassen, Institute of Zoophysiology, University of Oslo, Norway

The genus *Osphya* belongs to the family Serropalpidae in the superfamily Heteromera. According to Schaufuss (1916), most of the species in this family are night-active and rare. The species *Osphya bipunctata* F. is one of the few day-active species in the family, and is usually found on flowers of Hawthorn (*Crataegus* sp.), in the wood of which the species has its larval development. It has a length of 6 to 11 mm and has a very varying colouration. It is an example of sexual dimorphism, in that the males usually have very enlarged posterial femurs like those of saltatorial species (Hansen & Larsson 1945).

According to Schaufuss (1916), *O. bipunctata* F. occurs in Central Europe as far as Greece and the Urals. It is very rare in Sweden, where it has been found only in Blekinge (Lindroth 1960), and in Denmark, where it has been found on the islands Lolland and Falster (Hansen & Larsson 1945). The species has also been found in England south of Yorkshire, where it is also very rare (Linssen 1959), but according to Lindroth (1960) it has not appeared in Finland or in the Hamburg area.

One adult specimen of *O. bipunctata* F. was found by the author on a flowering *Crataegus* sp. at Berg Museum near Kragerö on the periphery of Telemark county, 13 June 1970. The specimen has a length of 8 mm and is black in colour, except for the sides of the pronotum. It is a male without enlarged posterial femurs. The specimen can be seen in the author's coleopter collection.

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Received 12 September 1972

Bokanmeldelser

L. G. Higgins og N. D. Riley. 1972. *Sommerfugler. Europas og Nordvest-Afrikas dagsommerfugler.* (Norsk utgave ved M. Opheim.) 366 pp. Tiden Norsk Forlag, Pris kr. 59,–.

De engelske forfatterne har lenge følt et stort behov for en omfattende og moderne håndbok om europeiske sommerfugler. Deres arbeid har resultert i en «Field Guide», som kom ut i England i 1970. Boken foreligger nå også i norsk utgave ved Magne Opheim. I den norske utgaven er gjort en del tilføyelser og rettelser angående de arter som fins her i landet.

I forordet til den norske utgaven sies det at bokens utgivelse er litt av en begivenhet. Dette er første gang det foreligger en bok, som er trykt i Norge, og behandler samtidig norske dagsommerfugler, 97 i tallet, med uttømmende beskrivelser og avbildninger av alle i naturtro farger.

Boken er beregnet som felthåndbok, og fargeplansjene vil være meget viktige for å kunne identifisere de forskjellige artene. Plansjene virker klare og tydelige, og viser både over- og underside av vingene for hver enkelt art. Alle illustrasjonene er laget av den engelske tegneren Brian Hargreaves, som har spesialisert seg på å tegne sommerfugler. De utgjør ca. 760 i antall, idet mange arter er avbildet både som hunn og hann, eller foreligger i flere underarter. De detaljrike fargeillustrasjonene er fordelt på 60 plansjer.

I teksten er påpekt de mest karakteristiske kjennetegn for de forskellige artene. Dessuten angis ofte hvilke arter som ligner på hverandre, noe det er viktig å være oppmerksom på. Under beskrivelsen av de enkelte artene inngår også avsnitt om deres geografiske område og utberedelse, samt opplysninger om hvilke biotoper de foretrekker, larvenes næringsplanter, m.m. Det er lagt stor vekt på å beskrive variasjon i former fra forskjellige geografiske områder. I tillegg til beskrivelse av de forskjellige artene har boken en kort, generell innledning. Denne inneholder bl. a. en beskrivelse av sommerfuglenes bygning, hvor man vil finne forklaring på mange av de uttrykk som brukes ellers i teksten. Innledning har også en verdifull veiledning om fangst og montering av sommerfugler. Helt bakerst i boken fins en samling av 371 små utbredelseskart, som i grove trekk viser hvor de enkelte artene er funnet i Europa og Nordvest-Afrika. Kartene er spesielt kontrollert og eventuelt korrigert for den norske utgaven.

Med de gode illustrasjonene og den utførlige, beskrivende takst, vil boken være et ypperlig hjelpemiddel til å identifisere dagsommerfugler. Boken omhandler imidlertid langt flere arter enn de fleste norske lesere vil være interesser i. Av de 380 artene som er omtalt, fins bare 97, eller omkring en fjerdedel, i Norge. De norske artene drukner så og si i det store utvalg av utenlandske arter. For å finne ut om arten forekommer i Norge, kan det bli nødvendig å bla en del fram og tilbake, og lese igjennom det som står om utbredelse for en rekke beslektede arter. Dette kan gjøre boken noe tungvint som felthåndbok. Atskillig enklere hadde det vært om norske arter var merket i teksten og på plansjene, f.eks. med en stjerne. Eller kanskje artsantallet kunne vært noe begrenset i en norsk utgave.

Men til tross for disse innvendinger må en bok som denne gis den beste anbefaling. Dette er et verk av høy kvalitet, og kan anbefales for alle som er interessert i sommerfugler. Er man det ikke fra før, blir man det sikkert etter å ha sett igjennom denne vakre felthåndboken.

Lauritz Sømme

Hidaka, Z., m. fl. (red.). 1971. *Entomological Essays to Commemorate the Retirement of Professor K. Yasumatsu.* 389 pp. Hokuryukan, Tokyo. Pris. U.S. $ 17.–.

Boken er utgitt som en hyldest til professor K. Yasumatsu i anledning av at han har trukket seg tilbake fra sin stilling ved Kyushu Universitet etter oppnådd aldersgrense. En rekke av hans venner og kolleger over hele verden har sendt inn sine bidrag, slik at boken har blitt en samling på ca. 30 originalarbeider.

De forskjellige artiklene har meget variabelt innhold. Noe over halvparten er faunistisk-taksonomiske arbeider, spesielt over Hymenoptera, men også over Diptera og Coleoptera. Videre inneholder boken artikler med emner som ethologi hos veps, utvikling av kaster hos veps og bier, lysfeller til bekjempelse av Lepidoptera i fruktbager, m.m.

Professor Yasumatsu har selv arbeidet med parasittiske Hymenoptera, og er spesielt interessert i bruk av parasitter og predatorer til biologisk bekjempelse. Den siste delen av boken inneholder flere artikler innen dette området. Disse artiklene er kanskje også den mest interessante del av boken, siden mange av dem gir mer generelle oversikter. Det gjelder f. eks. P. DeBach's artikkel om tilfeldig etablering av predatorer og parasitter i nye områder, og Y. Tanada's oversikt om insektdrepende virus' evne til å holde seg i økosystemer.

Tilsammen er bokens innhold meget variert, og man kan spørre om disse arbeidene ville vært lettere tilgjengelige om de var publisert i ordinære tidsskrifter. Hva man enn måtte mene om dette, er boken en gledelig og respektabel hyldest til en stor entomolog.

Lauritz Sømme

Palm, T. 1972. Skalbaggar. Coleoptera. Kortvingar: Fam. Staphylinidae. Underfam. Aleocharinae (Aleuonota-Tinotus). *Svensk Insektfauna 53, h. 7.* Almquist & Wicksell, Stockholm.

Med dette 7. hefte er staphylinidene blitt sluttbehandlet i «Svensk Insektfauna». Det er blitt i alt 973 sider usedvanlig rikt illustrert med habitusbilder og detaljtegninger av interesse for bestemmelsesarbeid.

I den nordiske fauna er staphylinidene forholdsvis sterkt representert og er uten tvil den mest interessante billefamilie, men den er også blitt holdt for den vanskeligste. Det er imidlertid etterhvert, spredt på en lang rekke arbeider, trukket frem karakterer som ikke er behandlet i de vanlig brukte bestemmelsesarbeider, men som i høy grad letter arbeidet. Det gjelder først og fremst genitaliene, men også mikroskulptur og behåring.

De sydlige artene har Victor Hansen gitt en utførlig, ajourført behandling i «Danmarks fauna», og de finnes også, men mer skjematisk bearbeidet, i serien «Die Käfer Mitteleuropas», hvor første halvpart av familien nylig er kommet. Men for de typisk nordlige artene, og de er mange i denne familie, har vi savnet en samlet, ajourført behandling. Den har vi nå fått med Palms grundige arbeid, som omfatter alle kjente arter fra Fennoskandia og Danmark.

Det er grunn til å nevne særskilt Palms utførlige opplysninger om funnforhold basert på hans egne funn gjennom et langt samlerliv. De er bl. a. til stor hjelp når det gjelder spørsmål om hvor de enkelte arter bør søkes.

De nordiske staphylinider er forholdsvis godt undersøkte, men at det fremdeles står meget igjen å gjøre viser bl. a. den ting at det like til det siste er dukket opp nye arter. Det er å håpe at Palms arbeid vil resultere i økt interesse for denne interessante familien.

Andreas Strand

ERRATUM: Vol. 19, No. 1, 1972

On page 79 in 'A Key to the full-grown larvae of *Agraylea*' the last sentence of 3 (2) should read: setoids. . . *Agraylea cognatella* McLachlan

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Examples:

Löken, A. 1964. Social wasps in Norway (Hymenoptera, Vespidae). *Norsk ent. Tidsskr. 12*, 191-218

Schwarts, R. J. 1955. *The Complete Dictionary of Abbreviations*. 211 pp., T. Y. Cromwell Co., New York.

Whitman, L. 1951. The arthropod vectors of yellow fever. pp. 229-298 in Strode, K. (ed.) *Yellow Fever*. McGraw-Hill, New York and London.

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