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Faunistical records of Caddis flies (Trichoptera) from Buskerud, South Norway

TROND ANDERSEN, LARS OVE HANSEN, KJELL ARNE JOHANSON & BJØRN A. SAGVOLDEN

Andersen, T., Hansen, L. O., Johanson, K. A. & Sagvolden, B. A. 1993. Faunistical records of Caddis flies (Trichoptera) from Buskerud, South Norway. *Fauna norv. Ser. B 40:* 49—57.

Records of a total of 111 Trichoptera species from Buskerud are given, 92 species are taken in eastern Buskerud, and 70 in western Buskerud. The total number of species until now recorded from eastern Buskerud is 102, while the number from western Buskerud is 80.

One species, *Lype reducta* (Hagen, 1868) is previously not recorded from Norway. Further, eight of the species are considered as rare in Norway. Four of these, *Rhyacophila fasciata* Hagen, 1859, *Ironoquia dubia* (Stephens, 1837), *Limnephilus fuscinervis* (Zetterstedt, 1840) and *Athripsodes albifrons* (Linnaeus, 1758) were taken only in eastern Buskerud, one species, *Ceratopsyche silfvenii* (Ulmer, 1906) only in western Buskerud, while three species, *Hydroptila simulans* Mosely, 1920, *Hydropsyche contubernalis* McLachlan, 1865 and *Ylodes simulans* (Tjeder, 1929) were taken in both regions.

Trond Andersen & Kjell Arne Johanson, Museum of Zoology, University of Bergen, Muséepl. 3, N-5007 Bergen, Norway.
Lars Ove Hansen, Department of Biology, Division of Zoology, University of Oslo, P. O. Box 1050 Blindern, N-0316 Oslo, Norway.
Bjørn A. Sagvolden, P.O. Box 30, N-3626 Rollag, Norway.

INTRODUCTION

Buskerud is one of the larger counties in South Norway, ranging from the eastern parts of the Hardangervidda mountain plateau in the west to the lowlands along the Oslofjord in the east. Several large rivers like Numedalslågen, Hallingdalselva, Simoa, Begna and Drammenselva flow through Buskerud, and there are a high number of lakes; the largest being Tyrifjorden with a surface of 133 km^2.

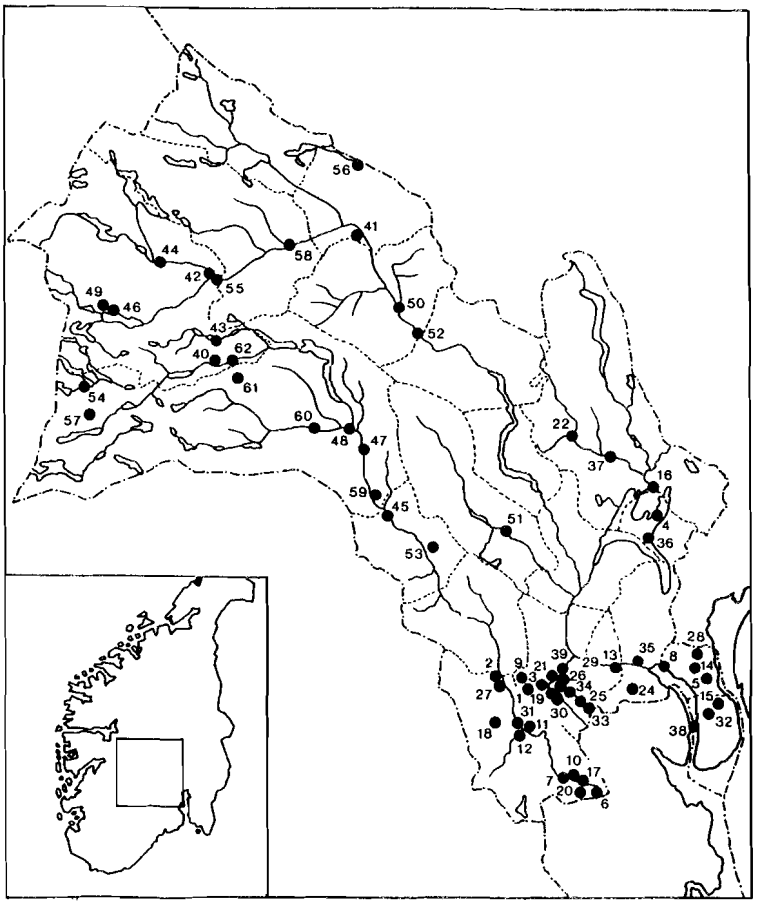
Freshwater localities are among our most threatened habitats. In Buskerud, many of the river systems are subjected to hydroelectric exploitation, and the larger rivers are dammed at several locations. Many of the rivers, like the lower reaches of Drammenselva, are strongly polluted due to industrial waste and housing sewer. Seepage from farming land adds to this pollution. Recently, acid rain has also led to an increased acidity in many ponds and lakes in Buskerud.

Deterioration of freshwater habitats often leads to an impoverished fauna. As maintenance of the biodiversity is considered to be one of the most important tasks in nature conservation, it is essential to get a better knowledge of the distribution and occurrence of freshwater insects. Although Trichoptera is considered to be one of the better studied insect groups in Norway (Aagaard & Hågvar 1987), the Trichoptera fauna in many districts is still very superficially known. The present study aims to add to the knowledge of this fauna in Buskerud.

STUDY AREA, MATERIAL AND METHODS

The material comprises approximately 18.320 imagines; in addition a few larvae have been identified. Most of the material was collected between 1986 and 1990, but a few specimens collected in the 1960th, 1970th and early 1980th are also included. 39 localities in eastern Buskerud and 23 in western Buskerud have been sampled, Fig. 1. The exact localities, with UTM- and EIS-re-

Fig. 1. Localities in eastern and western Buskerud; the numbers refer to the locality numbers in Tables 1 and 2.
Lokaliteter i Buskerud øst og vest; numrene henviser til lokalitets numre i Tabell 1 og 2.



ferences are listed in Table 1 & 2. The biogeographical provinces follow Strands' system as revised by Økland (1981).

Most of the material has been taken in light traps, but some specimens were also caught in malaise traps. In addition caddis flies have been collected with sweepnets or have been searched for on stones and vegetation along lakes and rivers. The larvae are mostly picked from stones and submerged vegetation in streams and rivers. Most of the material have been taken by the authors, but some specimens taken by Per Andersen, Yngvar Berg, David W. B. Johansen, Sverre Kobro, Tom Kleppaker, Deveg Ruud and Per Tallaksrud are also included. In addition, a few specimens collected by the VANDA project have been identified, as well as a few specimens deposited in the entomological collection at the Zoological Museum, University of Bergen.

Capture date and number of males and females caught are only given for species which are considered as rare.

SPECIES

Family Rhyacophilidae

Rhyacophila fasciata Hagen, 1859. BØ, Nedre Eiker: Miletjern 20—30 Aug. 1988 1 ♂.

R. nubila (Zetterstedt, 1840). BØ, Kongsberg: Hvittingfoss, Komnes, Reineelva; Nedre Eiker: Miletjern. BV, Nes: Nesbyen; Gol: Engjan; Hol: Egilstølen; Rollag: Rollag.

Family Glossosomatidae

Glossosoma intermedia (Klapálek, 1892). BV, Nes: Nesbyen.

G. nylanderi McLachlan, 1879. BV, Gol: Engjan.

Agapetus ochripes Curtis, 1834. BØ, Dram-

Table 1. Localities in eastern Buskerud, with UTM- and EIS-references.
Lokaliteter i Buskerud øst, med UTM- og EIS-referanse.

No.	LOCALITY	REGION	MUNICIPALITY	UTM (32V)	EIS
1	Dokka	BØ	Øvre Eiker	NM399163	27
2	Eikedoktjern	BØ	Kongsberg	NM337203	27
3	Fiskum	BØ	Øvre Eiker	NM462197	27
4	Gamtangen	BØ	Hole	NM721608	36
5	Hotvet	BØ	Røyken	NM820220	28
6	Hvittingfoss	BØ	Kongsberg	NL571935	19
7	Hvål	BØ	Kongsberg	NL505970	19
8	Kinnartangen	BØ	Røyken	NM753204	28
9	Kjennerudvann	BØ	Øvre Eiker	NM384168	27
10	Komnes	BØ	Kongsberg	NL518974	19
11	Labru	BØ	Kongsberg	NM377097	27
12	Labru kraftverk	BØ	Kongsberg	NM377093	27
13	Miletjern	BØ	Nedre Eiker	NM585239	28
14	Mortensrud	BØ	Røyken	NM814227	28
15	Mørk	BØ	Hurum	NM856153	28
16	Norderhov	BØ	Ringerike	NM7066	36
17	Reineelva	BØ	Kongsberg	NL546961	19
18	Saggrenda	BØ	Kongsberg	NM344101	27
19	Skarud	BØ	Øvre Eiker	NM470180	27
20	Skinnes	BØ	Kongsberg	NL555947	19
21	Skjelbred	BØ	Øvre Eiker	NM469215	27
22	Sokna	BØ	Ringerike	NM512789	36
23	Sommerstad	BØ	Kongsberg	NM464016	27
24	Steglevann	BØ	Drammen	NM6120	28
25	Steinbruelva	BØ	Øvre Eiker	NM556125	28
26	Stemning	BØ	Øvre Eiker	NM479119	27
27	Stengelsrud	BØ	Kongsberg	NM338192	27
28	Stordammen	BØ	Røyken	NM7726	28
29	Sundet	BØ	Øvre Eiker	NM476185	27
30	Sundhaugen	BØ	Øvre Eiker	NM473182	27
31	Sunnegrenda	BØ	Kongsberg	NM372097	27
32	Svendsrud	BØ	Hurum	NM857148	28
33	Tryterud	BØ	Øvre Eiker	NM549127	28
34	Tørrbekk	BØ	Øvre Eiker	NM519161	28
35	Underlia	BØ	Drammen	NM661254	28
36	Utvika	BØ	Hole	NM704552	36
37	Veme	BØ	Ringerike	NM597752	36
38	Verksøya	BØ	Hurum	NM799092	28
39	Vestfossen	BØ	Øvre Eiker	NM489223	27

Table 2. Localities in western Buskerud, with UTM- and EIS-references.
Lokaliteter i Buskerud vest, med UTM- og EIS-referanse.

No.	LOCALITY	REGION	MUNICIPALITY	UTM (32V)	EIS
40	Egilstølen	BV	Hol	MM655967	34
41	Engjan	BV	Gol	NN013277	44
42	Hagafossen	BV	Hol	MN643185	43
43	Holmevatnet	BV	Hol	MN654026	43
44	Hovet	BV	Hol	MN5421	43
45	Kjerre	BV	Rollag	NM068594	35
46	Kvasshøgdbotten	BV	Hol	MN3810	43
47	Lintveit	BV	Nore og Uvdal	NM012754	35
48	Liverud	BV	Nore og Uvdal	MM926806	34
49	Løa	BV	Hol	MN385105	42
50	Nesbyen	BV	Nes	NN053164	44
51	Prestfoss	BV	Sigdal	NM3557	35
52	Rauk	BV	Nes	NN145027	44
53	Rollag	BV	Rollag	NM167501	35
54	Sevra	BV	Nore og Uvdal	MM353907	33
55	Teigen	BV	Hol	MN671163	43
56	Tisleifjorden	BV	Gol	NN011452	44
57	Tormodstjøman	BV	Nore og Uvdal	MM3683	33
58	Torpo	BV	Ål	MN8425	43
59	Trytetjønn	BV	Nore og Uvdal	NM0367	35
60	Uvdal	BV	Nore og Uvdal	MM875815	34
61	Ånevatn	BV	Nore og Uvdal	MM717944	34
62	Åsbergtjønn	BV	Hol	MM693973	34

men: Underlia; Kongsberg: Hvittingfoss; Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Gol: Engjan; Rollag: Rollag.

Family Hydroptilidae

Agraylea cognatella McLachlan, 1880. BV, Hol: Hagafossen.

Hydroptila forcipata (Eaton, 1873). BV, Nes: Nesbyen; Hol: Holmevatnet.

H. simulans Mosely, 1920. BØ, Kongsberg: Hvittingfoss 24—27 July 1990 1 ♀. BV, Nes: Nesbyen 26 July—1 Aug. 1981 2 ♂♂ 1 ♀; Rollag: Rollag 31 Aug. 1989 1 ♀.

H. tineoides Dalman, 1819. BØ, Drammen: Underlia; Kongsberg: Hvittingfoss; Øvre Eiker: Vestfossen; Nedre Eiker; Miletjern; Røyken: Kinnartangen; Hurum: Verksøya. BV, Nes: Nesbyen, Rauk; Hol: Hagafossen, Teigen, Åsbergtjønn; Nore og Uvdal: Lintveit, Uvdal.

Ithytrichia lamellaris Eaton, 1873. BØ, Kongsberg: Hvittingfoss, Hvål, Sommerstad, Sunnegrenda. BV, Nes: Nesbyen; Rollag: Rollag.

Oxyethira flavicornis (Pictet, 1834). BØ, Øvre Eiker: Vestfossen; Røyken: Kinnartangen. BV, Nes: Rauk; Hol: Hagafossen; Rollag: Kjerre, Rollag; Nore og Uvdal: Lintveit.

O. frici Klapálek, 1891. BV, Nes: Nesbyen, Rauk; Rollag: Rollag; Nore og Uvdal: Uvdal.

O. simplex Ris, 1897. BV, Hol: Åsbergtjønn.

O. tristella Klapálek, 1895. BØ, Kongsberg: Hvittingfoss, Sunnegrenda. BV, Rollag: Rollag.

Family Philopotamidae

Philopotamus montanus (Donovan, 1813). BØ, Kongsberg: Komnes.

Wormaldia subnigra McLachlan, 1865. BØ, Kongsberg: Hvittingfoss, Labru kraftverk, Saggrenda; Øvre Eiker: Dokka, Steinbruelva; Nedre Eiker: Miletjern; Røyken: Hotvet.

Family Psychomyiidae

Lype phaeopa (Stephens, 1836). BØ. Kongsberg: Hvittingfoss, Labru, Sunnegrenda; Øvre Eiker: Sundet, Tørrbekk, Vestfossen; Nedre Eiker: Miletjern; Røyken: Mortensrud.

L. reducta (Hagen, 1868). BØ, Nedre Eiker: Miletjern 1—10 July 1988 1 ♂.
Psychomyia pusilla (Fabricius, 1781). BØ, Kongsberg: Hvittingfoss, Labru kraftverk; Nedre Eiker: Miletjern.
Tinodes waeneri (Linnaeus, 1758). BØ, Kongsberg: Hvittingfoss, Labru kraftverk; Hole: Garntangen; Øvre Eiker: Sundet, Sundhaugen, Tryterud, Tørrbekk; Nedre Eiker: Miletjern; Røyken: Kinnartangen; Hurum: Verksøya.

Family Ecnomidae
Ecnomus tenellus (Rambur, 1842). BØ, Hurum: Svendsrud.

Family Polycentropodidae
Cyrnus flavidus McLachlan, 1864. BV, Rollag: Rollag.
C. insolutus McLachlan, 1878. BØ, Hurum: Svendsrud.
C. trimaculatus (Curtis, 1834). BØ, Kongsberg: Hvittingfoss, Eikedoktjern, Labru kraftverk; Ringerike: Veme; Hole: Garntangen; Øvre Eiker: Dokka, Kjennerudvann, Skjelbred, Vestfossen; Nedre Eiker: Miletjern; Røyken: Hotvet, Mortensrud; Hurum: Svendsrud.
Holocentropus dubius (Rambur, 1842). BØ, Kongsberg: Stengelsrud; Nedre Eiker: Miletjern; Røyken: Storđammen; Hurum: Svendsrud. BV, Rollag: Rollag.
H. picicornis (Stephens, 1836). BØ, Øvre Eiker: Stemning.
Neureclipsis bimaculata (Linnaeus, 1758). BØ, Kongsberg: Hvittingfoss, Hvål, Labru kraftverk; Nedre Eiker: Miletjern. BV, Hol: Holmevatnet; Sigdal: Prestfoss; Rollag: Kjerre, Rollag.
Plectrocnemia conspersa (Curtis, 1834). BØ, Kongsberg: Reineelva, Skinnes; Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Hol: Egilstølen; Rollag: Rollag.
Polycentropus flavomaculatus (Pictet, 1834). BØ, Kongsberg: Hvittingfoss, Labru kraftverk; Øvre Eiker: Dokka, Kjennerudvann, Skarud, Skjelbred; Nedre Eiker: Miletjern; Røyken: Hotvet, Mortensrud. BV, Nes: Nesbyen; Hol: Hagafossen, Holmevatnet, Teigen, Åsbergtjønn; Rollag: Kjerre, Rollag; Nore og Uvdal: Lintveit, Uvdal.
P. irroratus (Curtis, 1835). BØ, Ringerike: Sokna; Øvre Eiker: Kjennerudvann; Nedre Eiker: Miletjern; Hurum: Svendsrud.

Family Hydropsychidae
Ceratopsyche nevae (Kolenati, 1858). BØ, Drammen: Underlia; Kongsberg: Hvittingfoss; Nedre Eiker: Miletjern. BV, Nes: Nesbyen, Rauk; Hol: Egilstølen; Rollag: Rollag.
C. silfvenii (Ulmer, 1906). BV, Gol: Tisleifjorden 19 July 1972 1 ♂.
Hydropsyche angustipennis (Curtis, 1834). BØ, Nedre Eiker: Miletjern.
H. contubernalis McLachlan, 1865. BØ, Kongsberg: Hvittingfoss 24—27 July 1990 3 ♂♂ 23 ♀♀; Nedre Eiker: Miletjern 10—30 June 1988 2 ♂♂. BV, Rollag: Rollag 1 July—12 Aug. 1988 4 ♂♂ 17 ♀♀, 20 June—29 July 1989 5 ♂♂ 5 ♀♀.
H. pellucidula (Curtis, 1834). BØ, Nedre Eiker: Miletjern. BV, Nes: Nesbyen.
H. siltalai Döhler, 1963. BØ, Drammen: Underlia; Nedre Eiker: Miletjern. BV, Rollag: Rollag.

Family Arctopsychidae
Arctopsyche ladogensis (Kolenati, 1859). BØ, Nedre Eiker: Miletjern. BV, Gol: Engjan.

Family Phryganeidae
Agrypnia obsoleta (Hagen, 1864). BØ, Kongsberg: Hvittingfoss, Stengelsrud, Sunnegrenda; Øvre Eiker: Kjennerudvann, Stemning; Nedre Eiker: Miletjern. BV, Rollag: Rollag; Nore og Uvdal: Trytetjønn.
A. picta Kolenati, 1848. BØ, Nedre Eiker: Miletjern.
A. varia (Fabricius, 1793). BØ, Nedre Eiker: Miletjern.
Phryganea bipunctata Retzius, 1783. BØ, Kongsberg: Labru; Nedre Eiker: Miletjern. BV, Hol: Hagafossen; Rollag: Rollag.
P. grandis Linnaeus, 1758. BØ, Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Rollag: Rollag.
Trichostegia minor (Curtis, 1834). BØ, Nedre Eiker: Miletjern.

Family Brachycentridae
Brachycentrus subnubilus Curtis, 1834. BV, Rollag: Rollag.
Micrasema setiferum (Pictet, 1834). BV, Gol: Engjan.

Family Lepidostomatidae
Crunoecia irrorata (Curtis, 1834). BØ, Røyken: Kinnartangen.
Lepidostoma hirtum (Fabricius, 1775). BØ, Kongsberg: Hvittingfoss, Labru kraftverk, Sommerstad; Nedre Eiker; Miletjern. BV,

Nes: Nesbyen; Hol: Egilstølen; Rollag: Rollag.

Family Limnephilidae

Ironoquia dubia (Stephens, 1837). BØ, Nedre Eiker: Miletjern 20—30 Aug. 1988 1 ♂.

Apatania stigmatella (Zetterstedt, 1840). BØ, Drammen: Underlia; Røyken: Kinnartangen. BV, Hol: Hovet; Rollag: Rollag; Nore og Uvdal: Liverud, Tormodstjørnan.

A. zonella (Zetterstedt, 1840). BV, Hol: Hagafossen.

Chaetopteryx villosa (Fabricius, 1798). BØ, Kongsberg: Saggrenda; Ringerike: Norderhov.

Glyphotaelius pellucidus (Retzius, 1783). BØ, Kongsberg: Hvittingfoss; Nedre Eiker: Miletjern; Røyken: Kinnartangen.

Limnephilus affinis Curtis, 1834. BØ, Nedre Eiker: Miletjern; Røyken: Kinnartangen; Hurum: Verksøya.

L. algosus (McLachlan, 1868). BV, Gol: Engjan.

L. auricula Curtis, 1834. BØ, Røyken: Kinnartangen.

L. binotatus Curtis, 1834. BØ, Nedre Eiker: Miletjern.

L. borealis (Zetterstedt, 1840). BØ, Drammen: Underlia; Kongsberg: Eikedoktjern; Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Rollag: Rollag; Nore og Uvdal: Ånevatn.

L. centralis Curtis, 1834. BØ, Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Hol: Hagafossen; Rollag: Rollag.

L. coenosus Curtis, 1834. BØ, Drammen: Underlia. BV, Hol: Egilstølen, Løa; Rollag: Rollag.

L. decipiens (Kolenati, 1848). BØ, Kongsberg: Sommerstad; Ringerike: Norderhov; Øvre Eiker: Fiskum; Nedre Eiker: Miletjern; Røyken: Kinnartangen.

L. elegans Curtis, 1834. BØ, Nedre Eiker: Miletjern. BV, Rollag: Rollag.

L. extricatus McLachlan, 1865. BØ, Nedre Eiker: Miletjern. BV, Nes: Nesbyen; Hol: Hagafossen; Rollag: Rollag.

L. femoralis Kirby, 1837. BV, Rollag: Rollag.

L. femoratus (Zetterstedt, 1840). BØ, Kongsberg: Sommerstad. BV, Gol: Engjan; Rollag: Rollag; Nore og Uvdal: Ånevatn.

L. fenestratus (Zetterstedt, 1840). BV, Hol: Egilstølen; Rollag: Rollag.

L. flavicornis (Fabricius, 1787). BØ, Drammen: Underlia; Nedre Eiker: Miletjern; Røyken: Kinnartangen.

L. fuscicornis Rambur, 1842. BØ, Nedre Eiker: Miletjern. BV, Rollag: Rollag.

L. fuscinervis (Zetterstedt, 1840). BØ, Nedre Eiker: Miletjern 20—30 Aug. 1988 1 ♀.

L. germanus McLachlan, 1875. BØ, Drammen: Underlia; Nedre Eiker: Miletjern.

L. griseus (Linnaeus, 1758). BØ, Drammen: Underlia.

L. ignavus McLachlan, 1865. BØ, Nedre Eiker: Miletjern; Røyken: Kinnartangen.

L. marmoratus Curtis, 1834. BØ, Nedre Eiker: Miletjern; Røyken: Kinnartangen.

L. nigriceps (Zetterstedt, 1840). BV, Nore og Uvdal: Ånevatn.

L. rhombicus (Linnaeus, 1758). BØ, Kongsberg: Eikedoktjern; Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Hol: Egilstølen; Rollag: Rollag.

L. sericeus (Say, 1824). BØ, Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Rollag: Rollag.

L. sparsus Curtis, 1834. BØ, Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Rollag: Rollag.

L. stigma Curtis, 1834. BØ, Drammen: Underlia; Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Hol: Egilstølen; Rollag: Rollag.

L. subcentralis Brauer, 1857. BØ, Drammen: Underlia; Nedre Eiker: Miletjern; Røyken: Kinnartangen.

L. vittatus (Fabricius, 1798). BØ, Kongsberg: Sunnegrenda; Ringerike: Norderhov. BV, Rollag: Rollag.

Phacopteryx brevipennis (Curtis, 1834). BV, Nes: Nesbyen; Rollag: Rollag.

Rhadicoleptus alpestris (Kolenati, 1848). BV, Nes: Nesbyen; Hol: Egilstølen; Rollag: Rollag.

Halesus digitatus (Schrank, 1781). BØ, Røyken: Kinnartangen.

H. radiatus (Curtis, 1834). BØ, Røyken: Kinnartangen. BV, Gol: Engjan; Nore og Uvdal: Sevra, Trytetjønn.

H. tesselatus (Rambur, 1842). BØ, Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Rollag: Rollag.

Micropterna lateralis (Stephens, 1837). BØ, Røyken: Kinnartangen. BV, Roliag: Rollag.

M. sequax McLachlan, 1875. BØ, Drammen: Underlia; Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Hol: Egilstølen.

Potamophylax cingulatus (Stephens, 1837). BØ, Drammen: Underlia; Nedre Eiker: Mi-

letjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Rollag: Rollag.
P. latipennis (Curtis, 1834). BØ, Kongsberg: Hvittingfoss. BV, Nes: Nesbyen; Ål: Torpo; Rollag: Rollag.
P. nigricornis (Pictet, 1834). BØ, Nede Eiker: Miletjern; Røyken: Kinnartangen. BV, Nes: Nesbyen; Hol: Egilstølen.

Family Goeridae
Goera pilosa (Fabricius, 1775). BØ, Hole: Garntangen; Øvre Eiker: Tørrbekk; Nedre Eiker: Miletjern; Røyken: Kinnartangen.
Silo pallipes (Fabricius, 1781). BØ, Kongsberg: Reineelva; Nedre Eiker: Miletjern, Skarud.

Family Beraeidae
Beraea pullata (Curtis, 1834). BØ, Ringerike: Sokna.

Family Sericostomatidae
Sericostoma personatum (Spence *in* Kirby & Spence, 1826). BØ, Kongsberg: Reineelva; Røyken: Kinnartangen.

Family Molannidae
Molanna albicans (Zetterstedt, 1840). BV, Hol: Hagafossen.
M. angustata Curtis, 1834. BØ, Kongsberg: Hvål, Sunnegrenda; Øvre Eiker: Sundet, Sundhaugen, Tryterud; Nedre Eiker: Miletjern. BV, Nes: Nesbyen; Rollag: Rollag.
Molannodes tinctus (Zetterstedt, 1840). BØ, Kongsberg: Sommerstad; Ringerike: Sokna; Øvre Eiker: Kjennerudvann, Tryterud; Nedre Eiker: Miletjern. BV, Hol: Åsbergtjønn; Rollag: Rollag.

Family Leptoceridae
Athripsodes albifrons (Linnaeus, 1758). BØ, Kongsberg: Hvittingfoss 22 July 1990 2 ♀♀, 24—27 July 1990 4 ♂♂ 50 ♀♀; Øvre Eiker: Vestfossen 30 July 1990 2 ♀♀; Nedre Eiker: Miletjern 1—10 Aug. 1988 5 ♀♀; Røyken: Kinnartangen 20—31 July 1986 1 ♂ 1 ♀.
A. aterrimus (Stephens, 1836). BØ, Kongsberg: Hvittingfoss, Hvål, Labru, Labru kraftverk, Sommerstad, Sunnegrenda; Ringerike: Sokna, Veme; Hole: Garntangen; Øvre Eiker: Stemning, Sundet, Tørrbekk; Nedre Eiker: Miletjern.
A. cinereus (Curtis, 1834). BØ, Kongsberg: Hvittingfoss, Hvål, Labru; Ringerike: Veme; Øvre Eiker: Dokka, Stemning, Sundet, Sundhaugen, Tryterud, Tørrbekk, Vestfossen; Nedre Eiker: Miletjern. BV, Rollag: Kjerre, Rollag.
A. commutatus (Rostock, 1874). BØ, Kongsberg: Hvittingfoss; Øvre Eiker: Vestfossen. BV, Rollag: Rollag.
Ceraclea alboguttata (Hagen, 1860). BØ, Kongsberg: Hvittingfoss; Nedre Eiker: Miletjern.
C. annulicornis (Stephens, 1836). BØ, Kongsberg: Hvittingfoss; Nedre Eiker: Miletjern. BV, Hol: Åsbergtjønn; Rollag: Kjerre, Rollag.
C. dissimilis (Stephens, 1836). BØ, Kongsberg: Hvittingfoss; Øvre Eiker: Vestfossen; Nedre Eiker: Miletjern; Røyken: Kinnartangen. BV, Rollag: Kjerre, Rollag.
C. fulva (Rambur, 1842). BV, Rollag: Rollag.
Mystacides azurea (Linnaeus, 1761). BØ, Drammen: Steglevann; Kongsberg: Hvittingfoss, Labru, Labru kraftverk, Sommerstad, Stengelsrud, Sunnegrenda; Ringerike: Sokna, Utvika, Veme; Øvre Eiker: Dokka, Fiskum, Sundhaugen, Tørrbekk; Nedre Eiker: Miletjern; Røyken: Kinnartangen, Mortensrud. BV, Gol: Engjan; Hol: Kvasshøgdbotten; Rollag: Kjerre, Rollag.
M. longicornis (Linnaeus, 1758). BØ, Drammen: Steglevann; Hole: Garntangen.
Oecetis lacustris (Pictet, 1834). BØ, Kongsberg: Hvittingfoss; Øvre Eiker: Fiskum, Stemning, Sundhaugen, Vestfossen; Nedre Eiker: Miletjern; Røyken: Kinnartangen.
O. ochracea (Curtis, 1825). BØ, Øvre Eiker: Fiskum; Nedre Eiker: Miletjern. BV, Rollag: Rollag.
O. testacea (Curtis, 1834). BØ, Kongsberg: Hvittingfoss, Sunnegrenda; Nedre Eiker: Miletjern. BV, Rollag: Rollag.
Triaenodes bicolor (Curtis, 1834). BØ, Øvre Eiker: Fiskum, Stemning; Hurum: Mørk. BV, Rollag: Rollag.
Ylodes simulans (Tjeder, 1929). BØ, Kongsberg: Hvittingfoss 24—27 July 1990 17 ♂♂ 74 ♀♀, Hvål 22 July 1990 1 ♂. BV, Rollag: Rollag 8—12 Aug. 1988 7 ♂♂ 2 ♀♀.

DISCUSSION

Brekke (1946) recorded 33 Trichoptera species from eastern Buskerud. Brittain et al. (1985) and Sæter et al. (1988) recorded thirteen Trichoptera species from the rivers Snarumselva and Drammenselva, of which eight species were not recorded from eastern Buskerud by Brekke (1946). Andersen & Han-

sen (1990) added eight more species in a list of thirteen species from the islands Tofteholmen, Ramvikholmen and Mølen. Of the species previously recorded from eastern Buskerud we failed to take *Oligotricha lapponica* (Hagen, 1864), *O. striata* (Linnaeus, 1758), *Anabolia nervosa* (Curtis, 1834), *Limnephilus lunatus* Curtis, 1834, *L. luridus* Curtis, 1834, *L. nigriceps* (Zetterstedt, 1840), *L. picturatus* McLachlan, 1875, *L. politus* McLachlan, 1865, *Phacopteryx brevipennis* (Curtis, 1834) and *Rhadicoleptus alpestris* (Kolenati, 1848). Our list adds 53 species to the number recorded from eastern Buskerud, giving a present total of 102 species from this region.

Brekke (1946) recorded 22 species from western Buskerud. In a survey of the fauna of Hardangervidda, Andersen (1979) listed eighteen species from western Buskerud, of which eleven species were not recorded by Brekke (1946). Bremnes et al. (1987) recorded four Trichoptera from the river Flya running from the lake Veslevatn to the lake Tisleifjorden, constituting the border between Oppland and Buskerud. Of these two species had previously not been recorded from the region. Of the species previously recorded from western Buskerud we failed to take *Agrypnia pagetana* Curtis, 1835, *A. picta* Kolenati, 1848, *Annitella obscurata* (McLachlan, 1876), *Chaetopteryx villosa* (Fabricius, 1798), *Anabolia concentrica* (Zetterstedt, 1840). *Asynarchus lapponicus* (Zetterstedt, 1840), *Limnephilus griseus* (Linnaeus, 1758), *L. nigriceps* (Zetterstedt, 1840), *L. pantodapus* McLachlan, 1875, *L. subnitidus* McLachlan, 1875, *L. vittatus* (Fabricius, 1798) and *Ceraclea nigronervosa* (Retzius, 1783). Our list adds 45 species to the number recorded from western Buskerud, giving a present total of 80 species from this region.

Lype reducta (Hagen, 1868) is not previously recorded from Norway. The species has a palaearctic distribution; taken in most parts of Europe including Denmark, Sweden and Finland (Botosaneanu & Malicky 1978, Andersen & Wiberg-Larsen 1987). In Sweden it is restricted to the southern regions: Skåne, Halland, Småland, Öland and Västergötland (Forsslund & Tjeder 1942, Forsslund 1953). The larvae live in streams and rivulets (Hickin 1967, Lepneva 1970). The present male was taken in a light trap situated at a small pond rich in vegetation.

Eight of the species recorded here are considered as rare in Norway (Aagaard & Hågvar 1987). *Rhyacophila fasciata* Hagen, 1859 was recorded for the first time in Norway from Fagernes in Ramfjord in outer Troms (Forsslund 1932). The species has later been recorded from Østfold, Akershus, Vestfold and outer Telemark (Andersen 1975, Andersen, Ligaard et al. 1990, Andersen, Johanson et al. 1993), and has also been taken in southern Hedmark (see Aagaard & Hågvar 1987). According to Lepneva (1970) the species inhabits rapidly running brooks and rivulets. The present male was taken in a light trap situated at a small pond rich in vegetation.

Hydroptila simulans Mosely, 1920 was recorded as new to Norway from Lillevann in Agdenes in outer Sør-Trøndelag (Solem 1966). Later the species has been taken in Østfold, Akershus and outer Hordaland (Andersen 1976, Andersen, Johanson et al. 1993, Andersen & Tysse 1985). The species inhabits rivers and streams (Marshall 1978). The present specimens were all taken in light traps situated close to large rivers.

Ceratopsyche silfvenii (Ulmer, 1906) was recorded for the first time in Norway from Rena in northern Hedmark and Namdalen in inner Nord-Trøndelag (Brekke 1943). Later the species has been taken in outer and inner Sør-Trøndelag (Bongard 1990). The species inhabits streams and small rivers (Botosaneanu & Malicky 1978).

Hydropsyche contubernalis McLachlan, 1865 is in Norway previously recorded from Østfold, Akershus and Vestfold (Andersen 1975, Andersen & Hansen 1990, Andersen, Johanson et al. 1993). In Denmark the species inhabits larger, slow flowing rivers (Wiberg-Larsen 1980); in England it is a typical inhabitant of the lower, slow flowing parts of the larger river systems (e.g. Hildrew & Morgan 1974, Badcock 1976). The present specimens have all been taken in light traps close to large rivers.

Ironoquia dubia (Stephens, 1837) has previously been taken in Østfold, Akershus, Vestfold and outer Telemark (Andersen 1975, Andersen & Hansen 1990, Andersen, Johanson et al. 1993, Andersen, Ligaard et al. 1990). In England the species inhabits small, shallow streams in deciduous woods (Wallace et al. 1990). The present male was taken in a light trap situated at a small pond rich in vegetation.

Limnephilus fuscinervis (Zetterstedt, 1840) was recorded from eastern Buskerud

by Brekke (1946), but no exact locality was given. Later the species has been recorded from Østfold, Akershus, eastern Buskerud and Vestfold (Andersen 1975, Andersen & Hansen 1990, Andersen, Johanson et al. 1993). The species inhabits lakes and ponds (Botosaneanu & Malicky 1978). The present female was taken in a light trap situated at a small pond rich in vegetation.

Athripsodes albifrons (Linnaeus, 1758) was recorded for the first time in Norway from Skjeveland in Klepp in outer Rogaland (Jensen 1942). The species has later been recorded from Østfold, Akershus, eastern Buskerud and Vestfold (Andersen 1975, Andersen & Hansen 1990, Andersen, Johanson et al. 1993). The species lives on stony substratum in rivers; occasionally also on lake shores (Wallace et al. 1990). The present specimens were either netted or taken in light traps not far from larger rivers.

Ylodes simulans (Tjeder, 1929) was recorded for the first time in Norway from Fiskevann in Sør-Varanger (Tobias & Tobias 1971), and has later been taken at the river Numedalslågen in Vestfold (Andersen 1975, Andersen & Søli 1990). The species inhabits lotic and lentic waters (Botosaneanu & Malicky 1978). The present speciemens were also taken in light traps or netted close to the river Numedalslågen.

Andersen, Johanson et al. (1993) suggested that among others *Rhyacophila fasciata, Hydropsyche contubernalis* and *Limnephilus fuscinervis* ought to be deleted from the list of rare species in Norway (Aagaard & Hågvar 1987). The present records of these species strengthen this suggestion. In addition, the records of *Hydroptila simulans, Ironoquia dubia* and *Athripsodes albifrons* implicate that none of these species should be included in the list. *Ylodes simulans* is now recorded from several localities along the river Numedalslågen, where it seems to be rather common. But, at the present we consider that the species should be retained on the list until records from other river systems are reported. *Lype reducta* must be added to the list.

The present contribution more or less doubles the number of species known from both eastern and western Buskerud. However, more comprehensive studies on the Trichoptera fauna in the region ought to be initiated. Our knowledge of the fauna of the larger rivers in South Norway is still very scanty. A detailed study on the distribution and relative abundance of the species along one of these rivers would be of great interest.

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SAMMENDRAG

Funn av vårfluer (Trichoptera) i Buskerud

Funn av tilsammen 111 vårfluearter rapporteres fra Buskerud; 92 arter ble tatt i Buskerud øst og 70 i Buskerud vest. Totalt er det nå rapportert 102 arter fra Buskerud øst og 80 arter fra Buskerud vest.

En art, *Lype reducta* (Hagen, 1868) er tidligere ikke funnet i Norge. Videre ansees 8 av artene som sjeldne i Norge. Fire av disse artene, *Rhyacophila fasciata* Hagen, 1859, *Ironoquia dubia* (Stephens, 1837), *Limnephilus fuscinervis* (Zetterstedt, 1840) og *Athripsodes albifrons* (Linnaeus, 1758) ble kun tatt i Buskerud øst, en art, *Ceratopsyche silfvenii* (Ulmer, 1906) kun i Buskerud vest, mens tre arter, *Hydroptila simulans* Mosely, 1920, *Hydropsyche contubernalis* McLachlan, 1865 og *Ylodes simulans* (Tjeder, 1929) ble påvist i begge regionene.

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Geographical distribution of the riparian species of the tribe Bembidiini (Col., Carabidae) in South and Central Norway

JOHAN ANDERSEN AND ODDVAR HANSSEN

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The geographical distribution of the riparian species of Bembidiini in South and Central Norway is presented. The species may be divided in five groups: 1. Ubiquitous species. The group has ten species. 2. Southern species with their northernmost reaches in Nordland county. The group consists of *Bembidion nitidulum* (Marsham) and *B. lunatum* (Duftschmid). 3. More strictly southern species not present north of about 65° N latitude. Eight species belong to this group. 4. South-western species consisting of *B. tibiale* (Duftschmid). 5. Northern species not occurring south of 59° latitude in Northern Europe. Five species belong to this group. The county Sør-Trøndelag and the northern parts of the river Gudbrandsdalslågen have the highest number of species whilst southernmost and western parts of Norway have the lowest one. Stenotopic or oligotopic river bank species dependent upon sand or fine sand/silt are absent from the southernmost and western parts of Norway, whereas most lithophilous species (dependent on gravel/stones) are present within at least one of these two areas. The main reason for this difference in distribution between the two groups seems to be the availability of suitable habitats.

Johan Andersen, Institute of Biology and Geology, University of Tromsø, N-9000 Tromsø, Norway. Oddvar Hanssen, NINA, Tungasletta 2, N-7005, Trondheim, Norway.

INTRODUCTION

The basic knowledge about the distribution of the Fennoscandian riparian Bembidiini species is given by the work of Lindroth (1945 a,b, 1949). Finds published in these works were made before 1949 and much collecting has been done in South Norway since that time. The known records of the riparian species in northern Norway up to 1979 have been published (Andersen 1980). The present paper gives the present-day known distribution of the species in South and Central Norway. This knowledge is based on Lindroth (1945 a, b, 1949), Fjellberg (1972), Hanssen & Olsvik (1982), our own collecting and an unpublished catalogue made by Andreas Strand. This catalogue has been brought more up to date (to about 1981) by Torstein Kvamme (T. Kvamme pers. comm.)

MATERIAL AND METHODS

Altogether 158 localities have been investigated by us in South and Central Norway (Table 1, Fig. 1). Apart from locality 50 and 57, all these localities are situated in the lowland, in the boreal (coniferous) or boreonemoral zones (cf. Gjærevoll 1973). Roadsides, arable land, sand and clay pits and seashores were investigated at several localities, although most effort was used to investigate banks and shores of freshwaters. The present paper, however, does not deal with species absent or only occasionally occurring at freshwater fringes. The beetles were collected by hand, with or without time notion (see Andersen 1983 a). The collecting has been made in the years 1965—1991. The localities at the bank of river Gaula (loc. 38—40) and at Trondheim (loc. 35) have been investigated in the period 1962—90, so the fauna here is very well known. Localities 15—17 and 133—137 have also been investigated several times, whereas most of the other localities have been visited only once. During the investigations temperatures have usually been >12° C and, in most cases, there has been no precipitation.

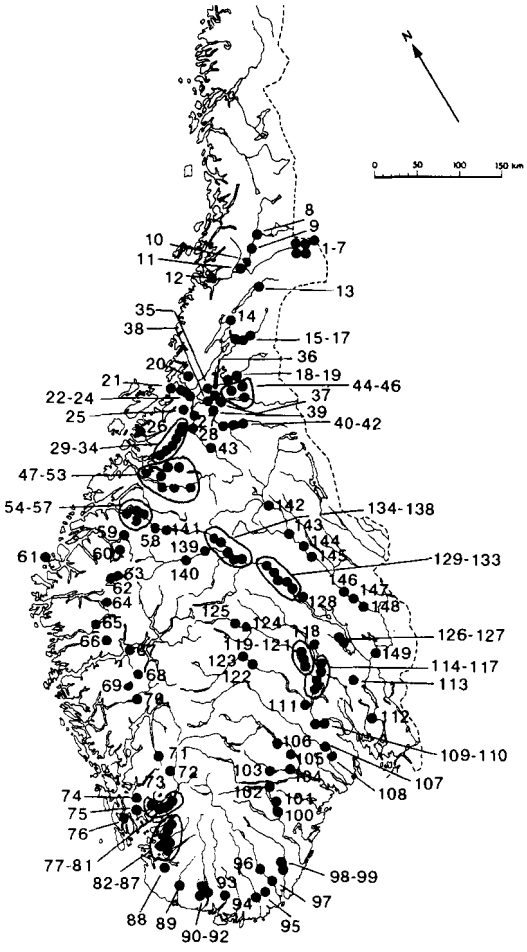

Fig. 1. Map of the localities investigated. The names of the stations are given in Table 1. The names are also given in Cappelens bil- og turistkart, 1—6.

New records according to the district division of Økland (1981) are marked with an asterix. Some other records of special interest regarding the distributional pattern of the species are also presented in the text.

The nomenclature follows Lindroth (1985—86).

THE DISTRIBUTION OF THE SPECIES

The geographical distribution in South and Central Norway of most of the riparian species of the tribe Bembidiini is shown in Figs. 2—6.

Table 1. Localities investigated. The position of the localities is shown in Fig. 1.

1. NTI, Lierne; Near Harbekkvollen (EIS 108). At the outlet of the lake Kvesjøen.
2. NTI, Lierne; Limannvika (EIS 108). At the lake Kvesjøen.
3. NTI, Lierne; Murusjøen (EIS 104). At the outlet of the lake.
4. NTI, Lierne; Near Kalvikhøgda (EIS 104). In a gravel pit.
5. NTI, Lierne; Small side river to the river Hestkjølelva (EIS 103).
6. NTI, Lierne; Kalddal (EIS 103). At the lake Sandsjøen.
7. NTI, Lierne; Near Kalvik (EIS 103). At a roadside.
8. NTI, Grong; Grøndalselv bru (EIS 107). At the river Namsen.
9. NTI, Grong; Aunfoss(on fallow land) and at the river Fjerdingelva (EIS 107).
10. NTI, Grong; Grong (EIS 107). On a parking place.
11. NTI, Grong; Bergsmo (EIS 107). At the river Namsen.
12. NTY, Namsos; Hovika (EIS 106). At a roadside.
13. NTI, Snåsa; Snåsa (EIS 102). At the lake Snåsavatn.
14. NTI, Steinkjer; Steinkjer (EIS 101). At the outlet of the river Grana.
15. NTI, Verdal; Verdalsøra (EIS 98). Near the outlet of the river Verdalselva.
16. NTI, Verdal; Stiklestad (EIS 98). At the river Verdalselva.
17. NTI, Verdal; Vuku (EIS 98). At the river Verdalselva.
18. NTI, Stjørdal; Hofstad (EIS 93). At the river Stjørdalselva.
19. NTI, Stjørdal; Hegra (EIS 93). At the river Stjørdalselva.
20. STY, Rissa; Skau (EIS 96). At the river Skaua.
21. STY, Agdenes; Agdenes (EIS 96). At the lake Storvatn and on a clayish brook.
22. STY, Agdenes; at the outlet of the river Størdalselva (EIS 91).
23. STY, Agdenes; Lensvik (EIS 91). Near the outlet of a small river.
24. STY, Agdenes; Ingdalen (EIS 91). At the outlet of the river Ingdalselva.
25. STI, Orkdal; Gangås (EIS 91). At the lake Gangåsvatnet.
26. MRY, Aure; Kalland on Skarsøya (EIS 90). In a gravel pit.
27. STI, Orkdal; Fannrem (EIS 91). At the river Orkla.
28. STI, Meldal; Storås (EIS 86). At the river Orkla.
29. MRI, Surnadal; Skei (EIS 85). At the river Surna.
30. MRI, Surnadal; Honnstad (EIS 85). At the river Surna and on arable land.
31. MRI, Surnadal; Mo (EIS 85). At the river Surna.
32. MRI, Surnadal; Dønnem (EIS 86). At the river Surna.
33. MRI, Rindal; Rindal (EIS 86). At the river Surna.
34. MRI, Rindal; Øvre Rindal (EIS 86). At the river Surna.
35. STI, Trondheim; Trondheim (EIS 92). In clay and sandpits, on roadsides.
36. STI, Klæbu; Moen (EIS 92). At a brook.
37. STI, Klæbu; Brøttem (EIS 92). At the outlet of the lake Selbusjøen.
38. STI, Trondheim; Bussleina (EIS 92). At the outlet of the river Gaula.
39. STI, Trondheim and Melhus. Four localities at the river Gaula between Klett and Kvål (EIS 92).
40. STI, Midtre Gauldal; Støren (EIS 87). At the river Gaula.
41. STI, Midtre Gauldal; Singsås (EIS 87). At the river Gaula.
42. STI, Midtre Gauldal; Hinbjørgen (EIS 87). At the river Gaula.
43. STI, Rennebu; Ulsberg (EIS 87). At the river Orkla.
44. STI, Malvik; Follsjøen (EIS 92). At the lake.
45. NTI, Stjørdal; Near Vinsmyr (EIS 93). At the lake Leksa.
46. STI, Selbu; Selbu (EIS 93). At the lake Selbusjøen.
47. MRY, Tingvoll; Near Meisingset (EIS 85). At the lake Hanemsvatnet.
48. MRI, Sunndal; Reinset (EIS 85). At a small river.
49. MRI, Surnadal; Todalen (EIS 85). At the river Todalselva.
50. MRI, Surnadal; Near Naustådals-sætra (EIS 85). At the bank of a small river, 650 m a.s.l (subalpine).
51. MRI, Sunndal; Near Sunndalsøra (EIS 78). At the river Driva.
52. MRI, Sunndal; Furugrenda (EIS 85). At the river Driva.
53. MRI, Sunndal; Gjøra (EIS 79). At the river Driva.
54. MRI, Rauma; Åndalsnes (EIS 77). At the river Rauma.

55. MRI, Rauma, Fiva (EIS 77). At the river Rauma.
56. MRI, Rauma; Horgheim (EIS 77). At the river Rauma.
57. MRI, Rauma; Ulvådalen (EIS 77). On moving soil in a scree 850 m a. s. l. (subalpine).
58. MRI, Rauma; Bjønnekleiv (EIS 78). At the river Rauma.
59. MRI, Norddal; Uri near Valldal (EIS 77). At a river.
60. MRI, Norddal; Eide bru (EIS 69). At the outlet of a brook.
61. MRY, Herøy; Runde (EIS 75). At the outlet of a brook.
62. SFI, Stryn; Hjelle (EIS 69). At the outlet of midle sized river.
63. SFI, Stryn; Stryn (EIS 68). At the river originating from the lake Strynsvatn.
64. SFY, Gloppen; Egge (EIS 59). At the river Storelva.
65. SFI, Jølster; Vassenden (EIS 58). At the lake Jølstravatn.
66. SFY, Gaular; Lauevatn (EIS 58). At the outlet of a brook.
67. SFI, Vik; Vangsnes (EIS 50). At the sea.
68. HOI, Voss; Stalheim (EIS 41). At a small river.
69. HOI, Voss; Hole bru, Strondaelva (EIS 41). At a brook.
70. HOI, Voss; Voss (EIS 41). At the lake Vangsvatn.
71. HOI, Odda; Hildal (EIS 32). At the outlet of midle sized river.
72. HOI, Odda; Røldalsvatn (EIS 24). At the lake
73. RI, Sauda; Hustveit (EIS 23). At a brook.
74. HOY, Ølen; Ølen (EIS 23). At a small river.
75. RY, Vindafjord; Gjerde (EIS 23). At the lake Gjerdedalsvatn and at the outlet of a brook.
76. RY, Tysvær; Grinde (EIS 13). At the sea and at a brook.
77. RY, Vindafjord; Imsland (EIS 14). At a small river.
78-81. RI, Suldal; Four localities at the river Suldalslågen (EIS 15).
82. RI, Hjelmeland; Tøtlandsvik (EIS 14). At a small river.
83. RI, Hjelmeland; Breilandsvatnet (EIS 14). At a small brook.
84. RI, Hjelmeland; Årdalsosen (EIS 14). At a midle sized river.
85. RI, Hjelmeland; Målandsdalen (EIS 14). At a brook.
86. RY, Strand; Bjørheimsbygd (EIS 14). At the lake Bjørheimsvatn.
87. RY, Strand; Botne S of Jørpeland (EIS 7). At the sea.
88. RY, Gjesdal; Oltedalsvatn (EIS 7). At the lake.
89. RY, Bjerkreim; Fjermedal (EIS 3). At a brook.
90. RY, Lund; Eidsvatn (EIS 4). At the outlet of a brook.
91. RY, Lund; Skjeggestad (EIS 4). At the outlet of a brook.
92. VAY, Flekkefjord; Sira (EIS 4). At the lake Sirdalsvatn.
93. VAI, Kvinesdal; Kvinesdal (EIS 4). At a river.
94. VAI, Audnedal; Tryland (EIS 5). At the river Audnedalselva.
95. VAY, Marnadal; Heddeland (EIS 5). At a small side river to the river Mandalselva.
96. VAY, Vennesla; Langevatnet (EIS 5). At the lake
97. AAI, Evje og Hornnes; Near Syrtveitfoss (EIS 5). At the river Otra.
98. AAY, Froland; Mykland (EIS 10). At a small brook.
99. AAI, Åmli; Bås (EIS 10). At the river Tovdalselv.
100. TEI, Nissedal; Tveitsund (EIS 10). At the lake Nisser.
101. TEI, Nissedal; Nissedal (EIS 17). At the outlet of a brook.
102. TEI, Kviteseid; Kviteseid (EIS 17). At the lake Kviteseidvatn.
103. TEI, Seljord; Seljord (EIS 17). At a midle sized river.
104. TEI, Bø; Bø (EIS 18). At the river Bøelva.
105. TEI; Notodden; Melås bru (EIS 27). At the river Heddalselva.
106. TEI, Notodden; Tinnoset (EIS 27). At the lake Tinnsjøen.
107. BØ, Kongsberg; Hvittingfoss (EIS 19). At the river Lågen.
108. VE, Lardal; Brufoss (EIS 19). At the river Lågen.
109. VE, Hof; Hof, S of the lake Eikeren (EIS 28). At a large brook.
110. BØ, Øvre Eiker; Tørrbekk (EIS 28). At the lake Eikeren and at the outlet of a brook.
111. BV, Sigdal; Kolsrud (EIS 27). At the river Simoa.
112. Ø, Askim; Fossum bru and Askim (EIS 29). At the river Glomma and on a roadside.
113. AK, Gjerdrum; between Sørum and Sandum (EIS 37). At the river Leira.
114-115. BØ, Ringerike. Two localities at the river Storelva (EIS 36).
116. OS, Jevnaker; Jevnaker (EIS 36). At the lake Randsfjorden.
117. OS, Gran; Grymyr (EIS 36). At a clayish roadside.
118. OS, Gran; Gullerudvika (EIS 36). At a brook.
119. BØ, Ringerike; Somdalen (EIS 36). At the river Ådalselv.
120. BØ, Ringerike; near Gunbjørrud (EIS 36). At the outlet of the lake Sperillen.
121. BØ, Ringerike; Near Renna (EIS 45). At the lake Sperillen.
122. BV, Nes; Nesbyen (EIS 44). At the river Hallingdalselva.
123. BV, Gol; Near Gol (EIS 43). At the river Hallingdalselva.
124. ON, Nord-Aurdal; Near Fagernes (EIS 53). At the lake Strandafjorden.
125. ON, Vestre Slidre; Riste (EIS 52). At a brook.
126. AK, Hurdal; Hurdal Verk (EIS46). At the river Hurdalselva.
127. AK, Hurdal; Hurdalsjøen (EIS 37). At the outlet of a brook and at the lake Hurdalssjøen.
128. HES, Ringsaker; Bergseng (EIS 54). At the lake Mjøsa.
129. OS, Lillehammer; Lillehammer (EIS 54). At a roadside.
130. OS, Øyer; Øyer (EIS 54). At a backwater of the river Gudbrandsdalslågen.
131. OS, Ringebu; Borgen (EIS 63). In a sandpit.
132. OS, Ringebu; Fåvang (EIS 63). At the river Gudbrandsdalslågen.
133. OS, Sør-Fron; Frya (Eis 63). At the river Gudbrandsdalslågen.
134. ON, Nord-Fron; Kvam (EIS 62). At the river Gudbrandsdalslågen.
135. ON, Sel; Sjoa (EIS 72). On fallow land.
136. ON, Sel; Otta (EIS 62). At the river Otta.
137. ON, Sel; Sel (EIS 71). At the river Gudbrandsdalslågen.
138. ON, Dovre; Brennhaug (EIS 71). At the river Gudbrandsdalslågen.
139. ON, Vågå; Vågåmo (EIS 71). At the river Otta.
140. ON, Lom; Lom (EIS 70). At the lake Ottavatn.
141. ON, Lesja; Lesjaskog (EIS 78). At the lake Lesjaskogsvatnet.
142. HEN, Alvdal; Alvdal (EIS 72). At the outlet of the river Folla.
143. HEN, Storelvdal; Atna (EIS 63). At the river Glomma.
144. HEN, Storelvdal; Koppang (EIS 64). At the river Glomma.
145. HEN, Storelvdal; Stai (EIS 64). At the river Glomma.
146. HEN, Åmot; Åsta (EIS 55). At the river Glomma.
147. HES, Elverum; Øksna (EIS 55). At the river Glomma.
148. HES, Elverum; Elverum (EIS 55). At the river Glomma and on fallow land.
149. HES, Sør-Odal; Ulleren (EIS 55). At the river Glomma.

Asaphidion pallipes (Duftschmid) (Fig. 2 A) is distributed throughout the continental parts of South and Central Norway. There is no reason to regard the distribution in Northern Norway as separated from that further south (Andersen 1980). In Trondheim (loc. 35) and at Sjoa (loc. 135) the species was found in sandpits or on fallow land (vide also Andersen 1970). All other finds in South and Central Norway have been made on river banks. The distribution south of 59° N latitude is somewhat scattered (Lindroth 1945 b).

A. flavipes (L.) which is a southern species, was found on two localities (loc. 114, 149) situated within the previously known geographic range of the species in Norway (vide Lindroth 1945 b).

Bemdidion velox (L.) (Fig. 2 B) is fairly densely distributed in SE Norway whereas there are a few known records from inner parts of Central Norway. The species seems to be absent in most parts of Western Norway. There is a big gap between the distri-

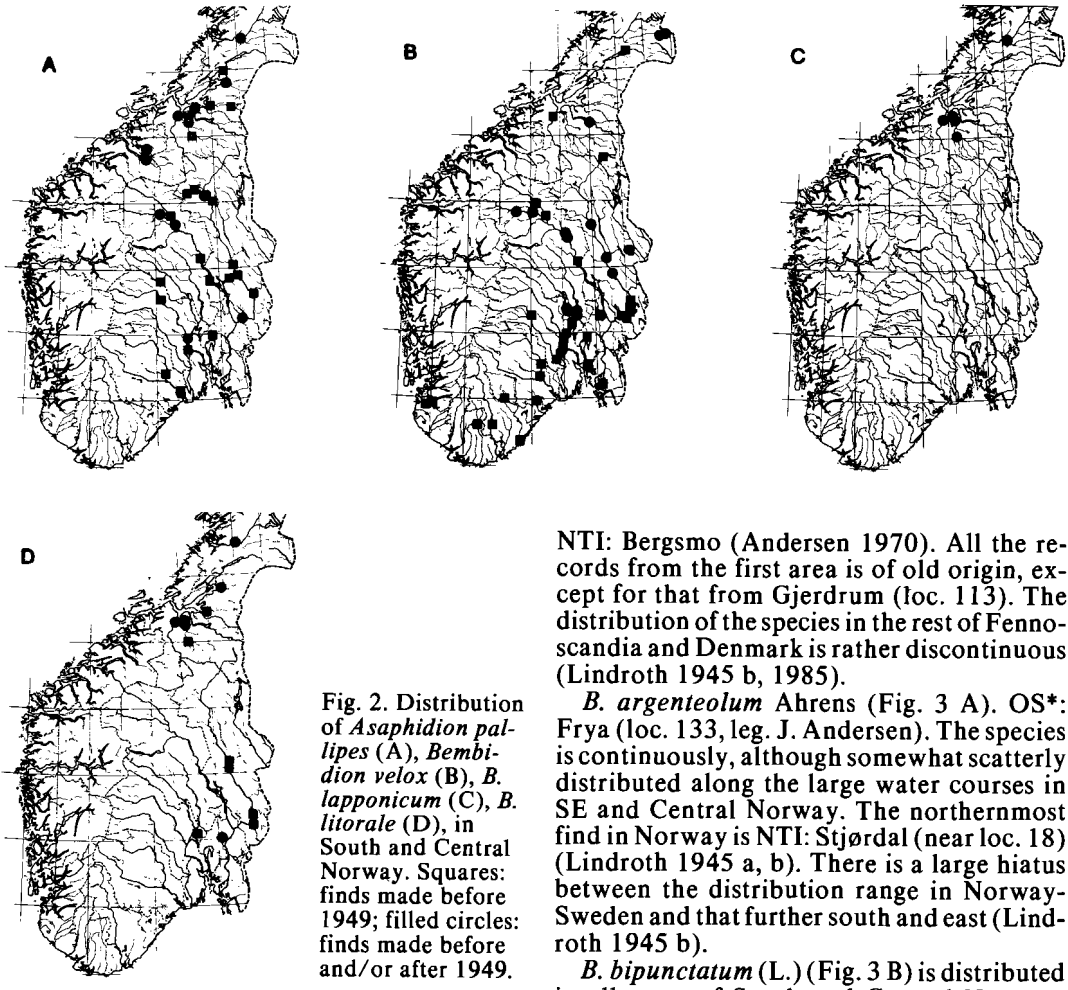

Fig. 2. Distribution of *Asaphidion pallipes* (A), *Bembidion velox* (B), *B. lapponicum* (C), *B. litorale* (D), in South and Central Norway. Squares: finds made before 1949; filled circles: finds made before and/or after 1949.

bution of the species in the central and northern parts (Troms and Finnmark counties) of Norway. However, the two areas are linked together via the occurrences in Sweden and Finland (Lindroth 1945 b). *B. velox* is widely distributed in Central and Northern Europe (Turin et al. 1977).

B. lapponicum Zetterstedt (Fig. 2 C) seems to have its southernmost occurrence in Norway at Støren (loc. 40). The species has a northern, circumpolar distribution (Lindroth 1985).

B. litorale (Olivier) (Fig. 2 D) obviously has a discontinous distribution in Norway. One area is at the larger rivers in SE Norway, whereas a second area is at the large rivers in Sør-Trøndelag and Nord-Trøndelag counties. The northernmost record in Norway is NTI: Bergsmo (Andersen 1970). All the records from the first area is of old origin, except for that from Gjerdrum (loc. 113). The distribution of the species in the rest of Fennoscandia and Denmark is rather discontinuous (Lindroth 1945 b, 1985).

B. argenteolum Ahrens (Fig. 3 A). OS*: Frya (loc. 133, leg. J. Andersen). The species is continuously, although somewhat scatterly distributed along the large water courses in SE and Central Norway. The northernmost find in Norway is NTI: Stjørdal (near loc. 18) (Lindroth 1945 a, b). There is a large hiatus between the distribution range in Norway-Sweden and that further south and east (Lindroth 1945 b).

B. bipunctatum (L.) (Fig. 3 B) is distributed in all parts of South and Central Norway, although somewhat scatterly in some parts, e.g. in south-east. The species is continuously distributed from the southernmost to the northernmost parts of Norway (Andersen 1980). The species is widely distributed in Europe (Turin et al. 1977).

B. dentellum (Thunberg) (Fig. 3 C). HEN*: Koppang and Stai (loc. 144, 145, leg. J. Andersen). The species is densely distributed in SE Norway. When Lindroth (1945 a, b) published his work occurrences in Central Norway seemed to be quite isolated from the distributional area further south. The new finds in HEN makes this isolation less obvious. In Western Norway there are a few old, rather isolated records. The species is distributed throughout central and southern parts of Northern Europe.

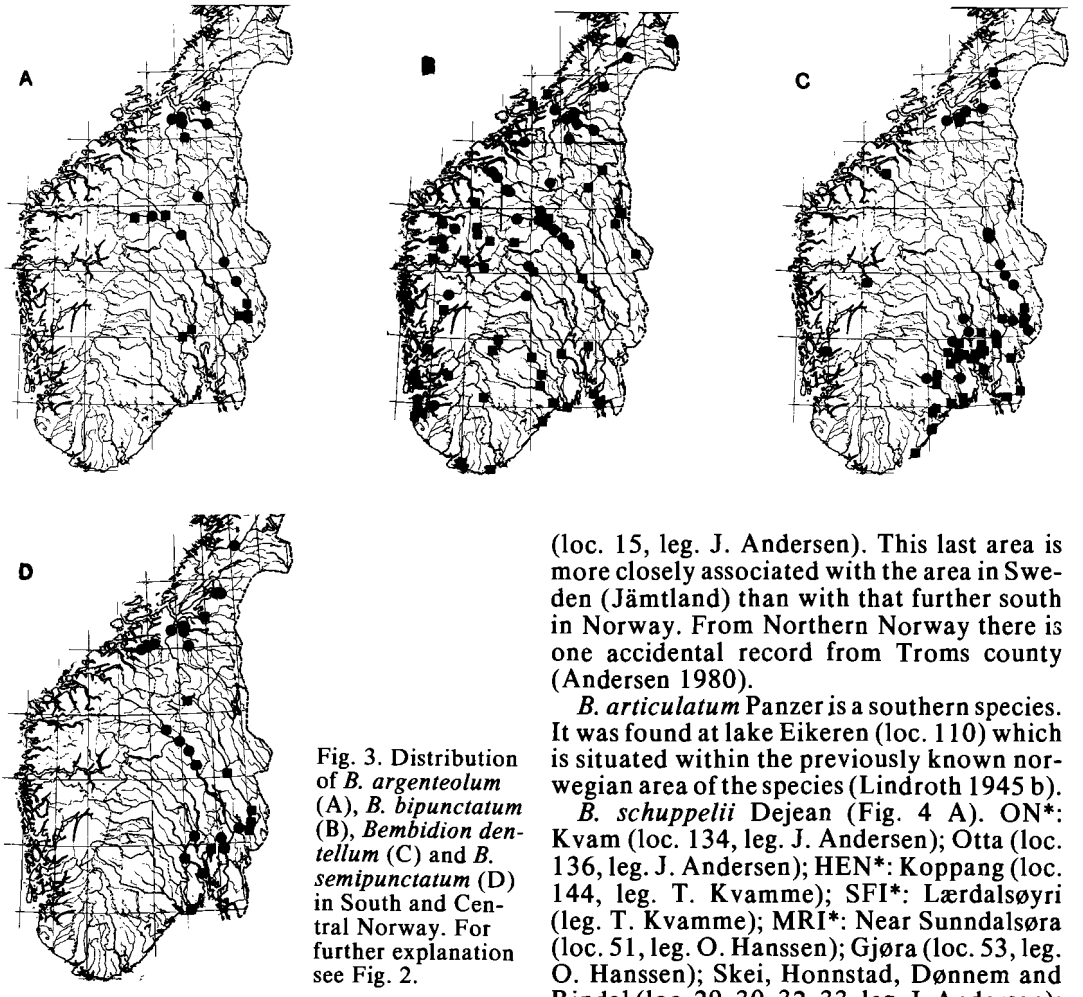

Fig. 3. Distribution of *B. argenteolum* (A), *B. bipunctatum* (B), *Bembidion dentellum* (C) and *B. semipunctatum* (D) in South and Central Norway. For further explanation see Fig. 2.

B. semipunctatum (Donovan) (Fig. 3 D). MRI*: Skei, Honnstad and Rindal (loc. 29, 30 and 33, leg. J. Andersen). The species is continuously distributed along the large rivers in SE and Central Norway with the northernmost occurrence at Grong (loc. 10). South of about 59° N latitude there are some accidental finds of the species in Denmark and southernmost parts of Sweden (Lindroth 1985). However, *B. semipunctatum* is widely distributed in Central and South Europe.

B. obliquum Sturm. ON*: Kvam (loc. 134, leg. J. Andersen); MRY*: Meisingset (loc. 47, leg. O. Hanssen). The species is rather densely distributed in South Norway north to Kvam (loc. 134) in Gudbrandsdalen. A second area is situated in Central Norway with the northernmost occurrence at Verdalsøra (loc. 15, leg. J. Andersen). This last area is more closely associated with the area in Sweden (Jämtland) than with that further south in Norway. From Northern Norway there is one accidental record from Troms county (Andersen 1980).

B. articulatum Panzer is a southern species. It was found at lake Eikeren (loc. 110) which is situated within the previously known norwegian area of the species (Lindroth 1945 b).

B. schuppelii Dejean (Fig. 4 A). ON*: Kvam (loc. 134, leg. J. Andersen); Otta (loc. 136, leg. J. Andersen); HEN*: Koppang (loc. 144, leg. T. Kvamme); SFI*: Lærdalsøyri (leg. T. Kvamme); MRI*: Near Sunndalsøra (loc. 51, leg. O. Hanssen); Gjøra (loc. 53, leg. O. Hanssen); Skei, Honnstad, Dønnem and Rindal (loc. 29, 30, 32, 33, leg. J. Andersen); STY*: Skau (loc. 20, leg. J. Andersen). These recent records indicate that *B. schuppelii* has a rather continuous distribution in Norway from OS: Gausdal (Lindroth 1945 b) to Finnmark (Andersen 1980). South of 59° N latitude there is a gap in the distribution to some occurrences in SE Jutland in Denmark (Lindroth 1945 b).

B. quadrimaculatum (L.) is distributed throughout most parts of Europe (Turin et al. 1977). It has a continuous distribution in SE and Central Norway, whereas it seems to be absent in the whole part of Western Norway south of MRI: Sunndalen (Hanssen & Olsvik 1982). The species occurs frequently on fallow land, in sand pits and in fields.

B. guttula (Fabricius) has a southern distribution in Norway. It was found on river

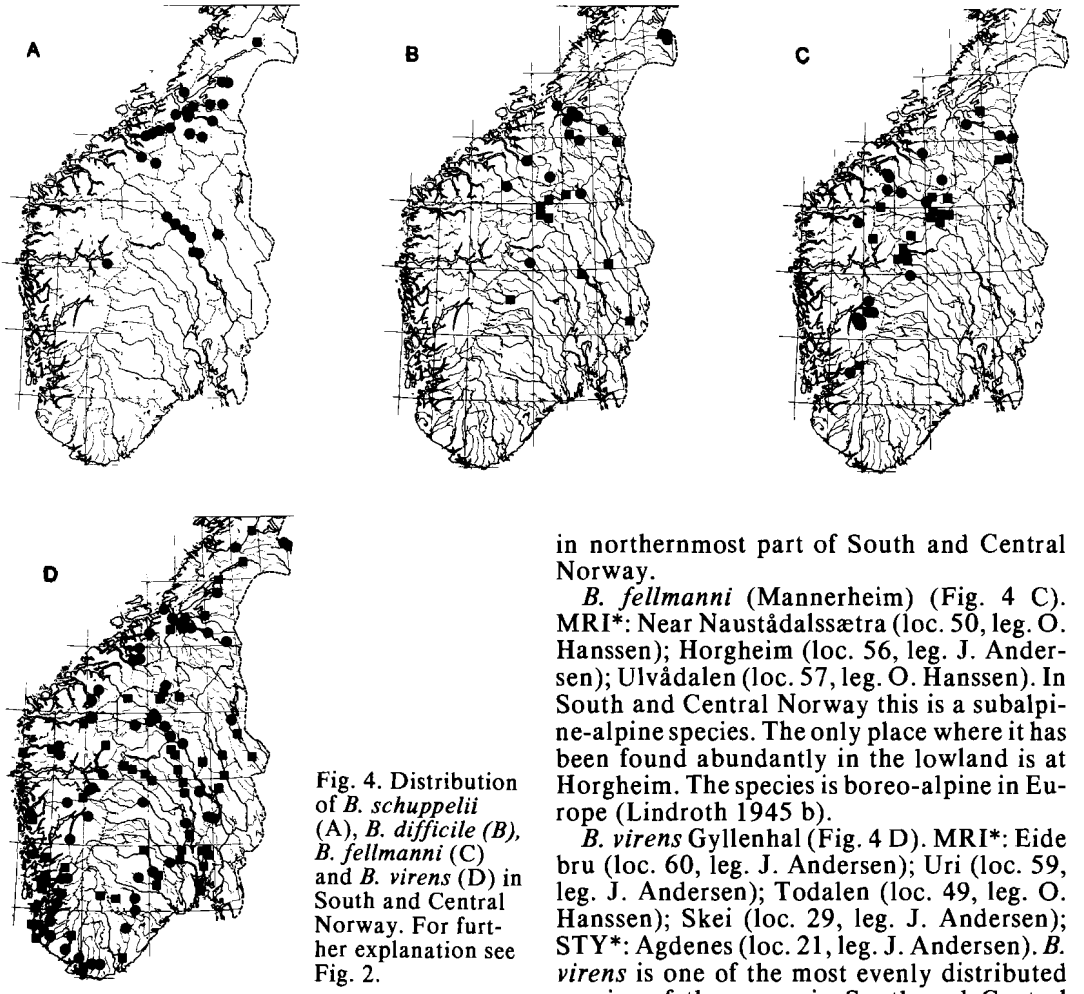

Fig. 4. Distribution of *B. schuppelii* (A), *B. difficile (B), B. fellmanni* (C) and *B. virens* (D) in South and Central Norway. For further explanation see Fig. 2.

banks or lake shores at a few localities (loc. 110, 111, 115, 118) within the previously known geographic range of the species in our country (Lindroth 1945 b).

B. mannerheimii Sahlberg which has a southern distribution in Norway, was found on a lake shore (loc. 92) and a river bank (loc. 119). These localities are situated within the previously known distribution of the species (Lindroth 1945 b).

B. difficile (Motschulsky) (Fig. 4 B). NTI*: near Harbekkvollen, Limannvika and Hestkjølelva (loc. 1, 2 and 5, leg. O. Hanssen). This is a northern, boreomontane (alpine) species (Lindroth 1945 b) with the southernmost occurrence in Fennoscandia at Kongsvinger. It is relative evenly distributed in northernmost part of South and Central Norway.

B. fellmanni (Mannerheim) (Fig. 4 C). MRI*: Near Naustådalssætra (loc. 50, leg. O. Hanssen); Horgheim (loc. 56, leg. J. Andersen); Ulvådalen (loc. 57, leg. O. Hanssen). In South and Central Norway this is a subalpine-alpine species. The only place where it has been found abundantly in the lowland is at Horgheim. The species is boreo-alpine in Europe (Lindroth 1945 b).

B. virens Gyllenhal (Fig. 4 D). MRI*: Eide bru (loc. 60, leg. J. Andersen); Uri (loc. 59, leg. J. Andersen); Todalen (loc. 49, leg. O. Hanssen); Skei (loc. 29, leg. J. Andersen); STY*: Agdenes (loc. 21, leg. J. Andersen). *B. virens* is one of the most evenly distributed species of the genus in South and Central Norway. Outside Fennoscandia, however, the distribution is highly discontinuous: Russia, Scotland, Lake Geneva (Lindroth 1985).

B. hastii Sahlberg (Fig. 5 A) is a mountain species in South and Central Norway and only few records are from the coniferous zone: SFY: Egge (loc. 64), ON: Brennhaug (loc. 138), NTI: Grøndalselv bru (loc. 8). The species has a northern, circumpolar distribution (Lindroth 1985).

B. prasinum (Duftschmid) (Fig. 5 B). MRI*: Skei and Rindal (loc. 29, 33, leg. J. Andersen); Todalen (loc. 49, leg. O. Hanssen); Furugrenda (loc. 52, leg. O. Hanssen); Horgheim (loc. 56, leg. J. Andersen); STY*: Skau (loc. 20, leg. J. Andersen, O. Hanssen). The species is distributed over larger parts of South and Central Norway, but in contrast to

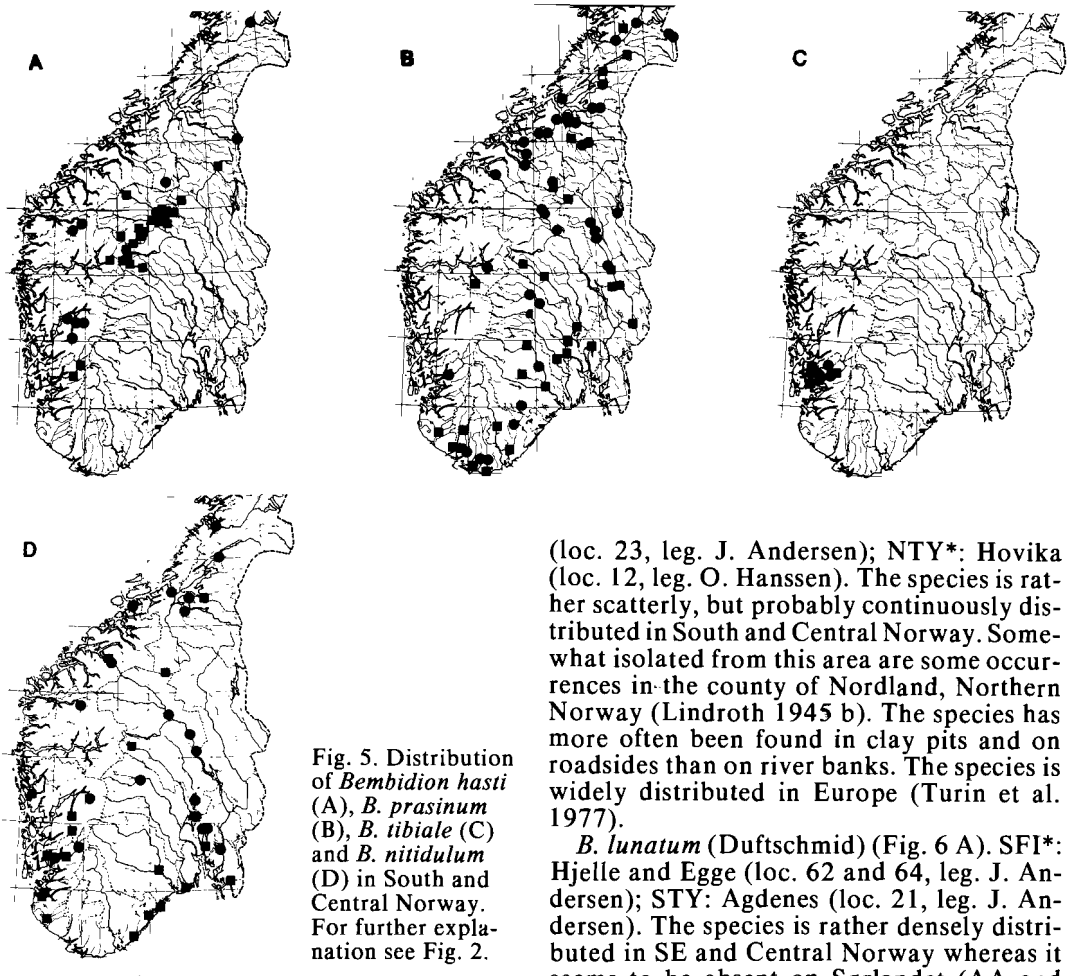

Fig. 5. Distribution of *Bembidion hasti* (A), *B. prasinum* (B), *B. tibiale* (C) and *B. nitidulum* (D) in South and Central Norway. For further explanation see Fig. 2.

B. virens it seems to be absent in large parts of Western Norway. The species is boreomontane in Europe (Lindroth 1945 b).

B. tibiale (Duftschmid) (Fig. 5 C). HOY*: Ølen (loc. 74, leg. O. Hanssen, S. Ligaard, F. Ødegaard). *B. tibiale* obviously has a very restricted distribution in the counties of Rogaland and southern part of Hordaland. The species is comparatively common within the area (observed 1972 and 1991). The area is isolated from the nearest occurrences in Germany (south of 52° N latitude) and The British Isles.

B. nitidulum (Marsham). (Fig. 5 D). OS: Lillehammer (loc. 129, leg, J. Andersen); Borgen (loc. 131, leg. J. Andersen); ON: Sjoa (loc. 135, leg. J. Andersen); MRY*: Kalland (loc. 26, leg. O. Hanssen); STY*: Lensvik (loc. 23, leg. J. Andersen); NTY*: Hovika (loc. 12, leg. O. Hanssen). The species is rather scatterly, but probably continuously distributed in South and Central Norway. Somewhat isolated from this area are some occurrences in the county of Nordland, Northern Norway (Lindroth 1945 b). The species has more often been found in clay pits and on roadsides than on river banks. The species is widely distributed in Europe (Turin et al. 1977).

B. lunatum (Duftschmid) (Fig. 6 A). SFI*: Hjelle and Egge (loc. 62 and 64, leg. J. Andersen); STY: Agdenes (loc. 21, leg. J. Andersen). The species is rather densely distributed in SE and Central Norway whereas it seems to be absent on Sørlandet (AA and VA) and most parts of Western Norway. South of 59° N latitude there are very scattered and probably accidental occurrences in Scandinavia (Lindroth 1985). However, the species is established in Denmark. *B. lunatum* also occurred in secondary habitats at several places.

B. tetracolum Say is scatterly distributed in South and Central Norway north to Trondheim (loc. 35). The species occurs in most parts of Europe south of about 64° N latitude (Turin et al. 1977).

B. femoratum Sturm. SFI: Hjelle (loc. 62, leg. J. Andersen); MRY*: Runde (loc. 61, leg. O. Hanssen); NTI: Stiklestad (loc. 16, leg. J. Andersen); Grøndalselv bru (loc. 8, leg. J. Andersen). The species seems to be continuously distributed throughout South and Central Norway and the new finds in NTI

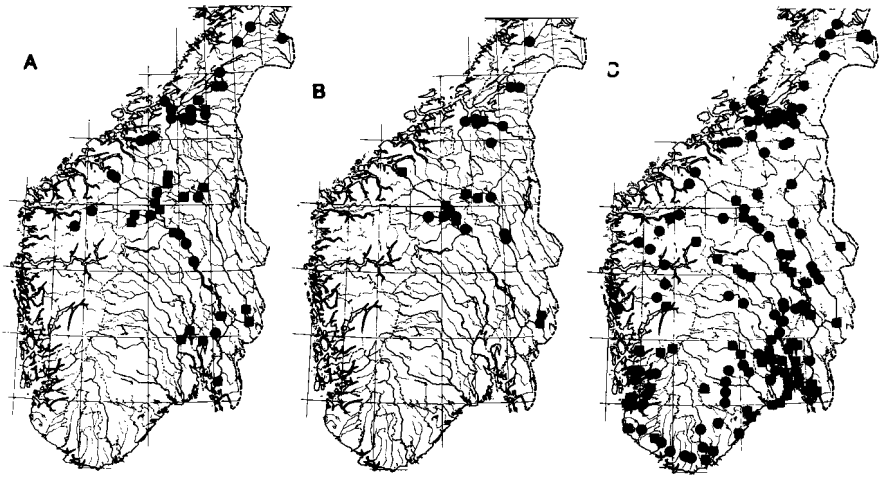

Fig. 6. Distribution of *B. lunatum* (A), *B. petrosum* (B) and *Bembidion saxatile* (C) in South and Central Norway. For further explanation see Fig. 2.

as well as earlier ones (Andersen 1980) show that the distribution throughout Norway is continuous. This species as well as the preceeding and the following ones occur frequently in secondary habitats. *Bembidion femoratum* is widely distributed throughout Europe (Turin et al. 1977).

B. bruxellense Wesmael is the most densely distributed of all species of the genus in the actual area. The same applies to Nordland and Troms counties of Northern Norway whereas it is more scatterly distributed in Finnmark county (Andersen 1980). The species occurs in most of Europe, except for the southernmost parts (Turin et al. 1977).

B. petrosum siebkei Sparre Schneider (Fig. 6B) has its southernmost occurrences in Norway at Kongsvinger, at the river Glomma. From this place it is rather evenly distributed along the large rivers in eastern parts of South and Central Norway north to Bergsmo (loc. 11). There is no hiatus between this area and the area in Northern Norway (Andersen 1980). The species has a northern, circumpolar distribution (Lindroth 1985).

B. saxatile Gyllenhal (Fig. 6 C). AAI*: Syrtveitfoss (loc. 97, leg. J. Andersen). The distribution of the species within the actual area is very similar to that of *B. virens.* This area is connected both with the area further south and north (Andersen 1980). The species has a northern distribution in Europe (Lindroth 1945).

DISCUSSION

There are many new records of several species within the areas of concern. This especially applies to *B. schuppelii, B. prasinum, B. lunatum* and *B. petrosum.* Much of this is obviously due to investigations of a number of new localities, especially in the counties Møre and Romsdal (previously hardly investigated at all), Sør-Trøndelag, Nord-Trøndelag and parts of the valleys Gudbrandsdalen and Østerdalen. Lindroth (1945 a) regarded one record of *B. schuppelii* from OS: Gausdal as isolated from the rest of the area further north. Several new finds in the area in between (Fig. 4 A) suggests that this hardly is more legitimate than for any other species. Lindroth (1945 a, 1949) was of the opinion that *Asaphidion pallipes, Bembidion femoratum, B. lapponicum, B. lunatum, B. petrosum* and *B. fellmanni* are bisentric or have a hiatus between the distribution in Central and Northern Norway. As is evident from the present paper and Andersen (1980) this hiatus does not exist for the five mentioned species, whereas it still is an open question regarding *B. fellmanni.*

There are some areas in South Norway with several old records, but few more recent ones. This especially applies to the southeastern parts of Norway between about 59° and 61° N latitude from Larvik and lake Tyrifjorden in the west to the river Glomma in the east. Some of the reason for this is certainly that a limited number of localities within the actual area have been investigated more re-

cently. It is noteworthy, however, that although several collectors have visited the river Glomma between Kongsvinger and Rena no recent records of *B. litorale* have been made there, whereas the species previously was known from four localities within that area. *B. dentellum,* on the other hand, has recently been found within the same area as well as on new localities further north. *B. litorale* prefers open, sparsely vegetated spots (Andersen 1970) and at the river Gaula it has repeatedly been observed how sensitive the species is to vegetational successions. At several places at this river where the species previously was abundant, it has now completely disappeared whereas other species, e.g. *B. schuppelii, B. lunatum* and *B. dentellum* have established (vide also Andersen 1970). The reason is obviously that the sites have become too densely vegetated and shady. At some places at the bank of Gaula new habitats suitable for *B. litorale* are created, but at other places the natural erosion and deposition of fluvial material seem to be prevented e.g. by the construction of stone walls. *B. dentellum, B. schuppelii* and *B. lunatum,* on the other hand, prefer later successional stages, i. e. habitats with a developed, often tall vegetation and/or shaded by bushes or trees. It is possible, therefore, that the conditions at the river Glomma has changed in the direction described above, i. e. in disfavour of *B. litorale,* but in favour of *B. dentellum.* If real, these changes most likely is due to some type of human activity, albeit the exact causes are obscure.

According to their distribution in South and Central Norway the species may be divided in the following groups:

1. Ubiquitous species. Present both in South, Central and Northern Norway including Finnmark county. Some of them are more or less continental (C), i. e. they are absent in most parts of Western Norway and western parts of North Norway. For two species the Fennoscandian areas are isolated from those further south (I). *Asaphidion pallipes* (C), *Bembidion velox* (C), *B. bipumctatum, B. schuppelii* (C), *B. quadrimaculatum* (C), *B. prasinum* (I), *B. virens* (I), *B. bruxellense, B. femoratum, B. saxatile.*
2. Southern species with their northernmost reaches in Nordland county. *B. nitidulum, B. lunatum.*
3. More strictly southern species with their northernmost occurrences in Nord-Trøndelag (NTI) or further south. The distribution of a majority of the species has a continental pattern (C), i. e. they are absent in most parts of Western Norway. *Asaphidion flavipes* (C), *Bembidion litorale* (C), *B. argenteolum* (C), *B. dentellum, B. semipunctatum* (C), *B. articulatum* (C), *B. abliquum, B. tetracolum.*
4. South-western species. *B. tibiale.*
5. Northern species. At least in Western Europe not occurring south of 59° N latitude. Two of the species, however, have isolated occurrences in the mountains of Central-South Europe (I). *B. lapponicum, B. fellmanni* (I), *B. difficile* (I), *B. hastii, B. petrosum.*

Fig. 7 shows a map of South-Central Norway with the number of riparian *Bembidion* species within selected areas. The species *Bembidion articulatum, B. quadrimaculatum, B. bruxellense, B. nitidulum, B. femoratum, B. gilvipes, B. guttula* and *B. mannerheimii* were not considered since they hardly can be regarded as riparian. The areas with the highest number of species are those covering the large rivers in Sør-Trøndelag county (area nr. 4 in Fig. 7) and the northern part of the river Gudbrandsdalslågen (area nr. 7). Nord-Trøndelag (area nr. 1 and 2), Østerdalen (area nr. 8 and 9) and the areas around Tyrifjorden and Oslofjorden (area nr. 13 and 14) also have a fairly high number of species,

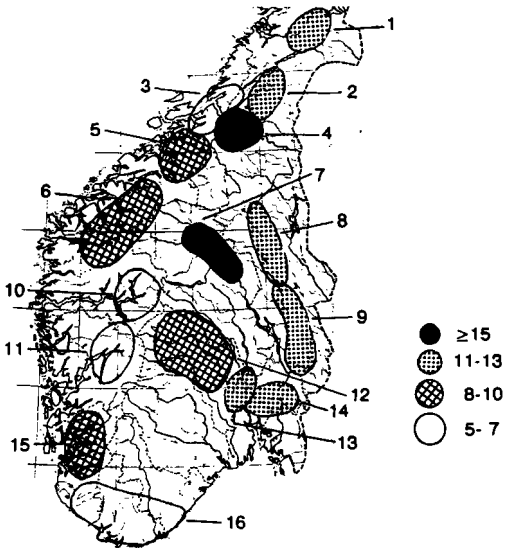

Fig. 7. The number of riparian species found in different areas in South and Central Norway.

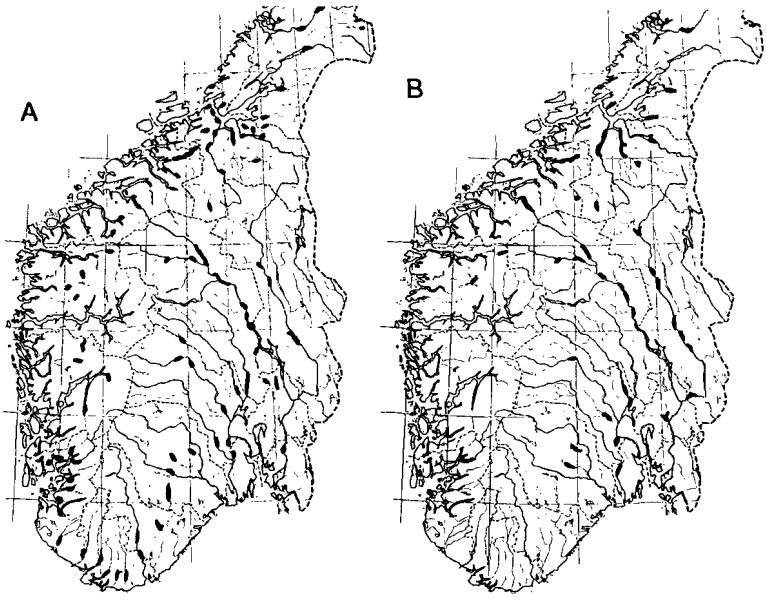

Fig. 8. River banks and lake shores observed by the present investigation with gravel/stones (A) or fine sand/silt (Clay) (B). Map B is almost identical with maps in Lindroth (1949, p 510) and Hultén (1971, p 39).

whereas the southernmost and western parts of Norway have the lowest number. A partial explanation of these differences in species-richness between areas may be given by dividing the species in two ecological groups: a) lithophilous species dependent upon a gravelly/stony substratum, consisting of *B. prasinum, B. virens, B. hastii, B. tibiale, B. saxatile* and *B. petrosum* (Andersen 1970, 1983 a, b, Andersen et al. 1989). b) stenotopic or oligotopic river bank species dependent upon sand or fine sand/silt, consisting of *Asaphidion pallipes, Bembidion lapponicum, B. litorale, B. argenteolum, B. semipunctatum, B. schuppelii* and *B. lunatum.*

Contrary to the other lithophilous species, *B. petrosum* has a clear preference to fine sand/silt underlying gravel/stones (Andersen 1983 a).

The species of group b) are absent from the southernmost and south-western parts of Norway, whereas the first group, *B. petrosum* excepted, are present within at least one of these two areas. As stated previously (Andersen 1983 b) the most reasonable explanation for these differences in distributional patterns is the absence or scarcity of river banks with sand or fine sand/silt in the southernmost and western parts of Norway, whereas lake shores and river banks with gravel/stones are frequent within the same areas (Fig. 8). Lindroth (1949) discussed the reasons for the absence of *Asaphidion pallipes, Bembidion litorale* and *B. semipunctatum* in Western Norway. Although he was aware of the scarcity of suitable substratum within the actual areas he emphasized lack of sunshine, insufficiently high summer temperatures and high precipitation as equally important limiting factors. That the whole group b) and *B. petrosum* are absent in the southernmost part of Norway can not be due to climatic factors, however. Thus, especially the eastern part of Sørlandet (AAY) has a favourable climate with high summer temperatures and a relatively high number of sun hours although the precipitation is quite high (Lindroth 1949, Bruun 1967, Hultén 1971). A high precipitation, however, can hardly be ascribed any negative influence at all since a majority of the species occur in Namdalen (loc. 10—11), which has equally as high or even higher precipitation as the district AAY (Lindroth 1949, Hultén 1971).

The lithophilous species, *B. saxatile* excepted, are absent in most parts of the lowland of North and Central Europe. Such distributional patterns are general among lithophilous beetles and the reason seems to be that suitable habitats for this ecological group are absent or scarce in the above mentioned areas (for discussion see Andersen 1983 b). Several species preferring fine substratum (e. g. *B. argenteolum, B. semipunctatum, B. schuppe-*

lii and *B. lunatum*) are absent in Denmark and/or Sweden south of 59° N latitude, but present further south. This is also, at least in part, due to differences in the availability of suitability habitats within the areas of concern (Andersen 1983 b).

SAMMENDRAG

Den geografiske utbredelsen i Sør-Norge og Trøndelag av de ripare artene av Bembidiini blir presentert. Artene kan deles i fire grupper: 1. Ubikvister. Gruppen har ti arter. 2. Sørlige arter med nordligste forekomst i Nordland. Gruppen består av *Bembidion nitidulum* (Marsham) og *B. lunatum* (Duftschmid). 3. Mer sørlige arter med nordgrense i Trøndelag. Består av åtte arter. 4. Sør-vestlige arter bestående av *B. tibiale* (Duftschmid). 5. Nordlige arter som ikke forekommer sør for 59° N i N-Europa. Fem arter hører til denne gruppen. Sør-Trøndelag og nordlige deler av Gudbrandsdalen har det høyeste antall arter, mens Sørlandet og Vestlandet har det laveste antallet. Mye av forklaringen på dette ligger i tilgjengeligheten av egnete habitater.

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Melanistic variation in *Nemastoma bimaculatum* (Fabricius, 1775) (Opiliones)

INGVAR STOL

Stol, I. 1993. Melanistic variation in *Nemastoma bimaculatum* (Fabricius, 1775) (Opiliones). *Fauna norv. Ser. B 40:* 71—75.

The probability of finding a fully black specimen of *Nemastoma bimaculatum* in Norway is as low as 0,00287. Expected binominal probability distributions for sample sizes of 5, 10, and 50 individuals and expected frequencis for 100 samples in each case are calculated. Observed frequencies of black individuals in Norway fit perfectly with the Poisson expected frequencies. The observations are found to be random and independent. Reasons for marked deviation from the expected values are briefly mentioned, and a model for future observations is given. A reported case of fully black *N. bimaculatum* from France is stated as extremely unnormal.

Ingvar Stol, Museum of Zoology, Museplass 3, N-5007 Bergen. Norway.

INTRODUCTION

Normally *N. bimaculatum* has dorsally two light spots which may vary somewhat in size. Occasionally the spots are greatly reduced or totally absent. Such fully black specimens are reported from several parts of Europe, for instance England (Gruber & Martens, 1968, Sankey & Savory, 1974, Martens, 1978), France (Gruber & Martens, 1968, Martens, 1978), Belgium (Martens, 1978) and Norway (Meidell & Stol, 1990). A specimen in which the dorsum was almost entirely white, is reported from England (Hillyard & Sankey, 1989). This variation of spot size can be a continuous, individual, genetical variation. Here, however, only the extreme end of the scale of variation, where both spots are absent, will be discussed. The frequencies of fully black specimens from European areas my vary somewhat. Sankey & Savory (1974) mention a collection (Roewer's) consisting of 300 normally specimens and 5 of the variety *unicolor.* However, the taxonomic status of this collection may be doubted, as Roewer (1914) incorrectly treated *N. bimaculatum* and *N. lugubre* (Müller, 1776) as the same species. He separated his «species» into two subspecies *N. lugubre-bimaculatum* (Fabricius) and *N. lugubre-unicolor* Roewer. Absence of spots may also occur within *N. lugubre* as mentioned by Gruber & Martens (1968) and Martens (1978). Fully black specimens of *N. lugubre* has not been reported from Norway. The main aim of the following discussion will be to present a frequency model, by which the number of fully black specimens of *N. bimaculatum* in an observed sample could be stated to be normal or unnormal.

MATERIAL, METHODS AND APPROXIMATIONS

The total material comprises 1046 adults of which 2 are fully black (Meidell & Stol, 1990). An empirical value of p, the probability that a specimen will be fully black, can be obtained from the data. If a third specimen with scarcely visible spots is included, the (maximum) value will be $p = 0{,}00287$. And q, the probability that a specimen has one or two spots, will thus be $q = 0{,}99713$.

The expected probability distributions for Y, the number of black specimens in a sample of size $k = 5$, 10 and 50 individuals, are calculated. This is done by expanding the binominal $(p + q)^k$ where individuals in theory occur independently in the two classes. In each of the three cases, the expected frequency for 100 samples, is calculated, Tab. 1a, 1b, 1c and Fig. 1.

Considering the observed Norwegian (Scandinavian) material, the most convenient way for a statistical treatment is to use the Poisson distribution. This is possible because of fulfilment of the criterion $p<0{,}1$. The

Poisson distribution is calculated in two different ways, either with 1 trap over 1 autumn or 1 locality over 1 autumn as the sampling unit. The number of traps in which specimens were taken is 114, and the number of localities where *N. bimaculatum* was found is 36, randomly scattered throughout the main distributional area (Norway south of 64° N).

The three black individuals were taken at three different sites (Hordaland: Fantoft, Rogaland: Tau, Vest-Agder: Fjellså).

RESULTS AND DISCUSSION

In a sample size (k) of 5 individuals, the relative expected frequency of not finding black specimens, is high (0,98573). The probability of finding 1 black is 1,42%, and the chances of finding two or more decrease to infinitesimal values, Tab. 1a.

In a sample size of 10 individuals, the probability that all have spots has decreased to 97,17%, and the chance of finding 1 black is nearly doubled (2,80%). It is still improbable to find 2 or more black ones, Tab. 1b.

Finally, if the sample size is 50 individuals, the chance that all specimens in a sample have spots, has decreased to 86,61%. The chance is markedly higher, 12,47%, of finding a black specimen, and the probability of finding two black specimens, 0,88%, is more realistic, Tab. 1c.

How expected frequencies change within 100 samples, with k = 5, 10 and 50, are illustrated in a bar diagram, Fig. 1.

The p-value observed is a good estimate, indeed, for several reasons. It is based on

Tab. 1a. Binominal expected frequencies, sample size (k) is 5 individuals. Last coloumn shows the expected distribution if 100 samples were taken. Symbols: k = sample size, Y = number of black specimens, μ =expected mean of black specimens per sample, σ = expected standard deviation, $\hat{f}_{rel}$ = relative expected frequency, $\hat{f}$ = absolute expected frequency.

No. black ones in a sample of size k = 5 Y	Powers of p = 0,00287	Powers of q = 0,99713	Binomial coefficients	Relative expected frequency $\hat{f}_{rel}$	Absolute expected frequencies if 100 samples $\hat{f}$
0	1,00000	0,98573	1	0,98573	98,6
1	0,00287	0,98857	5	0,01419	1,4
2	$8{,}24 \cdot 10^{-6}$	0,99141	10	$8{,}17 \cdot 10^{-5}$	0,0
3	$2{,}40 \cdot 10^{-8}$	0,99427	10	$2{,}39 \cdot 10^{-7}$	0,0
4	$6{,}78 \cdot 10^{-11}$	0,99713	5	$3{,}38 \cdot 10^{-10}$	0,0
5	$1{,}95 \cdot 10^{-13}$	1,00000	1	$1{,}95 \cdot 10^{-13}$	0,0
Σ				1,00000	100,0
		μ = 0,01435	σ = 0,11962		

Tab. 1b. Binominal expected frequencies, sample size (k) is 10 individuals. Symbols as in text and Tab. 1a.

No. black ones in a sample of size k = 10 Y	Powers of p = 0,00287	Powers of q = 0,99713	Binomial coefficients	Relative expected frequency $\hat{f}_{rel}$	Absolute expected frequencies if 100 samples $\hat{f}$
0	1,00000	0,97167	1	0,97167	97,2
1	0,00287	0,97446	10	0,02797	2,8
2	$8{,}24 \cdot 10^{-6}$	0,97727	45	$3{,}62 \cdot 10^{-4}$	0,0
3	$2{,}40 \cdot 10^{-8}$	0,98008	120	$2{,}82 \cdot 10^{-6}$	0,0
:	:	:	:	:	:
10	$3{,}79 \cdot 10^{-26}$	1,00000	1	$3{,}79 \cdot 10^{-26}$	0,0
Σ				1,00000	100,0
		μ = 0,02870	σ = 0,16917		

Tab. 1c. Binominal expected frequencies, sample size (k) is 50 individuals. Symbols as in text and Tab. 1a.

No. black ones in a sample of size k = 50 Y	Powers of p = 0,00287	Powers of q = 0,99713	Binomial coefficients	Relative expected frequency $\hat{f}_{rel}$	Absolute expected frequencies if 100 samples $\hat{f}$
0	1,00000	0,86614	1	0,86614	86,6
1	0,00287	0,86864	50	0,12465	12,5
2	$8{,}24 \cdot 10^{-6}$	0,87114	1225	0,00879	0,9
3	$2{,}40 \cdot 10^{-8}$	0,87364	19600	$4{,}11 \cdot 10^{-4}$	0,0
:	:	:	:	:	:
27	$2{,}31 \cdot 10^{-69}$	0,93603	$1{,}08 \cdot 10^{14}$	$2{,}34 \cdot 10^{-55}$	0,0
:	:	:	:	:	:
50	$7{,}84 \cdot 10^{-128}$	1,00000	1	$7{,}84 \cdot 10^{-128}$	0,0
Σ				0,99999	100,0
		μ = 0,14350	σ = 0,37827		

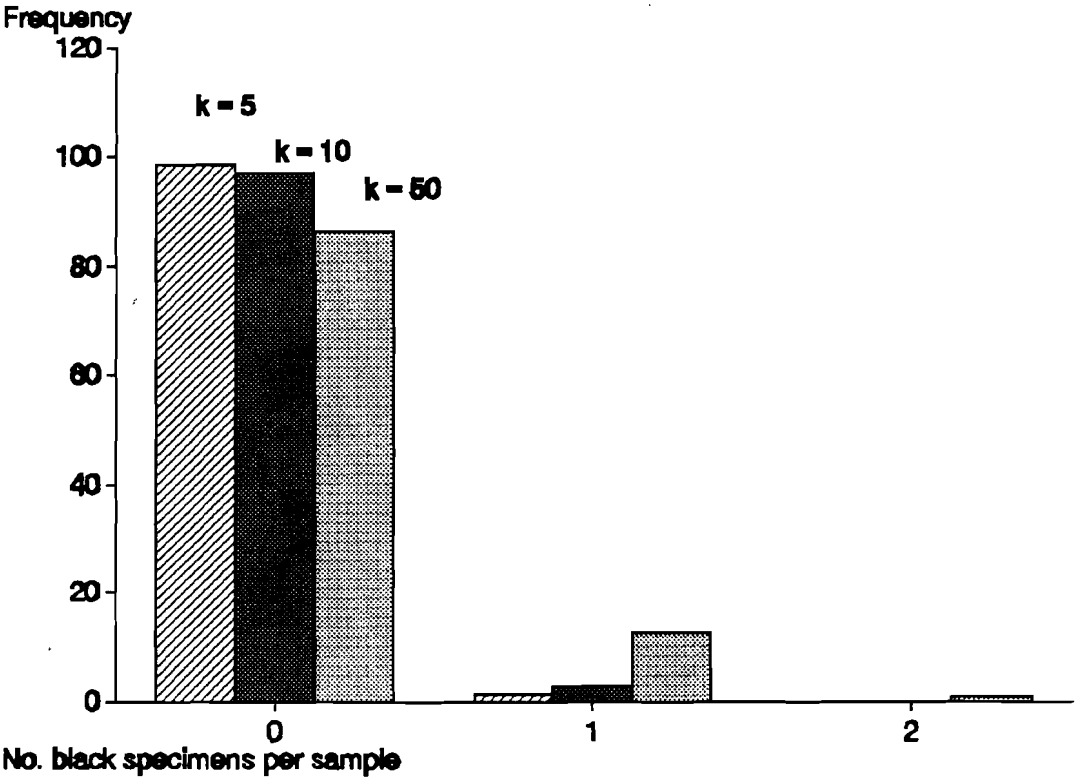

Fig. 1. Frequencis of black specimens in 100 samples when the sample size (k) is 5, 10 and 50 individuals.

Tab. 2. Poisson distribution. Black specimens in 114 traps in the course of 1 autumn. Symbols: f = observed frequency, $\hat{f}$ = Poisson expected frequency, Y = number of black specimens, $\overline{Y}$ =sample mean of black specimens per trap, s^2 = sample variance, CD = coefficient of dispersion ($s^2/\overline{Y}$).

Number of black ones found per trap, Y	Observed frequency, f	Poisson expected frequency, $\hat{f}$	Deviation from expectation, $f-\hat{f}$
0	111	111,039108310	-
1	3	2,922105174	+
2	0	0,038449060	-
3	0	0,000337275	-
4	0	0,000002219	-
5+	0	0,000000012	-
Σ	114	114,000002050	
$\overline{Y}$=0,026316	s^2=0,025850	CD=0,98229	

Tab. 3. Poisson distribution. Black specimens in 36 localities in the course of 1 autumn. Symbols as in text and Tab. 2.

Number of black ones found per locality, Y	Observed frequency, f	Poisson expected frequency, $\hat{f}$	Deviation from expectation, $f-\hat{f}$
0	33	33,121611833	-
1	3	2,760123279	+
2	0	0,115004677	-
3	0	0,003194562	-
4	0	0,000066553	-
5+	0	0,000001109	-
Σ	36	36,000002013	
$\overline{Y}$=0,083333	s^2=0,078571	CD=0,94286	

individuals from greater parts of the distributional area. The three rare events occurred independently at three scattered localities. The localities were randomly chosen and included deciduous-, mixed-, coniferous woods, gardens, parks, grazing land and heather. However, if a case arrised locally where 20 out of 50 individuals lacked spots, the occurrence of so many events at the same time would strongly indicate that they occurred dependently of each other. Causes might be intake of special substances, inheritance of factors coding for absence of spots, mutations and so on.

The p-value and frequencies presented here, primarily bear on Norway and should be regarded as indicative only for other parts of Europe. The case mentioned by Gruber & Martens (1968) and Martens (1978) concerning a locality in France, seems to be extremely unnormal. 27 out of 30 specimens were fully black. The locality lies in a valley near Lourdes (Middle-Pyrenean) in a coniferous wood near an energy producing factory («Kraftwerk Aste»). Even in a larger sample (Tab. 1c) the chance for observing such a result lies close to impossibility. The relative expected frequency ($\hat{f}_{rel}$) is so low as $2{,}34 * 10^{-55}$. Chance can't account for this rare event observed in France. Investigations are needed to discover the causes concealed within the environment, genetical material or both. It seems quite unlikely that the p-value in France differs enough from the Norwegian one letting chance alone explain it.

Observed frequencies from Norway, fit perfectly with the expected Poisson distributions, Tab. 2 and 3.

The purpose of testing against a Poisson distribution is because this can indicate randomness or independence (Sokal & Rohlf, 1981). The coefficient of dispersion (CD) should then be near 1. The CD-values here found, 0,98229 and 0,94286, are near enough to 1, to be described as random, Tab. 2 and 3.

A model for observation

To decide wether a local occurrence of fully black specimens of *N. bimaculatum* in Nor-

way is normal or unnormal the following criteria may be used:

1. Normal case: Only one specimen is fully black in a sample. Chance may account for this alone.

2. Transitional case: Two specimens are fully black in a sample. Chance may account for this in a large sample ($k>50$). However, most likely not in a very small sample. Thorough examination of the locality is needed.

3. Unnormal case: Three or more black specimens in a sample ($k<<1000$). Extraordinary causes at the locality are responsible for the events (environmental, genetical or both).

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SAMMENDRAG

Melanistisk variasjon hos *Nemastoma bimaculatum* (Fabricius, 1775) (Opiliones)

Sannsynligheten for å finne et helt svart individ av arten *Nemastoma bimaculatum* i Norge er så lav som 0,00287. Det er beregnet forventa binominale sannsynlighetsfordelinger for sample-størrelsene 5,10 og 50 individer, samt forventa frekvenser for 100 sampler i hvert tilfelle. De observerte frekvensene til svarte individer i Norge stemmer perfekt med Poisson's forventa frekvenser. Observasjonene ble funnet å være tilfeldige og uavhengige. Årsaker for markerte avvik fra forventa verdier er kort blitt antydet, og en fremtidig observasjonsmodell er presentert. Et rapportert tilfelle av helt svarte *N. bimaculatum* individer fra Frankrike er fremstillt som ekstremt unormalt.

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Check-list of North European Opiliones

INGVAR STOL

Stol, I. 1993. Check-list of North European Opiliones. *Fauna norv. Ser. B 40:* 77—79.

A check-list of North European Opiliones is given. Totally 24 species are reported whereof one species has newly invaded Denmark (and Sweden). Notes on distribution and nomenclature are also given.

The distribution of some species are yet uncertain. Six species may be designated as rare in North Europe. Three species are typically western distributed, and nine species are eastern distributed. Only three species are reported from all countries in the region.

Nomenclatorial notes concern changes of names, dates and author names of species.

Ingvar Stol, Museum of Zoology, Museplass 3, N-5007 Bergen, Norway.

INTRODUCTION

A check-list of North European Opiliones is presented.

The list includes Finland (Fi), Sweden (S), Denmark (D), Norway (N), The Faroes (Fa) and Iceland (I).

The number of species totally reported is 24, whereof 12 in Fi, 20 in S, 18 in D, 15 in N, 7 in Fa and 6 in I. A few changes have occured within the fauna list during the recent times.

Notes are given to the distributions and nomenclature. Regarding the distributions the most rarest species seem to be *Trogulus tricarinatus* (L., 1758), *Mitostoma chrysomelas* (Hermann, 1804), *Paroligolophus meadii* (Pickard-Cambridge, 1890) *Lacinius horridus* (Panzer, 1794), *Platybunus bucephalus* (C. L. Koch, 1835) and *Leiobunum limbatum* L. Koch, 1861.

Western distributed species (N, Fa, I) are *Nemastoma bimaculatum* (Fabricius, 1775), *Paroligolophus meadii* and *Megabunus diadema* (Fabricius, 1779).

Eastern distributed species (Fi, S, N) are *Nemastoma lugubre* (Müller, 1776), *Lacinius horridus, Phalangium opilio* L., 1758, *Opilio parietinus* (De Geer, 1778), *Lophopilio palpinalis* (Herbst, 1799), *Platybunus bucephalus, Leiobunum rupestre* (Herbst, 1799), *Nelima gothica* Lohmander, 1945 and *Leiobunum limbatum.*

Only *Lacinius ephippiatus* (C. L. Koch, 1835), *Mitopus morio* (Fabricius, 1779) and *Rilaena triangularis* (Herbst, 1799) are reported from all countries in the North European region.

Remarks on nomenclature concern changes of names, dates and author names of species.

CHECK-LIST OF NORTH EUROPEAN OPILIONES

Order OPILIONES Sundevall,1833								
Suborder Palpatores Thorell,1876								
Superfamily Troguloidea Sundevall,1833								
Family Trogulidae Sundevall,1833								
Trogulus tricarinatus (L.,1758)	1	-	S	D	N	-	-	
Family Nemastomatidae Simon,1872								
Nemastoma bimaculatum (Fabricius,1775)	2	-	-	-	N	Fa	I	
N. lugubre (Müller,1776)	3	Fi	S	D	N	-	-	
Mitostoma chrysomelas (Hermann,1804)	4	-	S	D	-	Fa	-	
Superfamily Phalangioidea Sundevall,1833								
Family Phalangiidae Latreille,1802								
Subfamily Oligolophinae Banks,1893								
Oligolophus tridens (C.L.Koch,1836)	5	Fi	S	D	N	-	I	
O. hanseni (Kraepelin,1896)	6	-	S	D	N	-	-	
Paroligolophus agrestis (Meade,1855)	7	-	S	D	N	-	-	
P. meadii (Pickard-Cambridge,1890)	8	-	-	-	-	Fa	-	
Lacinius ephippiatus (C.L.Koch,1835)	9	Fi	S	D	N	Fa	I	
L. horridus (Panzer,1794)	10	Fi	S	-	-	-	-	
Mitopus morio (Fabricius,1779)	11	Fi	S	D	N	Fa	I	
Subfamily Phalangiinae Latreille,1802								
Phalangium opilio L.,1758	12	Fi	S	D	N	-	-	
Opilio parietinus (De Geer,1778)	13	Fi	S	D	-	-	-	
O. saxatilis C.L.Koch,1839	14	-	S	D	-	-	-	
O. canestrinii (Thorell,1876)	15	-	S	D	-	-	-	
Megabunus diadema (Fabricius,1779)	16	-	-	-	N	Fa	I	
Rilaena triangularis (Herbst,1799)	17	Fi	S	D	N	Fa	I	
Lophopilio palpinalis (Herbst,1799)	18	Fi	S	D	N	-	-	
Platybunus bucephalus (C.L.Koch,1835)	19	Fi	-	-	-	-	-	

Subfamily Leiobuninae Banks,1893							
Nelima gothica Lohmander,1945	20	Fi	S	D	N	-	-
Leiobunum rotundum (Latreille,1798)	21	-	S	D	N	-	-
L. rupestre (Herbst,1799)	22	Fi	S	D	N	-	-
L. blackwalli Meade,1861	23	-	S	D	-	-	-
L. limbatum L.Koch,1861	24	-	S	-	-	-	-

DISTRIBUTIONAL NOTES

1. Sparsely found in S and D (Meinertz, 1962, Martens, 1978) and in N (Solhøy, 1982).
2. and 3. Both species found in N (Meidell & Stol, 1990).
4. Few reports from S and D (Meinertz, 1962, Martens, 1978) and Fa (Kauri, 1980).
8. Mentioned from Fa by Kauri (1980). The species is widely distributed in England and Wales (Hillyard & Sankey, 1989).
9. Also published from Fa and I (Henriksen, 1938, Kauri, 1980), although not mentioned by Martens (1978).
10. Few reports from Fi and S (Heinäjoki, 1944, Meinertz, 1962, Martens, 1978).
13. Published by Strand (1900), but later excluded from N by Stol (1982).
    Reported from Fi (Heinäjoki, 1944, Meinertz, 1962, Hippa, 1975, Martens, 1978).
    Published from S (Tullgren, 1906, Meinertz, 1962).
    Mentioned from D (Meinertz, 1962, Martens, 1978, Enghoff, 1988).
    Martens (1978) incorrectly writes for N and S not known.
14. Mentioned from D (Meinertz, 1962, Enghoff, 1988) and S (Martens, 1978).
15. Recently invaded D and S (Enghoff, 1987, 1988).
16. Most probable males are never found in Norway. In addition this parthenogenetic species is found in Britain, France and Spain (Martens, 1978, Hillyard & Sankey, 1989).
17. Also published from Fa and I (Henriksen, 1938), although not mentioned by Martens (1978).
18. Found in Fi (Hippa, 1975), S and D (Meinertz, 1962, Martens, 1978) and N (Kauri, 1977, Stol, 1982). Martens (1978) incorrectly writes for Fi and N not known.
19. Few reports from Fi (Heinäjoki, 1944, Hippa, 1975). Martens (1978) regards the report of Heinäjoki as uncertain.
20. Published from Fi (Ilvessalo, 1981), S and D (Meinertz, 1962, Martens, 1978) and N (Stol, 1982).
24. Martens (1978) mentions a single report from S. The main distributional area lies north of Italy. Scattered finds in North-Central Europe.

NOMENCLATORIAL NOTES

The classification of superfamily Phalangioidea is very poorly understood (Shear, 1982). The same is true for even higher taxa. I follows Martens (1978).

Comments on species level:

1. The author date of species name in Martens (1978), Solhøy (1982) and Hillyard & Sankey (1989) is 1767. I have adopted 1758 as correct date as done by Starega (1976). Martens (1978) refers to Linnaeus, Systema Naturae, 12th edition. Starega (1976) refers to 10th edition.
3. Species name *Nemastoma lugubre-bimaculatum* (Fabricius) as used by Heinäjoki (1944) and Meinertz (1962) is incorrect (Meidell & Stol, 1990). Hippa (1975) used an incorrect author name of the species.
4. The species has changed genus name. Meinertz (1962) used the name *Nemastoma chrysomelas.*
6. Species name incorrectly written in Enghoff (1988).
8. The species has changed genus name. Kauri (1980) used the name *Oligolophus meadii.*
11. Author date of species name is incorrect in Martens (1978) and Hillyard & Sankey (1989). They use the date 1799. Enghoff (1988) used the date 1798. Correct date is 1779 (Fabricius, 1779, Starega, 1976, Stol, 1982).
12. Author date of species name in Martens (1978), Stol (1982) and Enghoff (1988) is 1761. I have here adopted 1758 as the correct date as done by Starega (1976) and Hillyard & Sankey (1989). These authors refer to Linnaeus, Systema Naturae, 10th edition.
13. Author name of species is incorrectly written in Hillyard & Sankey (1989).
15. Species name here used is a senior syno-

nym (Gruber, 1984) for *Opilio ravennae* Spoek, 1962 which is found in Martens (1978).

17. The species has changed genus name. Heinäjoki (1944), Meinertz (1962), Koponen (1968) and Hippa (1975) used the name *Platybunus triangularis.*
18. The species has changed genus name. Meinertz (1962) and Hippa (1975) used the name *Odiellus palpinalis.*
20. The species name *Nelima silvatica* as used by Meinertz (1962) is incorrect.
21. The species name incorrectly written in Meinertz (1962).
22. Species name incorrectly written in Meinertz (1962) and Enghoff (1988).
23. Species name *Liobunum hassiae* Müller, 1914 as used by Meinertz (1962) is a junior synonym.
    Species name incorrectly written in Meinertz (1962) and Enghoff (1988).

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SAMMENDRAG

Sjekkliste over nord europeiske Opiliones med kommentarer til utbredelse og nomenklatur

24 arter er kjende for regionen, hvorav en art har nylig invadert Danmark (og Sverige). Seks arter kan betegnes som sjeldne i nord Europa. Tre arter har en typisk vestlig utbredelse, mens ni arter kan sies å være østlig utbredt. Antall arter som er utbredt over hele regionen er bare tre. I Finland finnes 12 arter, i Svergie 20, Danmark 18, Norge 15, Færøyene 7 og Island 6.

Nomenklatoriske kommentarer omfatter forandringer av artsnavn samt forfatter datoer og navn.

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Flight periods of Tipulidae (Diptera) from 22 Norwegian localities

TROND HOFSVANG, LARS OVE HANSEN AND FRED MIDTGAARD

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During the years 1984—1988 Tipulidae (Diptera) were collected from 22 Norwegian localities in Malaise traps and in light traps. The flight periods and abundance of males of 41 species are given.

Trond Hofsvang, Department of Entomology and Nematology, Norwegian Plant Protection Institute, Fellesbygget, N-1432 Ås, Norway.

Lars Ove Hansen, Sparavollen 23, N-3021 Drammen, Norway.

Fred Midtgaard, Department of Biology, Division of Zoology, University of Oslo, P. O. Box 1050, Blindern, N-0316 Oslo, Norway.

INTRODUCTION

Ninety three species of Tipulidae have been reported from Norway (Hofsvang 1992). However, only a few studies of systematic sampling of adult Tipulidae throughout the flight season are known from Norwegian localities (Hofsvang 1974, Hofsvang et al. 1987). The distribution of Tipulidae to different parts of the country is also insufficiently known. A few publications have summarized records of Tipulidae from Norway (Siebke 1877, Lackschewitz 1933, 1935, Tjeder 1965). In his study of the western paleeartictic species in the genus *Nephrotoma,* Oosterbroek (1978, 1979a,b,c), mapped the distribution, including Norway.

The present study summarizes data of 41 species of adult Tipulidae collected from 22 localities in Norway during the years 1984—1988.

MATERIAL AND METHODS

Only males of Tipulidae were identified to species level, because females of several subgenera are insufficiently described. The insects were collected in Malaise traps, except in five localities (Killingholmen, Langøya, Mølen, Ramvikholmen and Tofteholmen), where a light trap was used. Table 1 gives information of all localities. A detailed description of the localities on the islands in the Oslofjord is given by Greve & Midtgaard (1986) (Håøya and Ostøya) and Hauge & Hansen (1991) (Killingholmen, Langøya, Mølen, Ramvikholmen and Tofteholmen).

RESULTS

Tables 2—22 show the number of male Tipulidae recorded during the different collecting periods in all localities. The generic, subgeneric and specific names and the author's name and date are given in Hofsvang (1992).

DISCUSSION

The species in the genus *Nephrotoma* were dominant in localities along the coast in southern Norway (Håøya, Ostøya, Langøya, Ås, Hesnes and Oppdølsstranda) where the trap had been placed in deciduous woods, in meadows with a rich herb layer or close to agricultural fields. Oosterbroek (1978, 1979 a, b, c) gives an overview of the distribution and the flight period of the western palaearctic species in *Nephrotoma.* Sixteen species are reported from Norway (Hofsvang 1992). Six of these species have a southern distribution, however, in the present recordings *N. analis* and *N. flavescens* are found more to the north (Oppdølstranda) than earlier reported (Oosterbroek 1978, 1979c). The flight period of the nine *Nephrotoma* species found in this

Table 1. The position, the sampling year, and main vegetation of the localities. Prov. = provinces given by Økland (1981).

LOCALITY	MUNICIPALITY	PROV.	EIS	YEAR	VEGETATION
Håøya A+B	Frogn	AK	28	1984	Deciduous forest
Ostøya A	Bærum	AK	28	1984	Meadow
Ostøya B+C	Bærum	AK	28	1984	Deciduous forest
Djønno A+B	Ullensvang	HOI	41	1984	Deciduous forest
Filtvet	Hurum	BØ	28	1985	Spruce forest
Tofte	Hurum	BØ	28	1985	Deciduous forest
Mjølfjell	Voss	HOI	41	1985	Pine forest, heather
Oppdølstranda A	Sunndal	MRI	85	1985	Deciduous forest
Oppdølstranda B	Sunndal	MRI	85	1988	Deciduous forest
Ås, NLH	Ås	AK	28	1986	Agricultural field
Prestbakke	Halden	Ø	12	1986	Spruce forest
Sennumstad	Birkenes	AAY	6	1986	Spruce forest
Nordmoen	Nannestad	AK	37	1986	Spruce forest
Langtjern, Gulsvik	Flå	BV	35	1986	Spruce forest
Naustdal	Naustdal	SFY	58	1986	Spruce forest
Granhei	Rana	NSI	123	1986	Spruce forest
Slettta, Dividalen	Målselv	TRI	154	1986	Spruce forest
Svanhovd	Sør-Varanger	FØ	178	1986	Pine forest
Killingholmen	Sande	VE	19	1987	Deciduous forest
Langøya	Våle	VE	19	1987	Meadow
Mølen	Hurum	BØ	19	1987	Deciduous forest
Ramvikholmen	Hurum	BØ	19	1987	Spruce forest
Tofteholmen	Hurum	BØ	19	1987	Spruce forest
Hesnes	Grimstad	AAY	6	1988	Deciduous forest

Table 2. Tipulidae from locality A and B, Håøya (Frogn) 1984.

	19 May-3 June		3-16 June		16-27 June		27 June-22 July		22 July-18 Aug.		18 Aug.-16 Sept.	
	A	B	A	B	A	B	A	B	A	B	A	B
Nephrotoma aculeata							5	1	34	1	3	
Nephrotoma flavescens							1					
Nephrotoma tenuipes								1		1		
Tanyptera atrata		2		2		1						
Tipula (Lunatipula) fascipennis								1				
Tipula (Pterelachisus) irrorata						1		1				
Tipula (Pterelachisus) submarmorata		1										
Tipula (Savtshenkia) confusa									7	4	11	
Tipula (Schummelia) variicornis						1						
Tipula (Tipula) paludosa									1			

study are in accordance with the previous reports from west-palaearctic (Oosterbroek 1978, 1979a,b,c).

D. bimaculata has not been recorded in Norway north of Dovre, however, the present record from Målselv are in accordance with Swedish records, where the species has been found north to Torne Lappmark (Tjeder 1955).

T. (T.) paludosa, a well-known pest in agricultural fields in Norway, is reported from several localities in the present study within its known distribution area (Hofsvang 1981). The flight period of this species and the late autumn flight period of the closely related species *T. (T.) subcuntans* were within the range reported by Hofsvang (1981).

Only a few specimens of *T. (V.) hortorum* are known from Norway (BV, HOY, HOI). The present record of this species from Naustdal and Oppdølstranda are new localities farther to the north.

Table 3. Tipulidae from three localities (A, B, C), Ostøya (Frogn) 1984. No males were collected during the period 14—28 April and 28 April—12 May.

	12-30 May			30 May-10 June			10 June-1 July			1-24 July			24 July-12 Aug.			12 Aug.-1 Sept.			1-23 Sept.		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Nephrotoma aculeata										7	7	4	15	25	10	5	18	4			
Nephrotoma analis										1	1										
Nephrotoma cornicina											4	3	1	3			2	1			
Nephrotoma flavescens								2		5	4	1									
Nephrotoma tenuipes										1	2	1	1	1							
Nigrotipula nigra							1														
Prinocera turcica		3															1				
Tanyptera atrata	1	1	1	2																	
Tipula (Lunatipula) laetabilis															1						
Tipula (Lunatipula) vernalis	1	3		14	16		3	4													
Tipula (Pterelachisus) pabulina					1																
Tipula (Pterelachisus) varipennis		2	1	1	2																
Tipula (Savtshenkia) limbata																1					
Tipula (Savtshenkia) obsoleta																			1		
Tipula (Savtshenkia) pagana																			2		
Tipula (Tipula) subcuntans																			1		

Table 4. Tipulidae from locality A and B, Djønno (Voss) 1984. No males were collected during the period 26 June—10 July and 28 September—6 October.

	26 Apr.-22 May		22 May-5 June		5-26 June		10 July-27 July		27 July-11 Aug.		11-31 Aug.		31 Aug.-28 Sept.	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Dictenidia bimaculata						1								
Tipula (Pterelachisus) varipennis	1	1		5										
Tipula (Savtshenkia) confusa												71		9
Tipula (Schummelia) variicornis						1								
Tipula (Tipula) paludosa							5	26	6	20	3	19		
Tipula (Vestiplex) scripta								2						

Table 5. Tipulidae from Filtvet (Hurum) 1985.

	2-17 June	17 June-17 July
Tanyptera atrata	1	1
Tipula (Lunatipula) fascipennis		1
Tipula (Pterelachisus) irrorata		1
Tipula (Schummelia) variicornis		6
Tipula (Vestiplex) nubeculosa	1	2
Tipula (Vestiplex) scripta		1

Table 6. Tipulidae from Tofte (Hurum) 1985.

	18 May-2 June	2-17 June	17 June-17 July
Tanyptera atrata		1	
Tipula (Pterelachisus) pabulina	3	5	2
Tipula (Pterelachisus) varipennis	13	16	
Tipula (Yamatotipula) lateralis	1		

Table 7. Tipulidae from Mjølfjell (Voss) 1985. No males were collected during the periods 21 September—12 October and 12 October— 9 November.

	8 June-13 July	13 July-3 Aug.	3 Aug.-21 Sept.
Tipula (Savtshenkia) limbata			1
Tipula (Schummelia) variicornis	1	2	
Tipula (Vestiplex) excisa		1	

Table 8. Tipulidae from locality A, Oppdølstranda (Sunndal) 1985.

	10 June–9 July	9 July–28 Aug.
Tanyptera atrata	2	
Tipula (Schummelia) variicornis	2	
Tipula (Savtshenkia) confusa		2
Tipula (Pterelachisus) varipennis	1	

Table 9. Tipulidae from locality B, Oppdølstranda (Sunndal) 1988. No males were collected during the periods 29 April—6 May, 6—12 May, 12—25 May, 25 May—1 June, 24 July—14 August, 14—27 August.

	1-15 June	15-30 June	30 June–9 July	9-17 July	17-24 July	27 Aug.–18 Sept.
Nephrotoma analis			1			
Nephrotoma flavescens		3	6	3		
Nephrotoma tenuipes			3	1	1	
Tanyptera atrata	1	9				
Tipula (Savtshenkia) signata						1
Tipula (Vestiplex) hortorum		1				

Table 10. Tipulidae at NLH-Ås (Ås) 1986. Period of trapping: 15 May—9 October. The trap was checked once a week. The table shows the dates when the trap was emptied. No Tipulidae was recorded on 22 May, 29 May, 5 June, 12 June, 26 June, 25 September and 9 October.

	June	July					August				September			Oct.
	19	3	10	17	24	31	7	14	21	28	4	11	18	2
Nephrotoma aculeata					2	2	2	4	2					
Nephrotoma appendiculata	1	1	1											
Nephrotoma cornicina		1	1	3	2	8	13	14	27	13	12	1	2	
Nephrotoma flavescens		1	2											
Nephrotoma scurra			1			1	1	4	2		1			
Tipula (Lunatipula) fascipennis				1										
Tipula (Tipula) paludosa								2	4	1		1		
Tipula (Tipula) subcuntans														1

Table 11. Tipulidae from Prestbakke (Halden) 1986. No males were collected during the period 6 May—9 June.

	9-30 June	30 June–28 July
Tipula (Dendrotipula) flavolineata	1	
Tipula (Pterelachisus) irrorata	2	18
Tipula (Pterelachisus) pseudoirrorata	22	13
Tipula (Schummelia) variicornis		1
Tipula (Vestiplex) nubeculosa	2	

Table 12. Tipulidae from Svennumstad (Birkenes) 1986. No males were collected during the period 1 September—27 October.

	21 May–24 June	24 June–5 Aug.	5 Aug.–1 Sept.	27 Oct.–2 Dec.
Tipula (Pterelachisus) irrorata		5		
Tipula (Pterelachisus) pseudoirrorata		1		
Tipula (Savtshenkia) confusa			1	
Tipula (Savtshenkia) limbata				1
Tipula (Savtshenkia) signata				1
Tipula (Schummelia) variicornis	2	2		
Tipula (Vestiplex) nubeculosa		1		

Table 13.Tipulidae from Nordmoen (Nannestad) 25 June—24 July 1986.

Tipula (Lunatipula) fascipennis	2
Tipula (Pterelachisus) irrorata	6
Tiupla (Pterelachisus) pseudoirrorata	2
Tipula (Vestiplex) nubeculosa	1

Table 14. Tipulidae from Langtjern, Gulsvik (Flå) 1986. No males were collected during the period 21 July—31 August.

	3-29 June	29 June-21 July	31 Aug.-28 Sept.
Tanyptera atrata	1		
Tipula (Pterelachisus) pseudoirrorata		1	
Tipula (Savtshenkia) limbata			164
Tipula (Vestiplex) excisa		1	
Tipula (Vestiplex) nubeculosa	1	4	

Table 15. Tipulidae from Naustdal (Naustdal) 1986.

	28 May-3 July	3-28 July
Tipula (Pterelachisus) irrorata		8
Tipula (Pterelachisus) pseudoirrorata	1	
Tipula (Pterelachisus) submarmorata	2	
Tipula (Pterelachisus) varipennis	2	
Tipula (Savtshenkia) alpium	1	2
Tipula (Savtshenkia) grisescens	2	
Tipula (Savtshenkia) subnodicornis	15	
Tipula (Schummelia) variicornis	64	26
Tipula (Vestiplex) hortorum	2	
Tipula (Vestiplex) nubeculosa	3	

Table 16. Tipulidae from Granhei (Rana) 1986.

	11-29 June	29 June-27 July
Tipula (Pterelachisus) pseudoirrorata	1	3
Tipula (Pterelachisus) submarmorata	2	
Tipula (Pterelachisus) truncorum		1
Tipula (Savtshenkia) subnodicornis	1	
Tipula (Vestiplex) nubeculosa		1

Table 17. Tipulidae from Sletta, Dividalen (Målselv) 1986.

	14-29 June	29 June-3 Aug.
Dictenidia bimaculata		1
Tipula (Savtshenkia) subnodicornis	2	
Tipula (Vestiplex) excisa		1

Table 18. Tipulidae from Svanhovd (Sør-Varanger) 1986.

	20 June-4 Aug.	4 Aug.-1 Sept.
Tanyptera atrata	1	
Tipula (Savtshenkia) benesignata		2
Tipula (Vestiplex) excisa	1	

Table 19. Tipulidae from Langøya (Våle) 1987.

	Ultimo June	July	Aug.	Sept.	Oct.
Dictenidia bimaculata		2	1		
Nephrotoma aculeata			1		
Nephrotoma analis			1		
Nephrotoma appendiculata	2	11			
Nephrotoma flavescens	7	42	4		
Nephrotoma quarifaria			2		
Nephrotoma tenuipes			1		
Tipula (Acutipula) fulvipennis			2	1	
Tipula (Lunatipula) fascipennis	1	1			
Tipula (Savtshenkia) confusa			2	1	
Tipula (Savtshenkia) obsoleta					1
Tipula (Savtshenkia) pagana				12	34
Tipula (Tipula) paludosa		3	47	11	
Tipula (Tipula) subcuntans					17
Tipula (Vestiplex) scripta			2	4	
Tipula (Yamatotipula) pierrei			1		

Table 20. Tipulidae from Mølen (Hurum) 1987.

	Ultimo May	June	July	Aug.
Dictenidia bimaculata		1		
Nephrotoma flavescens		1		
Tipula (Lunatipula) lunata		1		
Tipula (Pterelachisus) submarmorata	3			
Tipula (Tipula) paludosa			9	24
Tipula (Vestiplex) scripta			3	1

Table 21. Tipulidae at Killingholmen (Sande), Ramvikholmen (Hurum) and Tofteholmen (Hurum) 1987.

	Ramvikholmen July	Tofteholmen July	Killingholmen Sept.
Nephrotoma flavescens		1	
Tipula (Tipula) paludosa	7		1
Tipula (Vestiplex) scripta	8		

Table 22. Tipulidae from Hesnes (Grimstad) 1988.

	12-23 May	23 May-23 June	23-28 June	28 June-7 July	7-15 July	15-23 July	23-30 July	30 July-7 Aug.	7 Aug.-10. Oct.
Nephrotoma aculeata					1	3	1	10	2
Nephrotoma analis				2	5				
Nephrotoma dorsalis				2	1	1			
Nephrotoma quadrifaria		1	3	2					
Nephrotoma scurra						1	2	1	
Tipula (Lunatipula) fascipennis				1					
Tipula (Lunatipula) lunata		2			1				
Tipula (Pterelachisus) submarmorata	2								
Tipula (Pterelachisus) varipennis		3							
Tipula (Savtshenkia) confusa									2
Tipula (Schummelia) variicornis		3	1						
Tipula (Tipula) paludosa								1	
Tipula (Vestiplex) scripta		1		2					

Norwegian species of the subgenus *Savtshenkia* have a late autumn flight period with exception of a few mountain species. *T. (S.) limbata* and *T. (S.) signata* are recorded later than 27 October at Birkenes (table 11), close to the southern coast. *T. (S.) benesignata* has recently been reported new to Norway based on a single record from Oslo (Hofsvang 1987). The new record from Svanhovd indicates that this species is distributed all the way from south to north in Norway in accordance with the records from Sweden (Tjeder 1955).

T. (P.) pseudoirrorata has previously been reported only from Dovre in Norway (Theowald 1980). The present records show that this species is common in South Norway (Prestbakke, Nordmoen, Langtjern, Birkenes, Naustdal) and as far north as Rana (Granhei). The flight period is June-July.

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We would like to thank Oddvar Hanssen and Lite Greve Jensen for supplying us with material.

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Short communications

PSACADINA ZERNYI (MAYER, 1953) (DIPTERA, SCIOMYZIDAE) FIRST RECORD FROM NORWAY

LITA GREVE & THOR JAN OLSEN

Psacadina zernyi, (Mayer, 1953) is reported from Norway, Østfold province, Aremark community, Bøensætra. A female was netted on 1 June 1991. The specimen was netted among flowers close to the edge of lake Bøensætratjern. This is the first record from Norway.

Lita Greve, Zoological Museum, University of Bergen, Muséplass 3, N-5007 Bergen, Norway.
Thor Jan Olsen, P. B. 1062 Valaskjold, 1702 Sarpsborg.

Hitherto 52 species of Sciomyzidae have been recorded from Norway (Greve 1991). Rozkošný (1984) in his survey of the family in Fennoscandia and Denmark listed a total of 83 species; however, less than 60% from Norway alone. The Norwegian fauna thus is probably incompletely known. Papers and notes published in recent years (Greve & Økland 1989; Greve 1990, 1991 and Greve & Midtgaard 1992) somewhat complete the faunistical outlines in Rozkošný's survey.

On 1 June 1991 one female *Psacadina zernyi* (Mayer, 1953) was netted by one of us (TJO) at Bøensætra in Aremark community (Olsen, 1992). Aremark community borders to Sweden. The locality Bøensætra is an old summer farm where no modern farming methods have been used. Old meadows are still used for grazing by sheep, horses and cows and parts of old forest border to the area. Some parts of the meadows are rich in flowering plants and the female was sweep-netted not far from the border of a small lake Bøensætratjern. The specimen was determined by Terje Jonassen, 4170 Sjernarøy.

The genus *Psacadina* is closely related to the genus *Pherbina* and both genera have clear wings with numerous dark and rounded spots. In *Psacadina* the mesopleuron is haired with one strong seta and pteropleuron with hair only, while in *Pherbina* the mesopleuron has hairs and 1—3 setae and the pteropleuron has one strong seta. Subalar setae are absent in *Psacadina,* present in *Pherbina.*

Psacadina verbekei Rozkošný, 1975 is closely related to *P. zernyi* (Mayer, 1953). Males can be distinguished in the genitalia see Rozkošný (1984). Female *P. zernyi* as a rule are without ventral setae on hind femora.

According to Rozkošný (1984) the genus *Psacadina* has two species in Fennoscandia and Denmark, *P. verbekei* Rozkošný 1975, and *P. zernyi. P. verbekei* is hitherto recorded as common in Denmark and recorded in Sweden from Skåne north to Uppland. *P. zernyi* is widespread in Denmark, recorded from southern Sweden north to Ly.Lpm., and it is not rare in southern and central Finland. Rozkošný also says that *P. zernyi* is clearly more common in northern Europe than *P. verbekei.* Both species could thus be expected to occur in Norway in the south-eastern parts where Bøensetra is located. The larvae of *P. zernyi* probably feed on snails like *Lymnaea* and *Physa* (Rozkošný 1984).

ACKNOWLEDGEMENTS

We wish to thank Terje Jonassen, Sjernarøy who determined the specimen.

SAMMENDRAG

En hunn av arten *Psacadina zernyi* (Mayer 1953) som tilhører fluefamilien Sciomyzidae ble tatt i hov på Bøensætra, Aremark kommune i Østfold 1 June 1991. Terje Jonassen, 4170 Sjernarøy har bestemt eksemplaret. Rundt Bøensætra ligger beitemarker som fremdeles er i bruk, og fangsten skjedde i en liten «blomstereng» like ved kanten til Bøensætratjern.

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FAUNISTICAL AND ZOOGEOGRAPHICAL NOTES ON SOME NORWEGIAN SPIDER SPECIES (ARANEAE)

ERLING HAUGE

Short notes are given to the distribution in Norway and elsewhere in Europe of seven spider species: *Amaurobius similis* (Blackwall, 1845), *Clubiona coerulescens* L. Koch, 1867, *C. stagnatilis* Kulczynski, 1897, *C. subsultans* Thorell, 1875, *C. germanica* Thorell, 1871, *Tetragnatha dearmata* Thorell, 1875, and Drapetisca socialis (Sundevall, 1832).

Erling Hauge, Zoological Museum, University of Bergen, Muséplass 3, N-5007 Bergen, Norway.

Amaurobius similis (Blackwall, 1845)
Previously in Norway known from southern and southwestern coastal areas (Kristiansand and Stavanger) (Strand 1904, Hauge 1989). The present specimen (1 male) was found indoors in Bergen in November 1990 (G. Bakkerud coll.), perhaps the most northern record ever for this species. It is not recorded from Sweden (Bonnet 1955), nor was it included in the lists from Finland (Palmgren 1977). Unlike its close relative, *A. fenestralis* (Stroem, 1768) it seem not to have reached the most northern island in Britain (the Orkneyes) and the Shetland islands (Locket & al. 1974). *A. fenestralis* has a much wider distribution (Bonnet 1955) in Europe, reaching north to the Åland islands in south-western Finland (Palmgren 1977), Shetland (Locket & al. 1974), regarded as common in Norway north to Trondheim (Strand 1904, Hauge 1989), occasionally north to Vadsø in Finnmark (Strand 1904).

Clubiona coerulescens L. Koch, 1867
Hitherto only one record from Norway: Ål in the Hallingdalen valley (Strand 1899). The present material from malaise traps was collected (A. Bruserud coll.) in a south-faced thermophilous deciduous forest (Eiksåsen) on the island of Helgøya in lake Mjøsa, Ringsaker, Hedmark: One male in June, 1 female in July, 13 males + 4 females in August, 24 males + 4 females in September 1990.

Rare on the British Isles (Locket & Millidge 1951), scattered north to Aberdeen (Locket & al. 1974), not recorded from Ireland. Reported from a few sites in the Netherlands (van Heldingen 1978) as well as from Belgium and France (Bonnet 1956). The rest of Bonnet's list indicates a distribution rather dominated by central and eastern areas of Europe (south to Italy and the Balkans), extending into Russia and Sibiria, as well as Japan. Its northern distribution in the Nordic countries seems well documented by Tullgren (1945): Widespreed in southern Sweden north to Värmland/Uppsal, i.e. roughly at the same latitude as its registrations in Finland (Åland/Tvärminne/-Mäntyharju), all in the most southern areas (Hackman 1953, Lehtinen & al. 1979, Palmgren 1972, 1977), a distribution pattern shared with several other Europaean species. However, the species is occasionally found also in more northern, areas like Jämtland (Tullgren 1945), as well as in the innermost parts of the west Norwegian fjords with a rather continental climate: One female in a pitfall trap (30 July—11 Sept. 1991) in Luster (Sogn) (J. Anonby coll.).

C. stagnatilis Kulczynski, 1897
Two males together with *C. coerulescens* on the Helgøya island (see above) in June 1990, for the first time in southern Norway. Compared to *C. coerulescens* seemingly more widespread, especially towards northern areas (Tullgren 1945, Locket & Millidge 1951, Locket & al. 1974, Palmgren 1965, Koponen 1975, Hauge 1989).

C. subsultans Thorell, 1875
Two males together with *C. coerulescens* (see above) on the Helgøya island in July 1990. Perhaps a more eastern and northern distribution in Europe compared to *C. coerulsecens* (Bonnet 1956, Locket & al. 1974), almost reaching the Polar Circle in Sweden and Norway (Strand 1904, Koponen 1975, Hauge 1989), and a little further north in Finland (Hackman 1954, Koponen 1976). In southern Sweden regarded as one of the most common *Clubiona* species, from Scania to Ångermanland, but obviously not in the western counties (Tullgren 1945). In southern Norway registered mostly in the inner parts of the eastern areas (Hedmark, southern Oppland, western Buskerud, as well as from Vestfold and Østfold, (Strand 1904), and from Aust-Agder in the more southern areas: One female at Mykland, 6 Sept. 1973 (T. Solhøy coll.). Not recorded from western Norway.

C. germanica Thorell, 1871
One male in a malaise trap 26 June—16 July 1990 (T. Andersen coll.), together with a female *C. subsultans,* at Bolfoss (Eidskog), close to the Swedish boarder in Hedmark county. Habitat: A mixture of *Picea* and *Alnus* (relatively humid) close to a river. Ground covered with coarse stones, mosses and *Vaccinium myrtillus. C. germanica* has previously been recorded from a few localities in south-eastern Norway (Hauge 1989) and from Klæbu (Central Norway), but not in the western areas. In Sweden and Finland registered north to Lappland (Tullgren 1945; Hackman 1954; Palmgren 1965; Koponen 1974, 1976), but also in the western areas: Bohuslän (Tullgren 1945) and Åland (Lehtinen & al. 1979). It is not recorded from the British Isles (Locket & al. 1974), there is only one record from Denmark (Brændegaard 1966) and a few registrations in the south-eastern corner of the Netherlands (van Helsdingen 1979). Otherwise rather widely distributed in eastern -

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northern parts of Europe, reaching Russia, Siberia and even Turkestan (Bonnet 1956).

Tetragnatha dearmata Thorell, 1875
One male and 2 females in a malaise trap (26 June—16 August 1990) at Nystuen (Eidskog), Hedmark (T. Andersen coll.). Known from most parts of Sweden and Finland and regarded as the most common species of the genus in these countries (Tullgren 1947, Palmgren 1974). In Norway, on the contrary, registered only twice: Hol (in the Hallingdalen valley) as *T. punctipes* Westring, 1874 (Strand 1899) and from Sør-Trøndelag (Central Norway) (Solem & Hauge 1973). It is not recorded from the British Isles, elsewhere in Europe with a predominantly eastern/northern distribution (Bonnet 1959, Wiehle 1965). The habitat at Nystuen was a mixture of *Salix* and *Alnus* on a very humid river bank with grasses (*Carex*). According to Wiehle (1963) and Palmgren (1974) a certain preference for coniferous forests.

Drapetisca socialis (Sundevall, 1832)
One male in a malaise trap (18 Aug.—12 Sept. 1990) in a birch wood close to buildings at Ramfjordnes, south of Tromsø, Northern Norway, at approximately 69° 30'N (L. G. Jensen leg.). Previously there are scattered records in southern Norway, mostly in western areas, but also in the east (Vassfaret) and north to Nærøy (Northern Trøndelag). In Finland very common in southern areas, distributed north to 66°N, which was regarded as its northern limit of distribution (Palmgren 1975).

SAMMENDRAG

For 7 edderkopparter er det gitt korte kommentarer om deres utbredelse i Norge og ellers i Europa, samt nye funn i Norge. Artene er: *Amaurobius similis* (Blackwall, 1845), *Clubiona coerulescens* L. Koch, 1867, *C. stagnatilis* Kczynski, 1897, *C. subsultans* Thorell, 1975, *C. germanica* Thorell, 1871, *Tetragnatha dearmata* Thorell, 1875, and *Drapetisca socialis* (Sundevall, 1832).

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ENDOTHENIA MARGINANA (HAWORTH, 1811) (LEP., TORTRICIDAE) IN NORWAY

LARS OVE HANSEN, KAI BERGGREN, RUNE CHRISTENSEN, KAI MYHR & SVEIN SVENDSEN

The tortricid moth *Endothenia marginana* is reported from the following localities in 1990 and 1991: the island Asmaløy, Hvaler, Østfold (Ø); Einarsneset, Farsund, Vest-Agder (VAY) and Skår, Haram, Møre og Romsdal (MRY). The species is previously not reported from Norway. Notes on distributed and biology are given.

Lars Ove Hansen, Sparavollen 23, N-3021 Drammen, Norway.
Kai Berggren, Bråvann terasse 21, N-4622 Kristiansand, Norway.
Rune Christensen, Hans Rustads vei 1, N-2008 Fjærdingby, Norway.
Kai Myhr, Postboks 140, N-2630 Ringebu, Norway.
Svein Svendsen, Sodefjedveien, Postkasse 28, Stangenes, N-4639 Kristiansand, Norway.

During light-trap catches at Asmaløy in Østfold (Ø Hvaler: Huser, EIS 12), a male of the tortricid moth *Endothenia marginana* was taken 3 August 1990, leg. Rune Christensen. This species is previously not reported from Norway. The trap was situated on a meadow scattered with heather *(Calluna vulgaris)* and partly surrounding by oak *(Quercus* sp.) and poplar *(Populus tremula).* On the samle night as the record above, a male was captured at Lista in Vest-Agder (VAY Farsund: Einarsneset, EIS 1), leg. Kai Berggren; 28 August 1990 a female was taken at the same locality, leg. S. Svendsen, and 2 males 30 August 1991, leg. Kai Berggren and Kai Myhr. Furthermore a male and two females were captured in Møre og Romsdal at the Norwegian west-coast (MRY Haram: Skår, EIS 76) 2 July 1991, leg. Kai Myhr; the locality is open moorland with marshy areas and situated only 300 meters from the sea, and the vegetation is dominated by heather *(C. vulgaris)* and scattered with grass.

At the British Isles the larvae of *E. marginana* are found from September to June in flower — and seed-heads of *Betonica officinalis* and *Galeopsis* spp., living in silken galleries and feeding on the seeds (Bradley et al. 1979). They are also found on *Pedicularis sylvatica, P. palustris* and *Rhinanthus minor,* eating the seeds and overwintering in the seed capsule. The species inhabits rough meadows and grassland, waysides, embankments, damp woods, boggy heaths and fens (Bradley et al. 1979). The imago is on the wings from June to August. It is easily disturbed from rest amongst low-growing vegetation during the day, and flies low down about its habitat during the evening.

Svensson et al. (1987) report *E. marginana* from 16 Swedish regions, southernmost Skåne (Sk) and northernmost Torne Lappmark (To). In Denmark it is reported from 7 regions (Schnack 1985). Furthermore it is reported from Finland (Svensson et al. 1987), the British Isles, Central and Southern Europe, North Africa (Bradley et al. 1979) and eastwards through Transcaucasia, Ural, Kazakhstan, Siberian to Mongolia and China (Kutznetzov 1976).

Since the species has a wide distribution in Sweden (Svensson et al. 1987), we may suppose that the species has a wide range also in Norway. The record from Torne Lappmark may indicate that the species also is present in northern Norway. However, we hope collectors will keep their eyes open in the future for this species.

The species may be distinguished from similar species with its more white hindwings. *E. marginana* is illustrated in colour by Bradley et al. (1979), while the genitalia are figured by Kutznetzov (1976).

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SAMMENDRAG

Vikleren *Endothenia marginana* er rapportert fra følgende norske lokaliteter i 1990 og 1991: Asmaløy, Østfold (Ø Hvaler: EIS 12); Lista, Vest-Agder (VAY Farsund: Einarsneset, EIS 1) og Skår, Møre og Romsdal (MRY Haram: EIS 76). Arten er tidligere ikke rapportert fra Norge. Anmerkninger angående utbredelse og biologi er gitt.

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Take care that all text in the figures is *large enough* for a format of column or page width, c. 7 or 14 cm. Never let odd words or numbers go outside the breadth of other elements of the figure. Figures with cross-hatching (bar charts) must not be drawn so large that it is difficult to judge the result of a considerable size reduction. When a dense cross-hatching is greatly reduced it will coalesce and thereby lead to confusion with an entirely black area. Choose contrasting patterns. Authors with access to a machine able to type Latin species names in italics should utilize this in all tables instead of underlining. We will then be more free to photograph tables without the underlining of Latin names detracting from the appearance of the tables.

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Fittkau, E.J. 1962. Die Tanypodinae (Diptera, Chironomidae). Die Tribus Anatopyniini, Macropeloponi und Pentaneurini. Abh. Larvalsyst. Insekten 453 pp.

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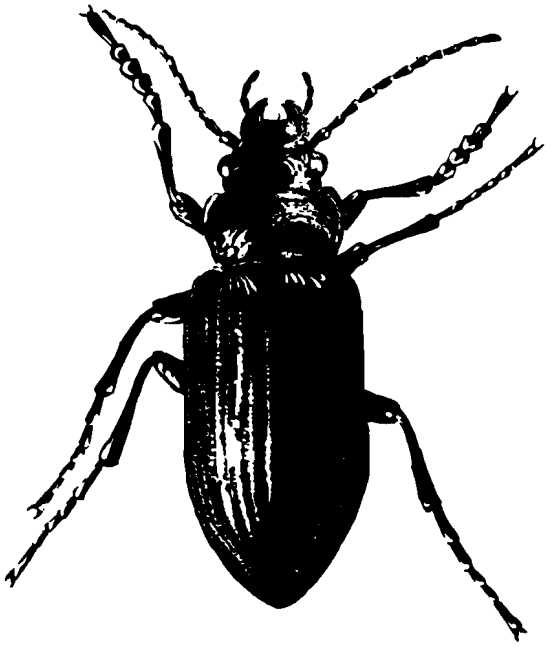

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Personalia:

Address:
Zoological Museum
Sars gt. 1
N-0562 Oslo
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