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## The distribution of predaceous diving beetles (Coleoptera: Noteridae, Dytiscidae) in Sweden

by A. N. Nilsson & S. Persson

**Abstract:** An up-to-date revision of the Swedish records of the aquatic beetles belonging to the families Noteridae and Dytiscidae is presented. Distributional records have been gathered from the literature and from museum and private collections. The distributions are presented as a catalogue of provincial records and as individual distribution maps. The recording unit used on the maps is the 50 × 50 km squares of the national grid. Comments are given on the distribution and habitat of each of the 149 species included.

**Key words:** Coleoptera Dytiscidae Noteridae – faunistics – Sweden – distribution maps.

### Introduction

An adequate knowledge of the distributions of species is a prerequisite for many studies. This applies especially to biogeographical research, including both ecological and systematical aspects. Also regional distribution are here of interest, providing the necessary base for the interpretation of subfossil records, for the evaluation of inventory work, for monitoring faunal changes etc.

The distributions of the Swedish Coleoptera species were recently listed in the Catalogus Coleopterorum Sueciae (LUNDBERG, 1986), which provides provincial records for all species. Besides the more modern nomenclature, the 1986 catalogue gives mainly only additional records to the previous Swedish beetle catalogue (KLEFBECK & SJÖBERG, 1960; also in LINDROTH, 1960). However, the records for Noteridae and Dytiscidae in LUNDBERG (1986) were chiefly based on the present revision of old collections.

The provincial records give only a coarse picture of the distribution. A more detailed account of the families Noteridae and Dytiscidae was given for northern Sweden by NILSSON (1983a), and this study is here extended to include the whole country as well as many more recent records. Distributions are here presented both as provincial records and as individual distribution maps.

Before studying the result one must remember that Sweden is a relatively large country, and consequently the main part of it is under-worked with respect to the water beetle fauna. We are a long way from

knowing the actual distributions, and this should be borne in mind when interpreting the data. It is our hope that the maps will show the critical regions that will have to be explored for a better understanding of the individual distributions and any eventual changes in these. In this way we hope to encourage collecting activity. There are still a lot of interesting records to be made.

### Sources and material

The records shown on the maps and used for the catalogue have been gathered from the literature and from museum and private collections. The literature records are chiefly from the two Swedish entomological journals *Entomologisk Tidskrift* (1880–1987) and *Opuscula Entomologica* (1936–1969). The other works studied have been included in the reference list.

The Swedish and Finnish museum collections have been studied by the senior author, and the Dutch and Danish ones by Mr M. Holmen, Copenhagen. Most of the private collections have been studied by the authors. In some cases the owner of the collection listed the records himself, and only some critical species were subsequently checked.

The included records can thus be divided into those studied directly by the authors, and those known only indirectly from the literature or from private collections. In the later case we have included only records which do not deviate too much from what might be expected from the position of the other records. However, most literature records have been checked as the actual specimens have been found in the collections studied. In some critical species, like *Hydroporus elongatulus* and *Hydaticus continentalis*, that have often been found misidentified, only the checked records have been included.

A very large material, preserved in alcohol and collected by Ms E. Engblom and Mr. P.-E. Lingdell for the National Swedish Environment Protection Board was studied by the senior author.

Museum and institution collections: Sweden: Department of Plant and Forest Protection, University of Agricultural Sciences, Ultuna (PFPU); National Museum of Natural History, Stockholm (NMNH); Department of Entomology, University of Uppsala (DEU); Museum of Natural History, Gothenburg (MNHG); University Zoological Museum, Lund (UML); Department of Biology, Rudbeckian School, Västerås (RSV). – Finland: University Zoological Museum, Helsinki

(UZM). — Denmark: University Zoological Museum, Copenhagen (ZMC); Museum of Natural History, Århus (NMÅ). — The Netherlands: National Museum of Natural History, Leiden (MNHL).

Private collections: S. Adebratt, Boxholm; Be. Andersson, Nybro; Bö. Andersson, Ösmo; B.J. Andersson, Värnamo; B. Andrén, Svanesund; R. Baranowski, Gårdstånga; J. R. Bergvall, Revsund; A. Carlsson, Södra Sandby; P. Cederström, Eslöv; K. Danell, Umeå; A. Dufberg, Malmö; B. Ehnström, Uppsala; B. Ericson, Höör; G. Gillerfors, Varberg; L. Gustafsson, Umeå; B. Henriksson, Edsbyn; M. Holmen, Copenhagen; C. Holmqvist, Hägersten; L. Huggert, Dalby; G. Israelsen, Lund (in UML); A. Jansson (in UML); T. Jonasson, Svalöv; M. Jonsell, Uppsala; O. Jonsson, Kristinehamn; W. Kronblad, Vetlanda; T.-E. Leiler, Vallentuna; Å. Lindelöw, Uppsala; N. Linnman, Lidingö; S. Lundberg, Luleå; L. Medqvist, Visby; A. N. Nilsson, Vindeln; G. Nilsson, Uppsala; S. E. Nilsson, Arvidsjaur; O. Nodmar, Åryd; E. Olofsson, Uppsala; F. Olsson, Hässleholm; J. Olsson, Vallentuna; T. Palm (in UML); B. Persson, Umgransele; S. Persson, Landskrona; P. Prütz, Landskrona; I. Rydh, Olofström; B. Tjeder, Lund; A. Törnvall, Göteborg; B. Vidgren, Vitå; B. Viklund, Johanneshov; B. Weidow, Skara.

### Nomenclature

The names used largely follow SILFVERBERG (1979), with the more recently published additions and corrections (Biström & SILFVERBERG, 1983 & 1985). We have also included the latest changes as proposed in the following papers: ANGUS (1985), LARSON & NILSSON (1985), VAN NIEUKERKEN & NILSSON (1985), NILSSON (1983b & c, 1984b, 1986a, 1987), and PERSSON (1985). These changes have been noted upon in the following text.

The pairs of subspecies of *Potamoneutes griseostriatus* (DeGeer) and *Agabus bipustulatus* (Linnaeus) recognized in Sweden (LUNDBERG 1986) are not accepted here. The distributions of the two cryptic species *Agabus congener* (Thunberg) and *A. lapponicus* (Thomson) (NILSSON, 1987) are not separated on the distribution map for practical reasons, i.e. they were not accepted as two valid species until most of the material had been examined. We refer to NILSSON (1987) for a rough picture of their Swedish distributions.

Genera are grouped in line with preparatory work on a Fennoscandian fauna volume by the senior author. Within genera, species are

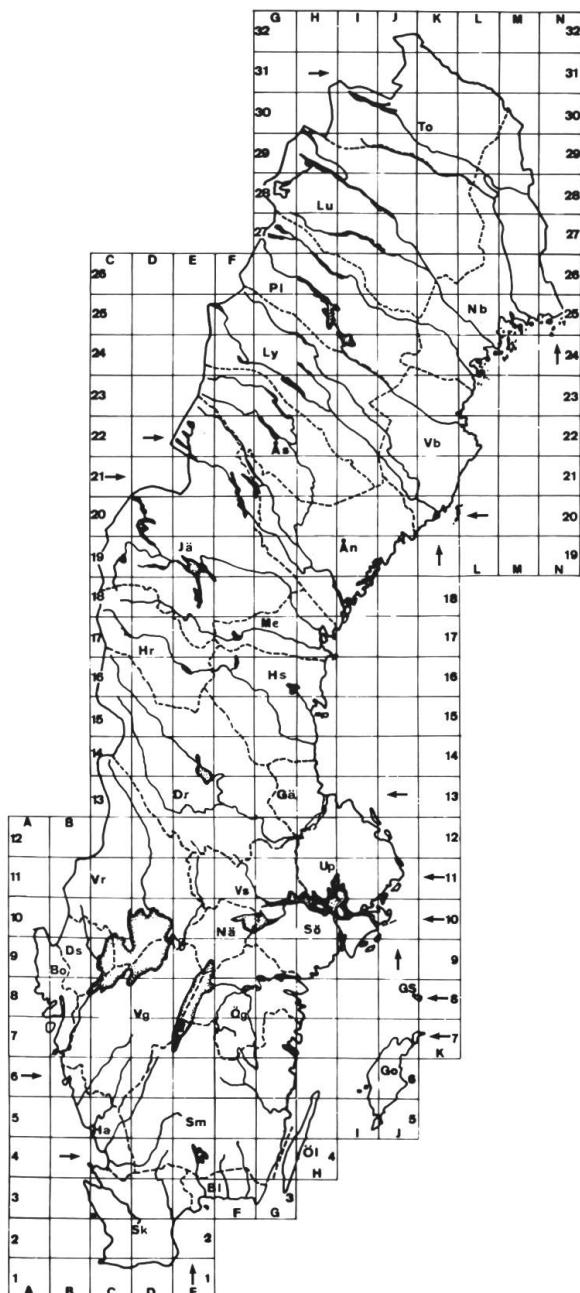


Fig. 1: The national grid system over Sweden showing the  $50 \times 50$  km squares used as a recording unit. Arrows indicate that the actual grid square is incorporated in the adjacent one. Provinces are delimited by broken lines, and the following abbreviations are used: Sk = Skåne; Bl = Blekinge; Ha = Halland; Sm = Småland; Öl = Öland; Go = Gotland; GS = Gotska Sandön; Ög = Östergötland; Vg = Västergötland; Bo = Bohuslän; Ds = Dalsland; Nä = Närke; Sö = Södermanland; Up = Uppland; Vs = Västmanland; Vr = Värmland; Dr = Dalarna; Gä = Gästrikland; Hs = Hälsingland; Me = Medelpad; Hr = Härjedalen; Jä = Jämtland; Ån = Ångermanland; Vb = Västerbotten; Nb = Norrbotten; Ås = Åsele lappmark; Ly = Lycksele lappmark; Pi = Pite lappmark; Lu = Lule lappmark; To = Torne lappmark.

alphabetically ordered. *Nartus* Zaitsev is regarded as a subgenus of *Rhantus* Dejean. The following synonyms have been adopted from ROUGHLEY & NILSSON (in press & in manuscript): *Hydroporus longitarsis* J. Sahlberg, 1910 [= *H. eugeniae* sensu auct., nec Zaitsev, 1909], *Hydroporus puberulus* LeConte, 1850 [= *H. levanderi* J. Sahlberg, 1889], *Laccophilus biguttatus* Kirby, 1837 [= *L. strohmi* Thomson, 1874].

SILFVERBERG (1977) recognized that *Laccophilus variegatus* (Germar, 1812) is a junior homonym, and suggested that it should be replaced with *L. obsoletus* Westhoff, 1881. The latter name was, however, described as a form of *Haliplus variegatus* Sturm, and not of *Laccophilus variegatus* as listed by ZIMMERMANN (1920:28) (H. SCHAEFLEIN, in litt.). The oldest valid name is instead *Laccophilus ponticus* Sharp, 1882 (see BRANCUCCI 1983:324 for synonymy).

### The catalogue

Provincial records of the Swedish species of Noteridae and Dytiscidae are presented in Table 1. This catalogue is based on KLEFBECK & SJÖBERG (1960) with the additions found in KLEFBECK (1962) and LUNDBERG (1968, 1972 & 1986).

All previous records found to be based on misidentified specimens have here been omitted. Our studies of museum and private collections have on the contrary revealed a large number of unknown records that here are included. The old records from KLEFBECK & SJÖBERG (1960) that we have not been able to neither confirm nor reject are given with a question-mark in the catalogue (Table 1). These records might have been based on misidentified specimens that later have been moved in the actual collections. Another possibility is that they refer to collections that we have not studied.

The provincial records that lack a more detailed locality information are given with an open circle (Table 1). Altogether 149 species of Noteridae (2) and Dytiscidae (147) have been found in Sweden.

### The maps

To locate the data we have used the national grid of Sweden (CEDERHOLM & DOUWES, 1974) (Fig.1). The choice of this grid system

Table 1. Provincial records for the Swedish species of Noteridae and Dytiscidae. Different symbols are used for confirmed and located records (x), confirmed but not exactly located records (o), and records from Lindroth (1960) that have not been possible to confirm (?).











	A	B	C	D	E	F	G	H	I	J	K	L	M	N
32									10	7				
31									28	22	46	44		
30									7	64	18	46	16	14
29									0	12	35	32	56	9 15
28									23	30	46	37	25	26 20
27									23	45	31	41	30	12 48 28
26									14	50	24	29	68	46 49 45 34
25									6	41	47	49	21	50 40 56 58 55
24									19	39	46	50	17	42 15 51 5
23									31	37	47	32	46	43 44 28
22									34	34	40	37	72	80 33 55
21									0	1	1	51	39	30 82 60 29
20									1	9	20	42	9	7 38 61 68
19									38	37	55	25	33	18 35 21
18									26	0	21	66	55	36 44
17									31	26	32	34	32	69 35
16									43	7	30	11	74	27
15									28	21	15	63	57	22
14									15	57	47	31	4	47
13									43	17	60	66	40	56 57
12									15	43	25	60	47	32 70 27
11									5	38	35	19	29	64 72 85 42
10									27	25	48	57	59	83 37 57 96 38
9									52	57	34	8	20	24 52 59 56
8									49	79	52	65	81	65 63 32 31
7									15	96	67	69	55	25 41 46 82
6									86	38	36	51	70	46 25 65 77
5									59	48	42	73	50	65 71 60 57
4									78	60	56	59	96	68
3									47	88	89	76	74	65
2									97	104	53			
1									75	71				

Fig. 2: Total numbers of species of Dytiscidae plus Noteridae found in each grid square. Squares numbered as in Fig. 1.

was mainly made for practical reasons. A great advantage is that the grid squares are identical with the sheet lines of the topographical map series found also in most modern atlas editions of Sweden. The national grid has some disadvantages in an international perspective when compared to the UTM grid system, used by e.g. HOLMEN (1981) for Denmark and BISTRÖM (1983) for Finland. The UTM grid is also used in the European Invertebrate Survey (HEATH, 1971). However, as no useful UTM maps were available at the start of our work, the national grid is here used.

As a recording unit we have chosen the  $50 \times 50$  km grid. A coarser system would have meant the loss of too much information and a finer one would have given excessive scatter due to the lack of sufficient information. Also did most of the museum and literature data studied not provide enough information for a more fine-scaled location.

On the maps (Figs 3–39), each dot indicates only that the actual species has been recorded from that square. Thus the maps offer no quantitative information. Neither do they provide information of the age of the records. In those cases where only older records are known from a specific region this has been commented upon in the following text. The records only located to a province have on the maps (Figs 3–39) been marked with a triangle in the centre of the actual province. In the following text the provinces are abbreviated as in figure 1.

The total number of species found in each grid square is shown in figure 2. Actual numbers mainly reflect collecting-intensity in the separate squares. A rough picture of the south to north gradient in species numbers is indicated from a comparison of some of the most well-worked squares, viz. 2D with 104, 4G with 96, 10I with 96, 21J with 82, and 30I with 64 species.

#### Notes to the maps

##### Noteridae Thomson

###### 1. *Noterus clavicornis* (DeGeer, 1774) Fig. 3:1, above.

In Sweden with a coastal distribution in the S half. Along the west-coast it reaches Bo: Tanum (leg. B. Andrén, 1984), and along the east-coast Up: Östhammar (leg. N. Linnman, 1956).

Occurs in small stagnant waters with at least some vegetation. Along the coast in sheltered bays with soft bottoms and dense vegetation.

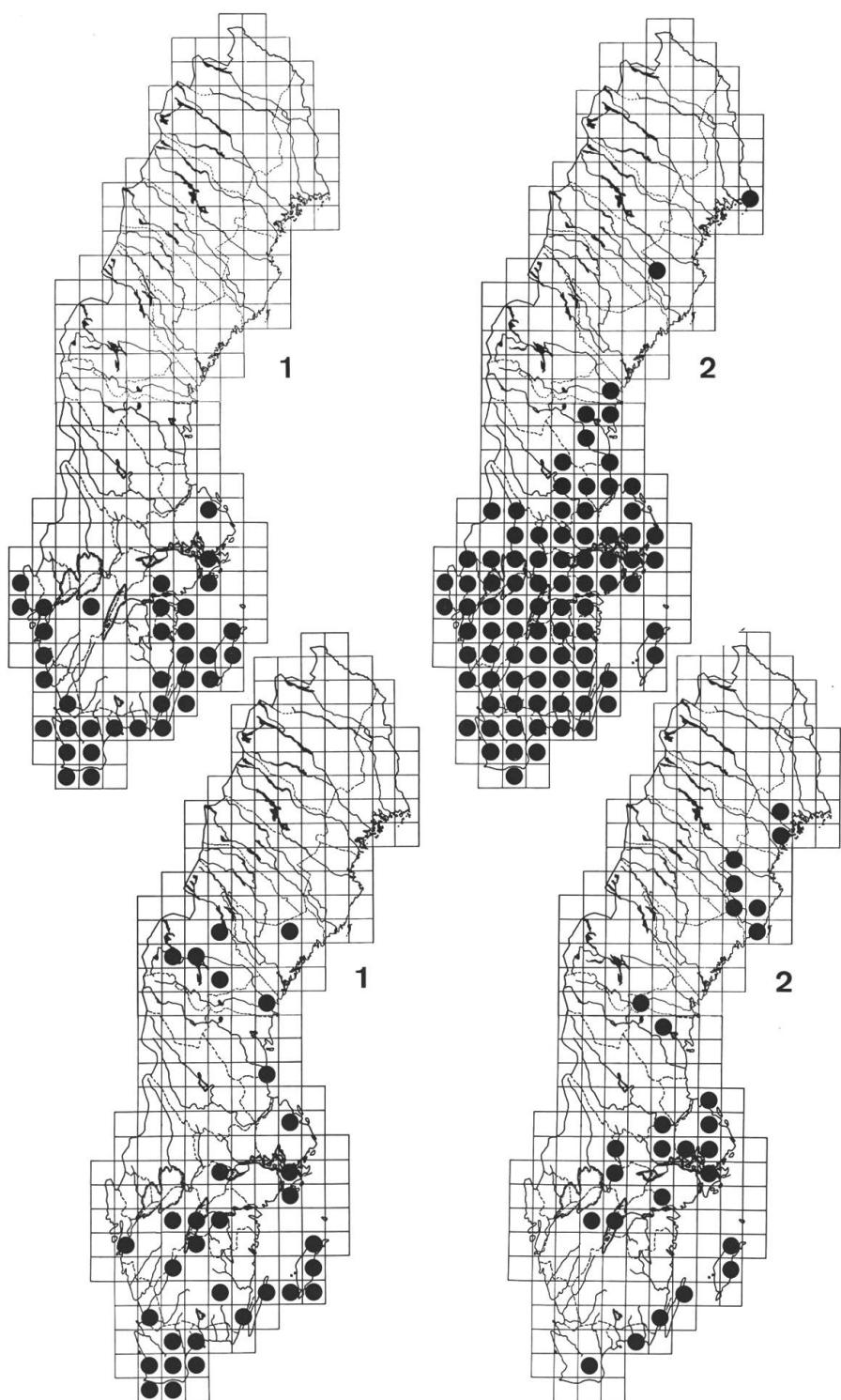


Fig. 3: Distribution in Sweden: Above: 1, *Noterus clavicornis* (DeGeer). 2, *N. crassicornis* (Müller). Below: 1, *Laccornis oblongus* (Stephens). 2, *Bidessus grossepunctatus* Vorbringer. Records in 50 × 50 km grid squares shown with black dots, and those only located to province with black triangles.

2. **Noterus crassicornis** (Müller, 1776)

Fig. 3:2, above.

Continuously distributed in S Sweden up to N Vr, E Dr and E Me. Two northern isolated records are from Vb: Åmsele (leg. A. Johansson, 1986) and Nb: Sävis, not Kalix as stated by NILSSON (1983a).

A typical inhabitant of S Swedish lakes. Found also in slow-running parts of larger streams and in sheltered sea-bays. Prefers soft bottoms with dense vegetation.

**Dytiscidae Leach**  
**Hydroporinae Erichson**

1. **Laccornis oblongus** (Stephens, 1835)

Fig. 3:1; below.

Widely distributed in south and central Sweden. The markedly scattered and relatively few records may partly be due to oversight. In the south only few localities are known outside Sk, Öl and Go. An old record (KLEFBECK & SJÖBERG, 1960) from Dr is based on a misidentified specimen (Ehnström, in litt.). It is known from several localities in Jä and there are also single records from Me (Selånger, leg. A. Nilsson, 1986) and N Ån (NILSSON, 1983d). An old record (KLEFBECK & SJÖBERG, 1960) from "Lapponia" is based on two specimens in coll. Thomson, UML, but it is not sure if these really are from Sweden.

It is always found in dense growth of aquatic mosses, *Sphagnum* or brown-mosses. Most records are from various forest-fens and in most cases only one or two specimens were found.

2. **Bidessus grossepunctatus** Vorbringer, 1907

Fig. 3:2, below.

Added to the Swedish fauna only 12 years ago (HUGGERT & NILSSON, 1978). Before that it was mixed up with the next species, and it was collected already by Paykull and Thomson. It has a wide distribution from Sk to Nb. The northernmost record is from the Luleälven river 15 km downstream Boden (leg. B. Andrén, 1973). All records from Vs, Up, Vr and Dr previously assigned to the next species in fact represent *B. grossepunctatus*.

Occurs in moss surrounding lakes or ponds. Frequently collected in quagmires near the open water.

3. **Bidessus unistriatus** (Schrink, 1781)

Fig. 4:3.

In Sweden confined to the S part, and previously mixed up with the preceding species (see above). It is most common in the SE part, and the

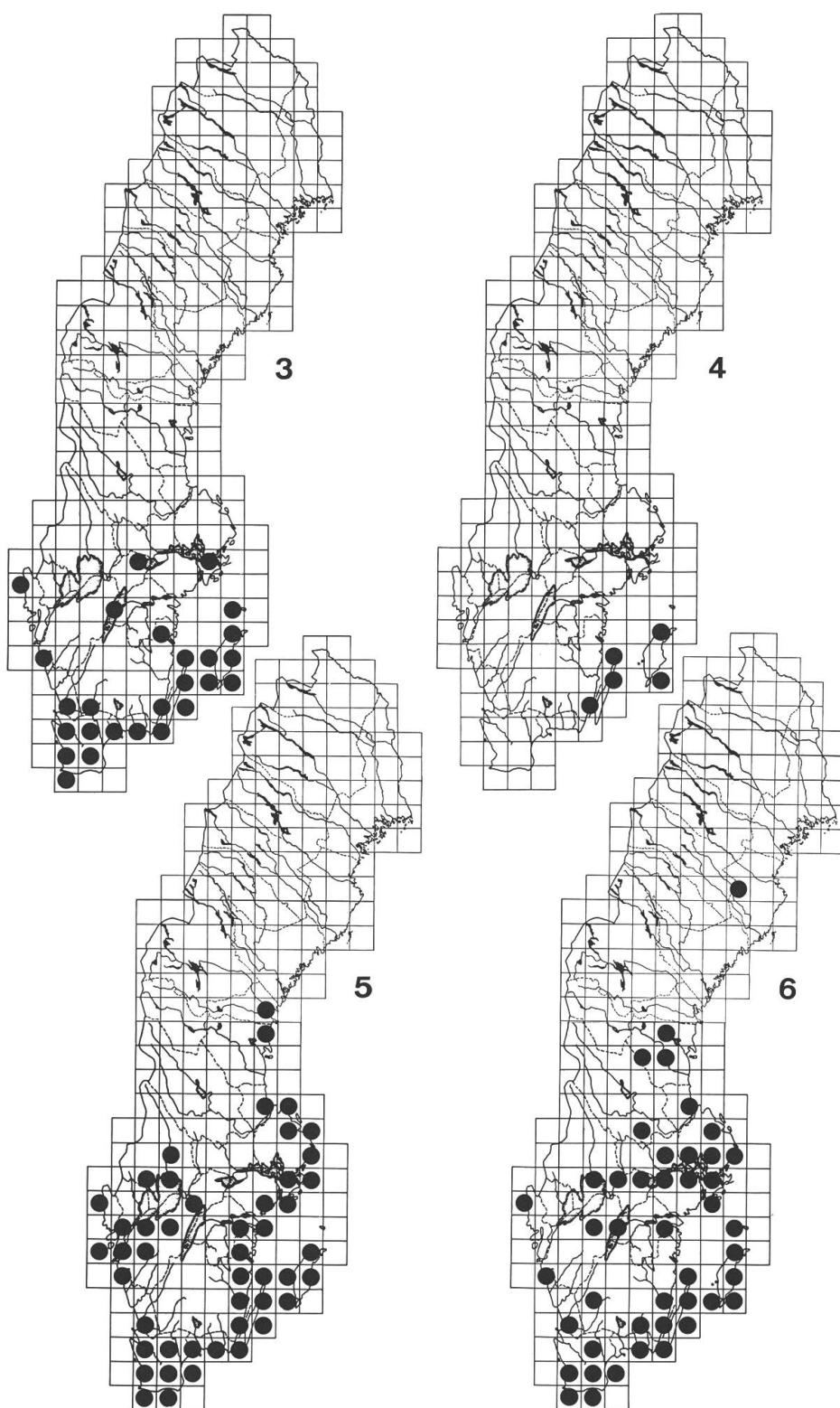


Fig. 4: Distribution in Sweden: 3, *Bidessus unistriatus* (Schrank). 4, *Hydroglyphus hamulatus* (Gyllenhal). 5, *H. pusillus* (Fabricius). 6, *Hygrotus decoratus* (Gyllenhal).

northernmost records are from Sö: Stockholm (coll. UML) and Nä: Örebro (AHLBERG, 1915). Also distributed along the entire west-coast where the northernmost record is from Bo: Tanum (leg. B. Andrén, 1984).

In shallow, grassy pools near lakes or sea-bays. Abundant in open, temporary pools on limestone.

4. *Hydroglyphus hamulatus* (Gyllenhal, 1813). Fig. 4:4.

In Sweden with a pronounced southeastern distribution, and most records are from the Baltic Islands Öl and Go. It is also known from SE Sm, and an old record (KLEFBECK & SJÖBERG, 1960) from Bl has not been possible to confirm.

Mainly found at the margins of shallow lakes with lakemarl bottoms. Rarely also in brackish water at the margins of sheltered sea-bays.

5. *Hydroglyphus pusillus* (Fabricius, 1781). Fig. 4:5.

Widely distributed in S Sweden north to Me: Njurunda (leg. A. Nilsson, 1979). Most records are from coastal sites, including also the Lake Vänern, and it is not known from the S Swedish highland.

Occurs on silty or sandy bottoms in small, stagnant waters. Often near lake- or seashores, e.g. in rock-pools. Frequently collected in pools in abandoned gravel-pits.

6. *Hygrotus decoratus* (Gyllenhal, 1810). Fig. 4:6.

In Sweden confined mainly to the S half, with a more or less continuous distribution north to Hs, 20 km N of Ljusdal (NILSSON, 1982a). It is not recorded from the S Swedish highland. A single, isolated record is known from Lapland (Ly: Siksele, leg. A. Nilsson, 1985).

Occurs in dense vegetation in fens and marshes, also at lake-margins. In Lapland it was found in high numbers in the very dense growth of *Phragmites* and *Sphagnum* surrounding a small lake.

7. *Hygrotus inaequalis* (Fabricius, 1777). Fig. 5:7.

A widely distributed species, seemingly absent only from W Lapland. The northernmost record is from To: Sappisaasi (leg. T. Karlsson & U. Norling, 1969, in coll. UML).

A typical inhabitant of permanent waters with a rich vegetation. Very abundant in eutrophic lakes, also often found in sheltered sea-bays.

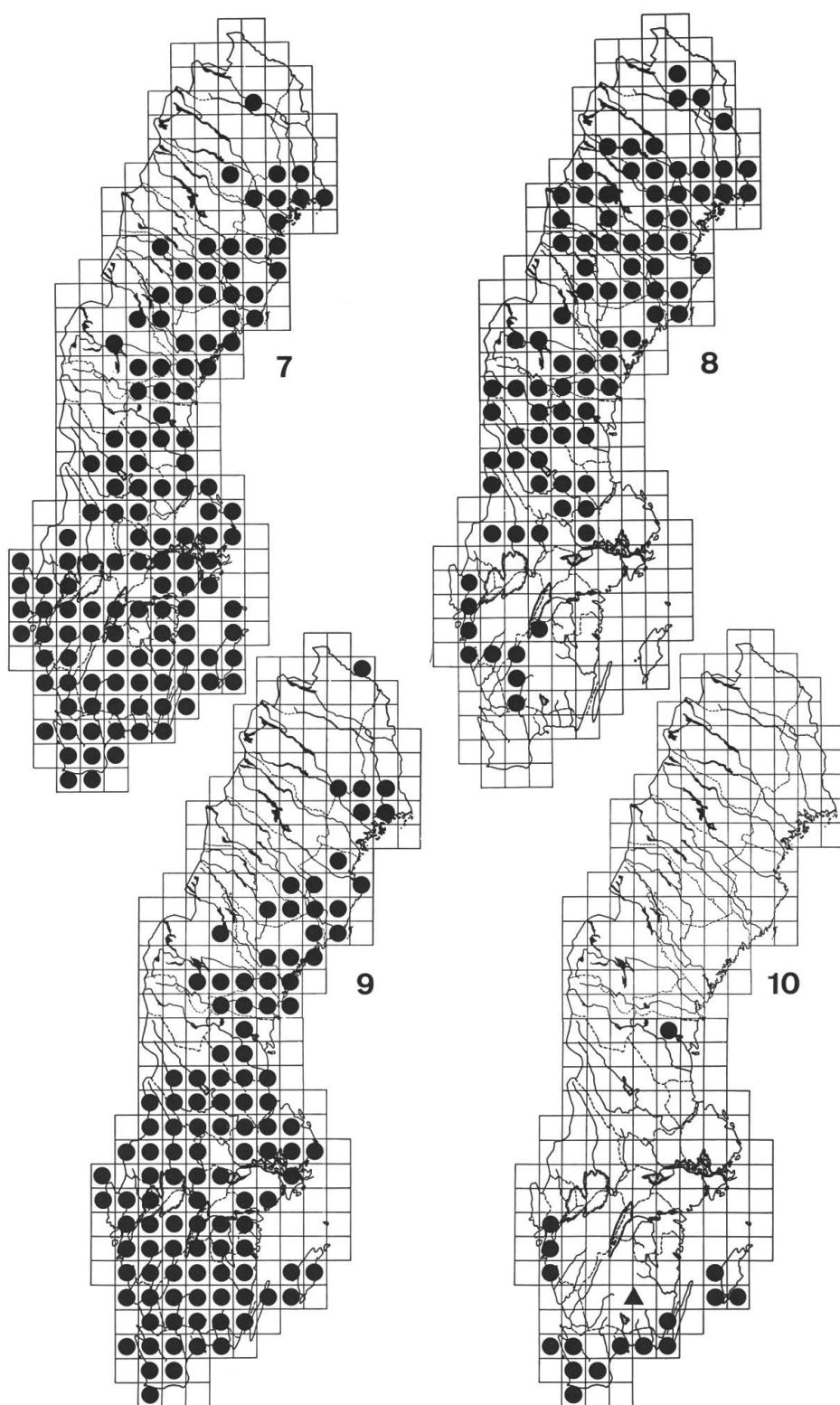


Fig. 5: Distribution in Sweden: 7, *Hygrotus inaequalis* (Fabricius). 8, *H. quinquelineatus* (Zetterstedt). 9, *H. versicolor* (Schaller). 10, *Coelambus confluens* (Fabricius).

8. *Hygrotus quinquelineatus* (Zetterstedt, 1828) Fig. 5:8.

Though widely distributed this species is of very local occurrence in the S half of the country, and not known from the SE including Öl and Go. The record from Öl given by Wirén (1969) has been omitted as it has not been possible to confirm. The southernmost record is from Sm: Annestad (leg. M. Holmen, 1974).

Mainly a lake species, in S Sweden confined to oligotrophic lakes with sparse vegetation and sandy bottoms. In the N half it occurs also in ponds and rivers.

9. *Hygrotus versicolor* (Schaller, 1783) Fig. 5:9.

In Sweden mainly a southern species. It is of quite local occurrence in the N half and seemingly absent from most of Lapland. The northernmost record is that given by ZETTERSTEDT (1840) from To: Karesuando.

Occurs in sparsely vegetated lakes and running waters. In the N half confined to coastal lakes or larger rivers.

10. *Coelambus confluens* (Fabricius, 1787) Fig. 5:10.

In Sweden chiefly a southeastern species most frequently collected in Öl and Sk. Besides some old records from the west-coast it was also recently collected in Bo: Ucklum (leg. B. Andrén, 1984). The record from Sm (leg. Ahlrot, vide LINDBERG, 1948) has not been possible to locate. It was noted also from Up by Paykull (1798), though this record has not been possible to confirm. In coll. MNHG there is a single specimen from Hs: Delsbo collected by Rudolphi before 1900.

Typically found in small, stagnant waters with little vegetation and sandy or silty bottoms. Frequently collected in abandoned gravel-pit ponds. Found also in brackish water.

11. *Coelambus impressopunctatus* (Schaller, 1783) Fig. 6:11.

Widespread in Sweden. In the N half it has been most frequently collected in the coastal parts. It is of very local occurrence in the NW with isolated records from Pi: Pieljekaise (LEILER, 1983) and To: Karesuando (PALM, 1964). An old record (KLEFBECK & SJÖBERG, 1960) from Lu has not been possible to confirm.

Found in a wide variety of mainly stagnant waters with a dense vegetation. Very abundant in eutrophic lakes. Often found in brackish water in sheltered sea-bays with dense vegetation.

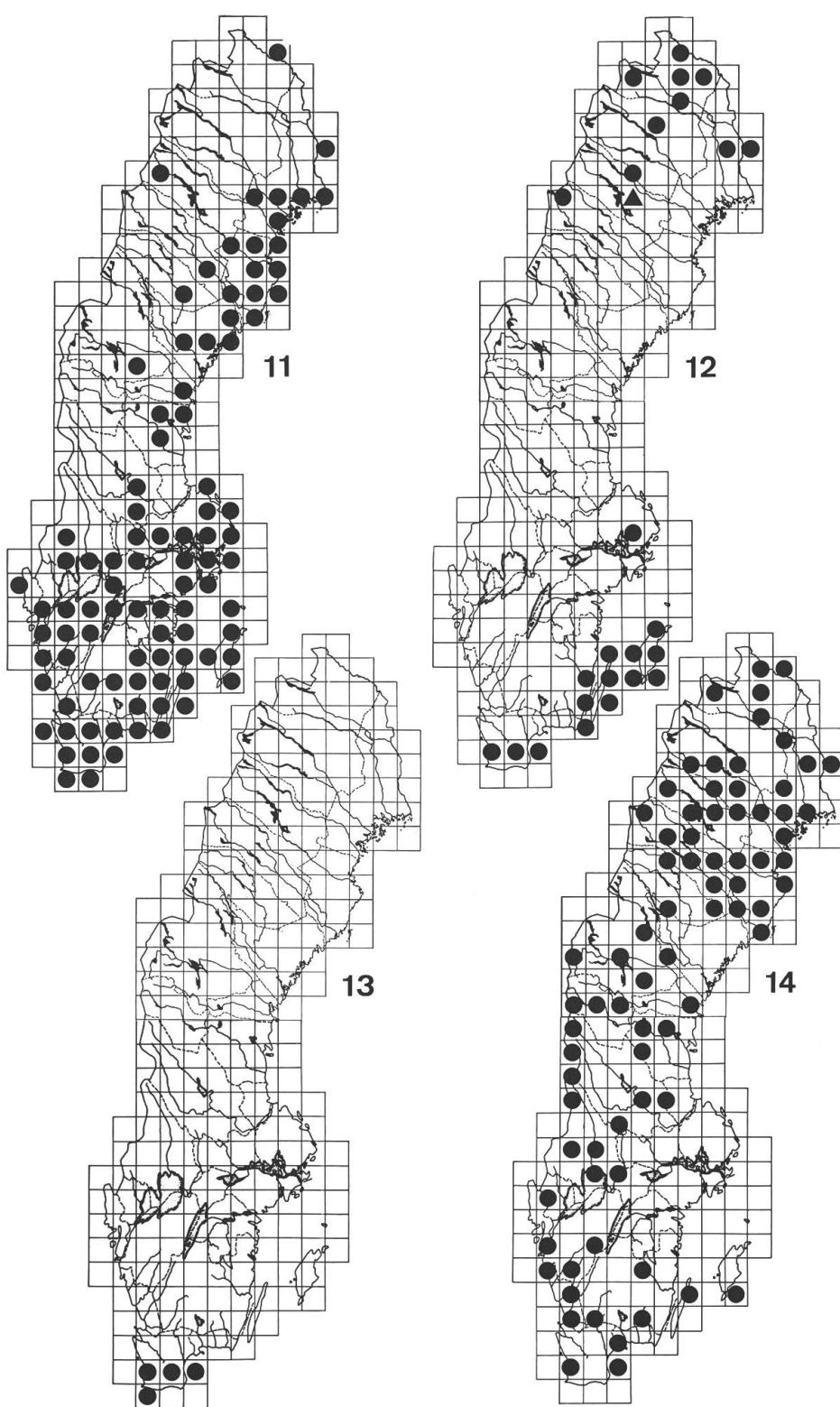


Fig. 6: Distribution in Sweden: 11, *Coelambus impressopunctatus* (Schaller). 12, *C. marklini* (Gyllenhal). 13, *C. nigrolineatus* (Steven). 14, *C. novemlineatus* (Stephens).

12. **Coelambus marklini** (Gyllenhal, 1813)

Fig. 6:12.

In Sweden with a markedly disjunct distribution, here only known from the SE and NW parts. The record from Up is based on a single specimen collected before 1900 by Ridderbielke (in coll. Johansson, RSV).

Confined to open, more or less temporary ponds with silty bottoms and little vegetation. Frequently collected on alvar ground, i.e. the steppe-like limestone formation of the Baltic Islands. In NW Sweden also above the tree-limit.

13. **Coelambus nigrolineatus** (Steven, 1808).

Fig. 6:13.

Previously known as *C. laetus* (Schaum) (VAN NIEUKERKEN & NILSSON, 1985). It is in Sweden known only from six localities in Sk. It was first collected in Sweden in the year 1971 (Stenshuvud, leg. E. Olofsson). Later it has also been found at Lund, Saxtorp, Tomelilla, Trelleborg, Vitaby and Vitemölla.

Confined to small silt-ponds of recent origin, e.g. in abandoned gravel-pits. The ponds are only inhabited for a short initial period of at most a few years.

14. **Coelambus novemlineatus** (Stephens, 1829)

Fig. 6:14.

Though found all over the country this species is chiefly northern, and of very local occurrence in S Sweden.

In S Sweden confined to oligotrophic lakes where it occurs on sandy or silty bottoms with little vegetation. A few exceptional records are known from ponds of recent origin. Northern Swedish habitats include also large rivers and various ponds.

15. **Coelambus parallelogrammus** (Ahrens, 1812)

Fig. 7:15.

In Sweden with a pronounced coastal distribution in the S half. Along the west-coast it reaches Orust (LINDBERG, 1948) in central Bo, and along the east-coast Sö: Stockholm (Nämndö, leg. R. Baranowski, 1968).

Occurs chiefly in brackish water at sea-shores, both in the sea and in adjacent ponds and ditches. A few exceptional inland records are from open ponds.

16. **Hyphydrus ovatus** (Linnaeus, 1761)

Fig. 7:16.

Widespread in Sweden. In the N half it is mainly confined to the coastal region, and the northernmost record is from Lu: Pålkem (WIRÉN, 1945).

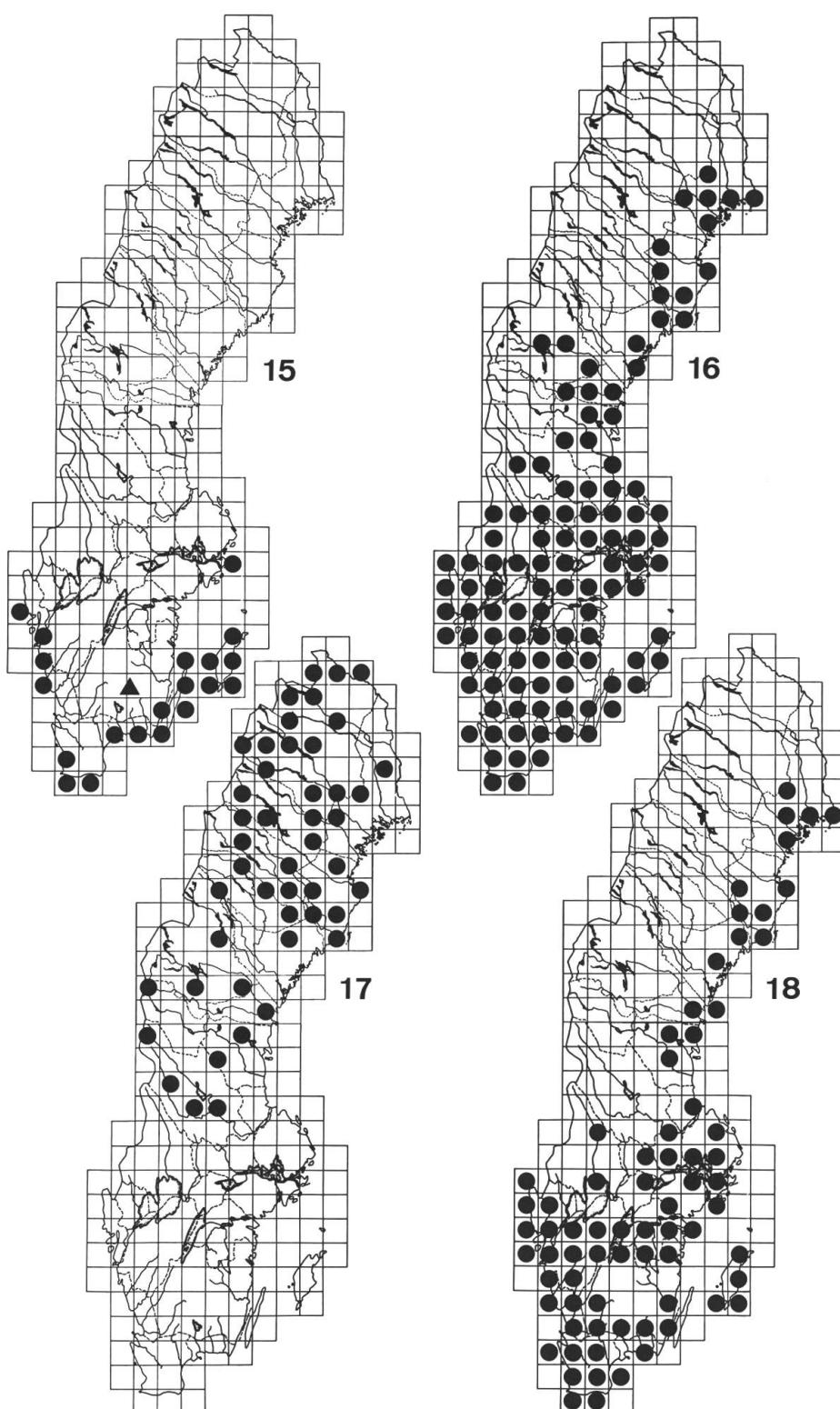


Fig. 7: Distribution in Sweden: 15, *Coelambus parallelogrammus* (Ahrens). 16, *Hyphydrus ovatus* (Linnaeus). 17, *Hydroporus acutangulus* Thomson. 18, *H. angustatus* Sturm.

Mainly found in permanent, stagnant waters such as lakes and ponds with a rich vegetation. Rarely also among vegetation at stream-margins.

17. **Hydroporus acutangulus** Thomson, 1856

Fig. 7:17.

A northern boreal and arctic species in Sweden found south to Dr: Järna (leg. Arne Nilsson, 1983). An old record (KLEFBECK & SJÖBERG, 1960) from Hr has been omitted as a misidentified specimen was found in coll. A. Jansson. The record given by LINDROTH & PALM (1934) from Nb is also based on a misidentified specimen. This specimen, found in coll. MNHG, belongs to *H. fuscipennis* Schaum. Recently, *H. acutangulus* was found also in this province (Kuusivaara, leg. A. Nilsson, 1987).

Typically found in small waterbodies with *Sphagnum* or *Polytrichum* moss in forest. Frequently collected also above the tree-limit.

18. **Hydroporus angustatus** Sturm, 1835

Fig. 7:18.

Widespread in Sweden north to Up, though of very local occurrence in the S highland. In the N part it is confined to the coastal provinces.

Occurs in stagnant waters with dense vegetation. Abundant in eutrophic lakes, but also in various fens and marshes. Occasionally collected at river-margins.

19. **Hydroporus brevis** F. Sahlberg, 1834

Fig. 8:19.

Widespread in Sweden, though seemingly rare in the S and central parts. Only older records are known from the southern provinces. In Sk it was collected by Thomson (in coll. UML) and ROTH (1896), and in Sm by Boheman (in coll. Thomson, UML). FALKENSTRÖM (1922) collected it in Up (in coll. UML).

Occurs in small stagnant, more or less temporary pools with *Polytrichum* moss in forest and near mires and rivershores. Near Sundsvall (Me: Stornäset, 3.V.1983, leg. A. Nilsson) it was very abundant in small, mossy hollows on a small mire with seeping melt-water.

20. **Hydroporus discretus** Fairmaire & Brisout, 1859

Fig. 8:20.

Widespread in S Sweden, though of very local occurrence in the S highland. As noted by NILSSON (1983d) many N Swedish records are erroneous, and the northernmost valid ones are from Me: Alnön (leg. A. Nilsson, 1986) and Jä: Östersund (leg. A. Nilsson, 1981). It was collected in Hs before 1900 by Ströhm (in coll. MNHG).

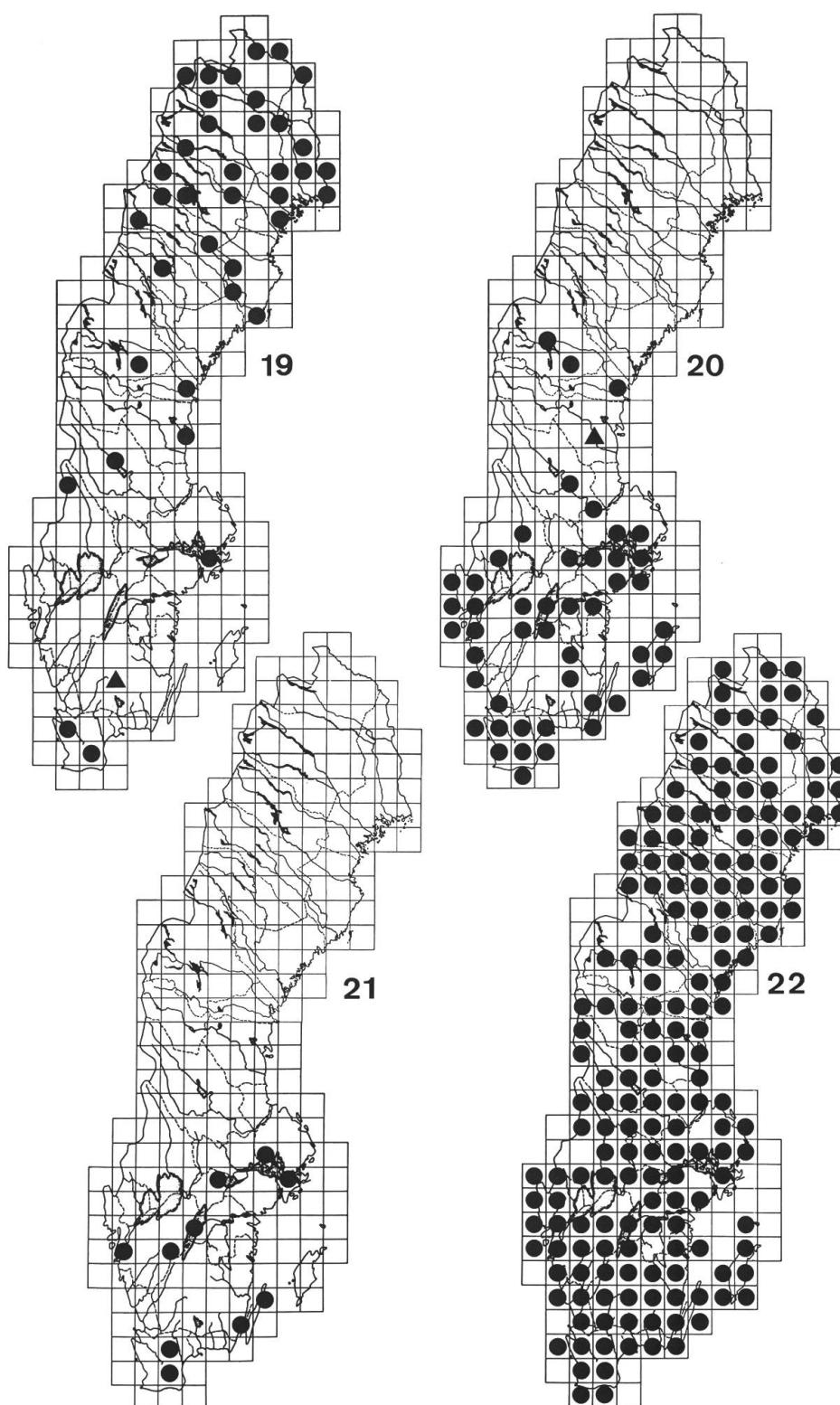


Fig. 8: Distribution in Sweden: 19, *Hydroporus brevis* F.Sahlberg. 20, *H. discretus* Fairmaire & Brisout. 21, *H. elongatulus* Sturm. 22, *H. erythrocephalus* (Linnaeus).

Occurs chiefly in small streams and springs with a silty or clayish substrate.

21. **Hydroporus elongatus** Sturm, 1835

Fig. 8:21.

In Sweden with a very patchy distribution in the S half. As it is very frequently misidentified only the controlled records are included on the map. The record from Hs given by WÅNGDAHL (1880) has not been possible to confirm, as an old record from Sm (KLEFBECK & SJÖBERG, 1960). In N Sweden it has previously been mixed up with *H. longitarsis* J. Sahlberg (NILSSON, 1983c). The record from Go given by WIRÉN (1969) has been omitted as it has not been possible to confirm.

Of rare occurrence in more or less temporary dark-bottom pools in forest and marshes. Vegetation is either absent or sparse and often includes tussocks of *Carex elata*.

22. **Hydroporus erythrocephalus** (Linnaeus, 1758)

Fig. 8:22.

Very frequently collected all over Sweden.

Occurs in a wide variety of mainly stagnant waters, also above the tree-limit.

23. **Hydroporus fuscipennis** Schaum, 1868

Fig. 9:23.

In Sweden known from S Sk to northernmost Lapland. It has been found in most parts of N Sweden and is of a much more local occurrence to the south where it is seemingly absent from large areas, especially in the SW. The record in KLEFBECK & SJÖBERG (1960) from Bl is considered erroneous, as a misidentified specimen was found in coll. Sjöberg (NMNH).

Found mainly in open, temporary, grassy pools. In N Sweden frequently collected at seasonally flooded rivershores, and also above the tree-limit.

24. **Hydroporus glabriusculus** Aubé, 1838

Fig. 9:24.

Though of quite local occurrence all over the country, this species has been more frequently collected in the N part. In the S half there are large areas from where it is not known. The southernmost records are from Öl: Halltorp (several recent records) and Gråborg (leg. P. Cederström, 1984).

Of a relatively rare occurrence in birch- and sprucemarshes. More frequently collected on Go at the margins of *Cladium*-fens.

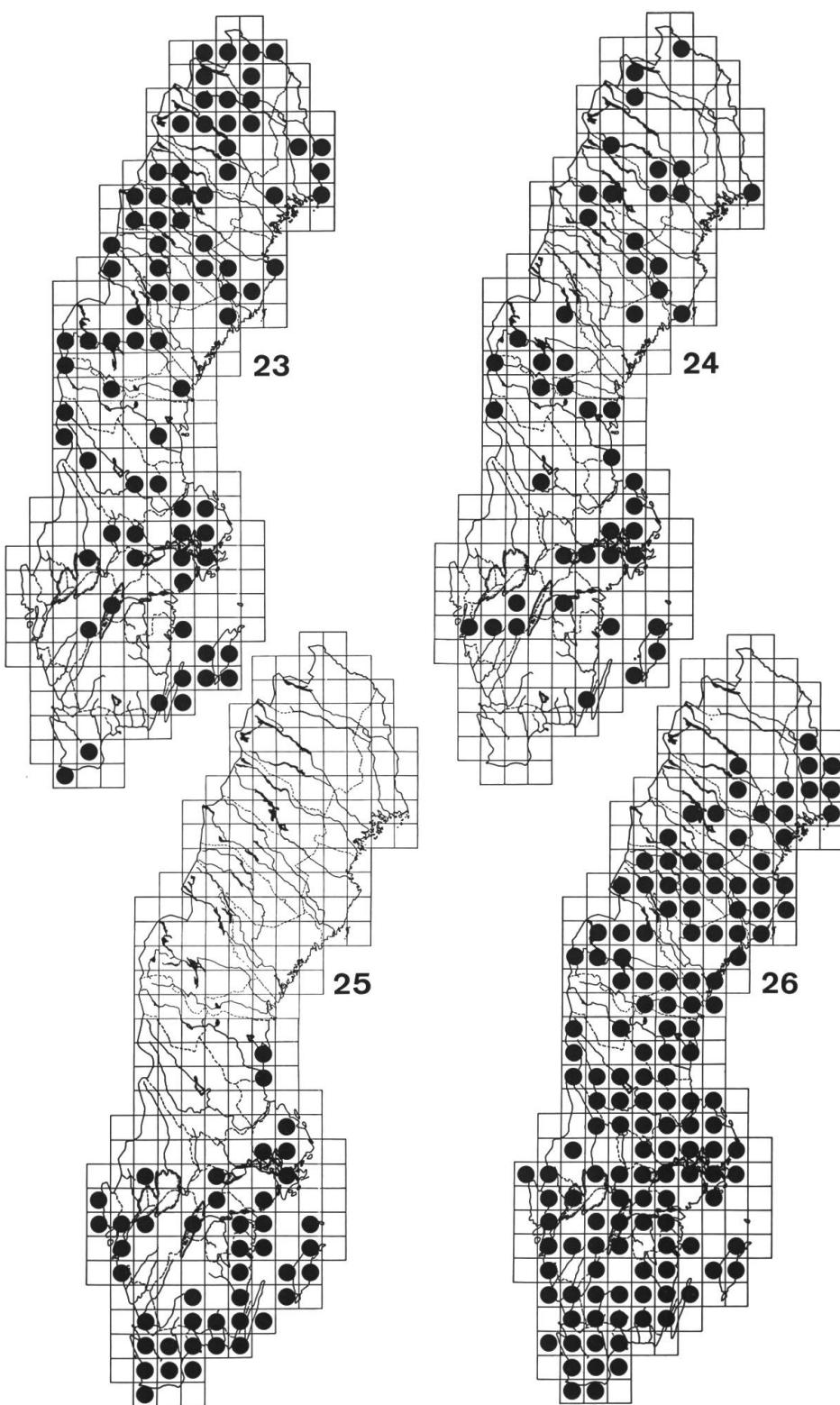


Fig. 9: Distribution in Sweden: 23, *Hydroporus fuscipennis* Schaum. 24, *H. glabriusculus* Aubé. 25, *H. gyllenhalii* Schiödte. 26, *H. incognitus* Sharp.

25. *Hydroporus gyllenhalii* Schiödte, 1841

Fig. 9:25.

Though widespread in S Sweden, this species is most common in the SE parts. The record given by WÅNGDAHL (1880) from Hs: Iggesund is most probably valid as there in coll. MNHG is a specimen labelled "Norl". Further, this species was recently found in N Gä (Axmars bruk, leg. A. Nilsson, 1985).

Confined chiefly to marshes and other small, stagnant waters in forest.

26. *Hydroporus incognitus* Sharp, 1869

Fig. 9:26.

Collected all over Sweden, except for W and northernmost Lapland. An old record (KLEFBECK & SJÖBERG, 1960) from To has been considered erroneous (misidentified in coll. Höglund, NMNH).

Occurs in a wide variety of mainly smaller, stagnant waters. Often found in springs and in small ponds filled with decomposing leaves.

27. *Hydroporus lapponum* Gyllenhal, 1808

Fig. 10:27.

In Sweden with a markedly western distribution in the N half. Though most records are from sites above the tree-limit, it has also at several occasions been collected in the coniferous forest zone. The southernmost record is from the mountain Fulufjället W of Särna in N Dr (leg. Kaiser, 1975, in coll. NMÅ). The provincial records from Vb and Nb given by KLEFBECK & SJÖBERG (1960) have not been possible to confirm and are most probably erroneous. According to THOMSON (1874) it was collected in Hs by Ströhm. As this old record is rather isolated we have included it with some doubt on its validity.

Confined to various ponds and small lakes with sparse vegetation at high-altitude sites. Often found in dystrophic bog-pools.

28. *Hydroporus longicornis* Sharp, 1871

Fig. 10:28.

Though markedly local in its occurrence, this species is distributed all over the Swedish mainland. It is not known from Go, and collected only once on Öl (LUNDBLAD, 1950b). Recently it was also found in Sk: Tjörnarp (leg. B. Ericson, 1983). A specimen from Ög (in coll. A. Jansson) has not been possible to locate.

Confined mainly to springs and small streams. Found also in moss with seeping water on bogs. Occasionally very abundant in forest-ditches.

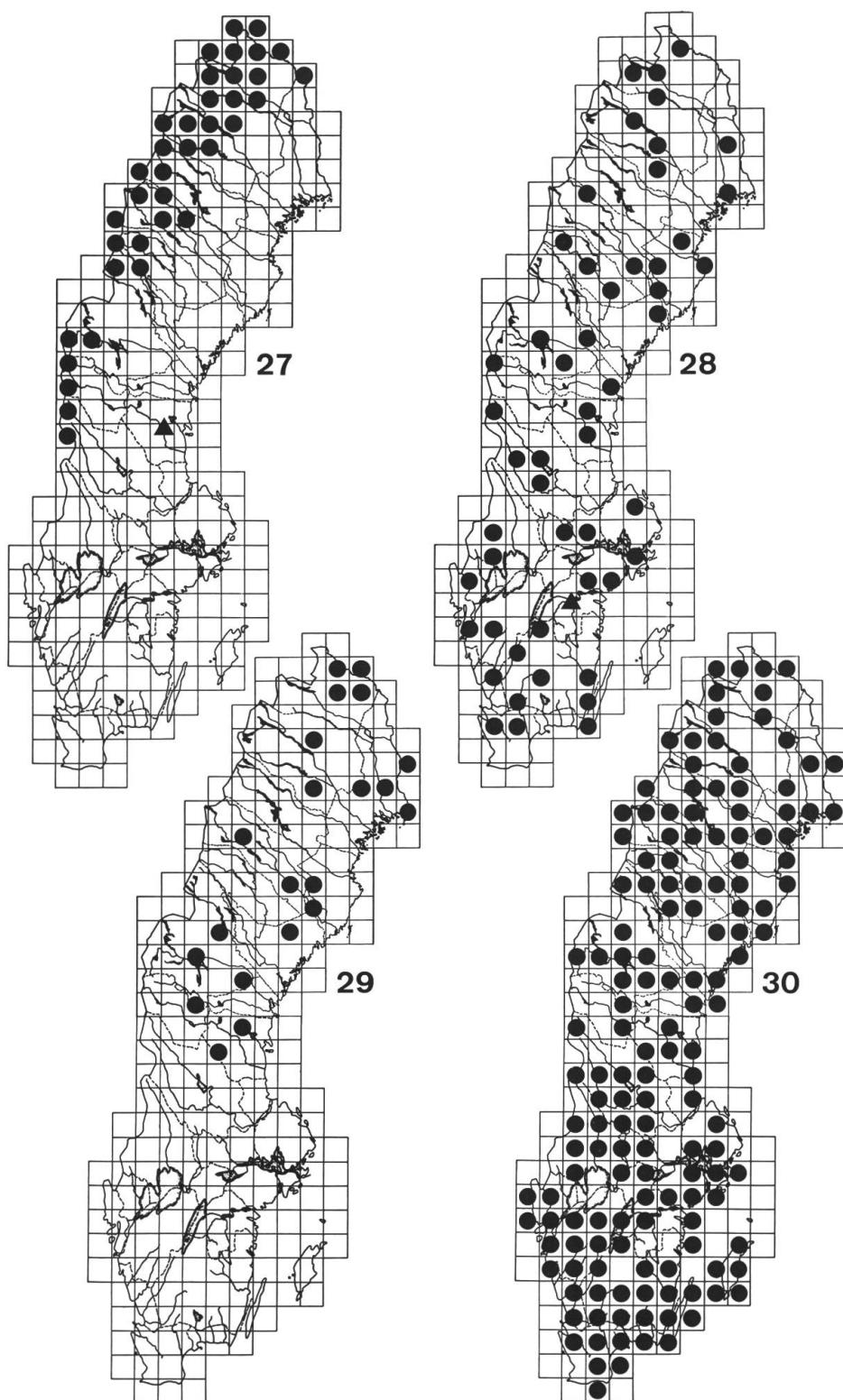


Fig. 10: Distribution in Sweden: 27, *Hydroporus lapponum* (Gyllenhal). 28, *H. longicornis* Sharp. 29, *H. longitarsis* J. Sahlberg. 30, *H. melanarius* Sturm.

29. **Hydroporus longitarsis** J. Sahlberg, 1910 Fig. 10:29.

NILSSON (1983c) recognized this species as *H. eugeniae* Zaitsev. However, after the examination of Zaitsev's type material it is clear that *H. eugeniae* was described from another species (ROUGHLEY & NILSSON, in manuscript). Previously listed as *H. afflatus* Scholz, and as such mixed up with *H. elongatulus* (NILSSON, 1983c). It is confined to the N part of the country, and here not recorded from most of the coastal region or above the tree-limit. The southernmost record is from Hs: Voxna (leg. B. Henriksson, 1985).

Occurs in grassy fens in spruce forest, where it is most abundant in late spring and early summer in connection with the flooding caused by snow melt-water.

30. **Hydroporus melanarius** Sturm, 1835 Fig. 10:30.

Frequently collected all over the country.

Mainly a bog species that is abundant in various small, peaty waterbodies. Most often collected in forest.

31. **Hydroporus memnonius** Nicolai, 1822 Fig. 11:31.

Frequently collected all over the country.

Occurs in various small waterbodies in forest, often rich in mosses. Frequently encountered in springs and springfed streams.

32. **Hydroporus morio** Aubé, 1838 Fig. 11:32.

[= *melanocephalus* sensu auct., nec Marsham 1802, see Nilsson 1985].

Collected all over the country, though of a markedly more local occurrence in the S half, and here not known from large areas. Old records (KLEFBECK & SJÖBERG, 1960) from Öl and Ds have not been possible to confirm. WIRÉN's (1969) records from Öl are considered erroneous.

Occurs in various small waterbodies in forest and on mires, also frequently collected above the tree-limit. One of the dominating species in coastal rock-pools.

33. **Hydroporus neglectus** Schaum, 1845 Fig. 11:33.

A relatively infrequently collected species with a wide distribution in Sweden. It is not known from W Lapland and the northernmost part. An old record (KLEFBECK & SJÖBERG, 1960) from Ds has not been possible to confirm.

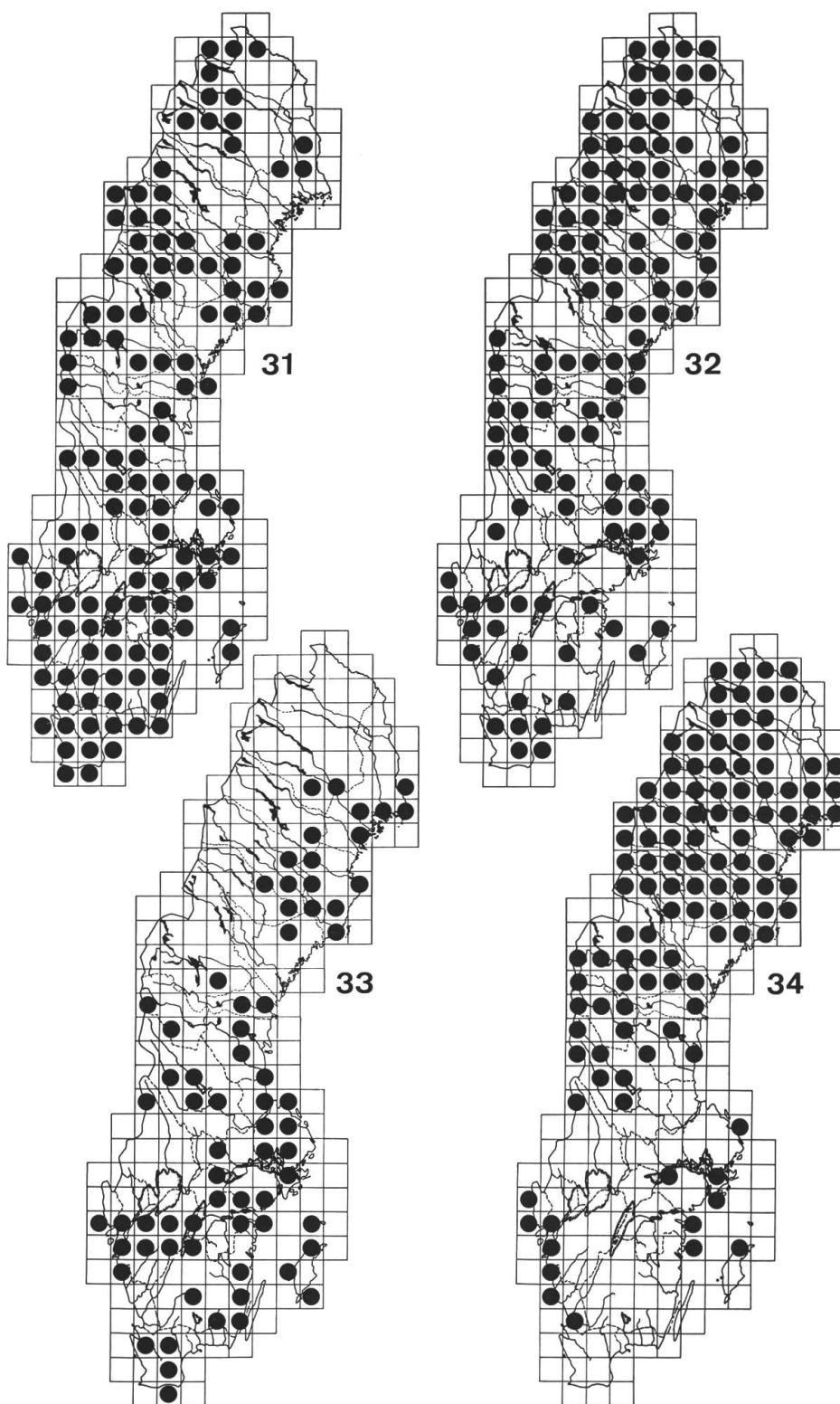


Fig. 11: Distribution in Sweden: 31, *Hydroporus memnonius* Nicolai. 32, *H. morio* Aubé.  
33, *H. neglectus* Schaum. 34, *H. nigellus* Mannerheim.

Found in different sorts of small waters rich in mosses or debris, most often in forest. Frequently abundant in deciduous fens among dead leaves.

34. **Hydroporus nigellus** Mannerheim, 1853 Fig.11:34.

Previously known as *H. tartaricus* LeConte (NILSSON, 1983c). It has a continuous distribution in N Sweden south to northernmost Vr (PALM & LINDROTH, 1937). In S Sweden it is known from the west-coast and parts of the east-coast. The record from Öl given by WIRÉN (1969) has not been possible to confirm and is here considered erroneous. A single specimen is known from Go (Ava, leg. T. Palm). Also old records from Sk and Nä (KLEFBECK & SJÖBERG, 1960) have not been possible to confirm. The n. sp. from To: Abisko listed by ENGELHARDT (1957) is actually *H. nigellus* (in the National Collection, Munich).

In N Sweden found in most kinds of small, stagnant waters, frequently also above the tree-limit. Records from S Sweden are almost exclusively from coastal rock-pools.

35. **Hydroporus nigrita** (Fabricius, 1792) Fig. 12:35.

Distributed all over the country.

Known from all sorts of small waters, also above the tree-limit. A certain preference for a minerogenic substrate is noted, and the species is often very abundant in roadside ditches.

36. **Hydroporus notabilis** LeConte, 1850 Fig. 12:36.

A northern boreal and arctic species in Sweden found south to Dr: Lima (leg. A. Olsson, 1928). In N Sweden it has been most frequently collected in the western mountain range, and is of very local occurrence in the coastal region. We have accepted the identity of *H. notabilis* LeConte and *H. arcticus* Thomson suggested by ANGUS (1985). However, the suggested splitting of this species into three subspecies needs validation from more detailed studies prior to acceptance.

Found mainly in various ponds and pools above the tree limit. At lower altitudes found chiefly in river-lagoons but also in lakes and gravel-pit ponds.

37. **Hydroporus notatus** Sturm, 1835 Fig. 12:37.

In Sweden with a markedly disjunct distribution. Though of a very local occurrence, it is widespread N to Up: Båtfors (leg. R. Baranowski, 1973). The old records from Nä and Hs (WÅNGDAHL, 1880) have not

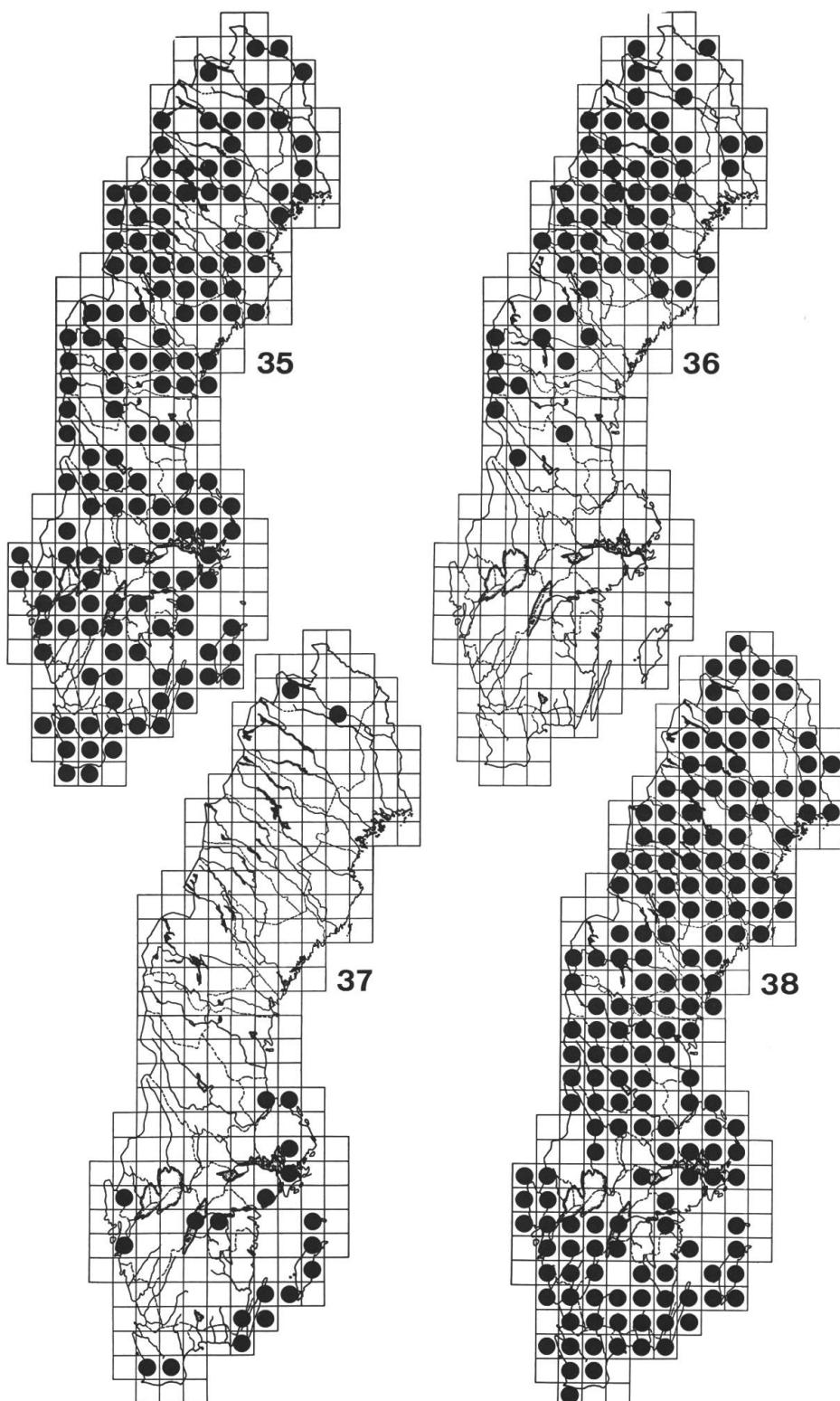


Fig. 12: Distribution in Sweden: 35, *Hydroporus nigrita* (Fabricius). 36, *H. notabilis* LeConte. 37, *H. notatus* Sturm. 38, *H. obscurus* Sturm.

been possible to confirm, as the record from Bl given by KLEFBECK & SJÖBERG (1960). There are also three isolated records from northernmost Lapland (Vittangi, leg. T. Palm, 1963 & Abisko: ENGELHARDT, 1957 and leg. E. Wirén, 1968).

A rare species that mainly inhabits open ponds and pools with a rich vegetation, most often including brown-mosses. Found also in forest-fens.

38. **Hydroporus obscurus** Sturm, 1835

Fig. 12:38.

Frequently collected all over the country.

Occurs in a wide variety of stagnant waters. Often among *Sphagnum* in different bog habitats, but also along naked shores of oligotrophic lakes.

39. **Hydroporus obsoletus** Aubé, 1838

Fig. 13:39.

In Sweden restricted to the SW coast and Go. It is known from several localities in Sk, in Ha from Lindberg (leg. G. Gillerfors, 1981) and the two localities given by HUGGERT (1974), and in Bo from St. Askerön (leg. B. Andrén, 1987). The records from Go and adjacent islands were reviewed by NILSSON (1984a).

The main habitats are seemingly springs and springfed streams. Found also in other small running or seeping waters and in a barren pond in an abandoned gravel-pit.

40. **Hydroporus palustris** (Linnaeus, 1761)

Fig. 13:40.

Frequently collected all over the country.

Known from all sorts of stagnant and running waters, also above the tree-limit. In N Sweden a certain preference for lakes and larger running waters has been noted.

41. **Hydroporus picicornis** J. Sahlberg, 1875

Fig. 13:41.

In Sweden found in Lapland, Nb, Vb and northernmost Jä. Some records were given by NILSSON (1983d), and the southernmost ones are from Ly, 5 km S of Knaften (leg. A. Nilsson, 1981) and Vb: Strycksele (leg. O. Söderström, 1986). An old record from Jä (GRILL, 1896) is validated from a specimen in NMNH, and from a specimen collected at Frostviken in 1932 (coll. A. Jansson).

Occurs in seepage-fed moss-carpets on mires or at mire-margins. The water is very cold and the beetles are found creeping in the moss.

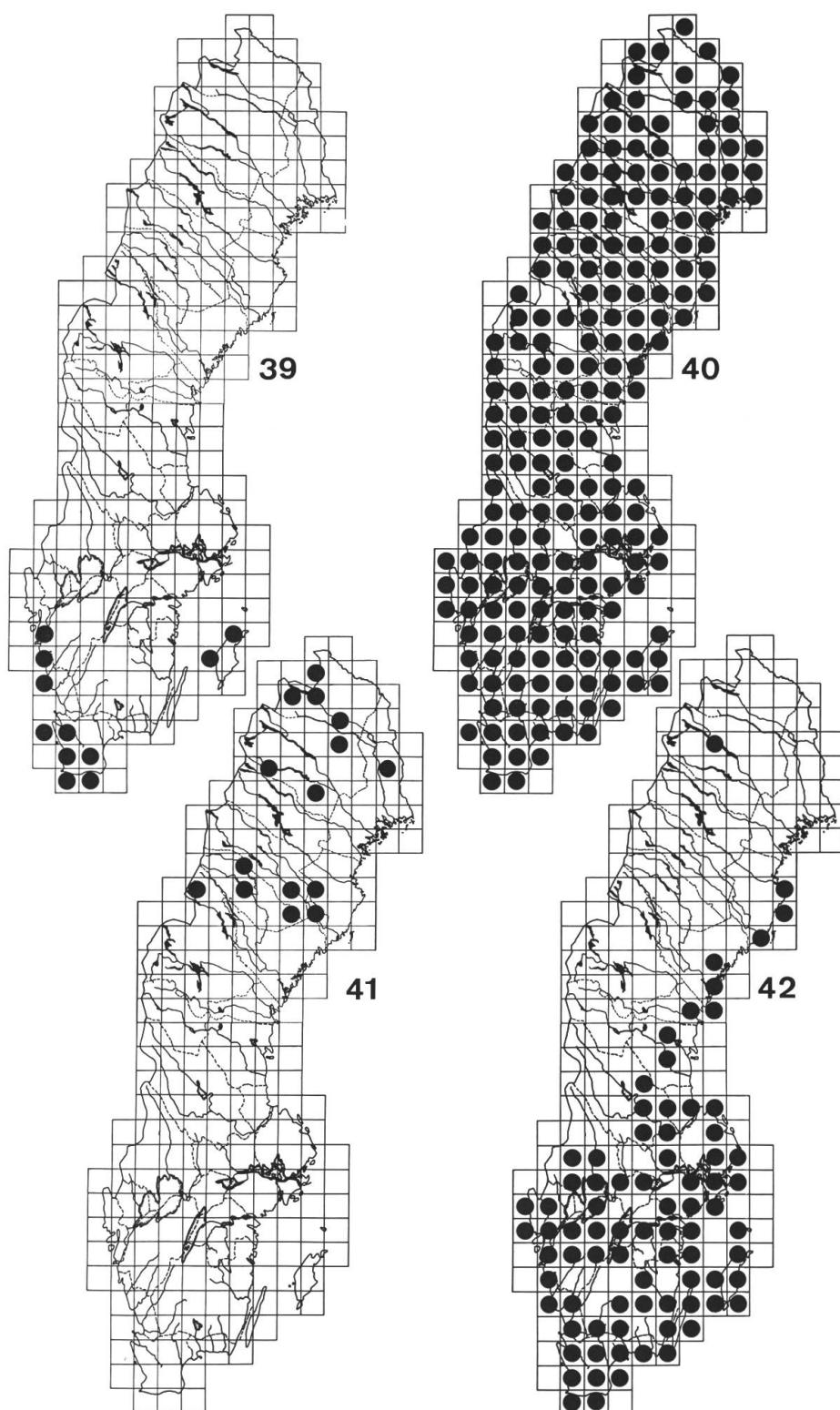


Fig. 13: Distribution in Sweden: 39, *Hydroporus obsoletus* Aubé. 40, *H. palustris* (Linnaeus). 41, *H. picicornis* J. Sahlberg. 42, *H. planus* (Fabricius).

42. *Hydroporus planus* (Fabricius, 1781) Fig. 13:42.

Very common in S Sweden and reaches Vb along the east-coast (northernmost record Bjuröklubb, leg. A. Nilsson, 1985). Outside this range a single record is known from Lu: Saltoluokta (leg. T.-E. Leiler, 1962).

In S Sweden found in various, smaller waterbodies, often with a silty or clayish bottom. Northern Swedish records are from abandoned gravel-pits or rock-pools.

43. *Hydroporus puberulus* LeConte, 1850 Fig. 14:43.

Upon the recognition of the identity with this nearctic species, *H. levanderi* J. Sahlberg is reduced to a junior synonym (ROUGHLEY & NILSSON, in manuscript). In Sweden confined to the N half, and the southernmost record is from Hs, 20 km N of Ljusdal (NILSSON, 1982a). It is a northern boreal species that so far has not been collected in the western mountain range. The somewhat isolated northernmost record is from To: Lainiovuoma (leg. A. Carlsson, 1980).

Occurs in various seasonal ponds and pools in forest. Found also in small hollows in birch- and alder-marshes.

44. *Hydroporus pubescens* (Gyllenhal, 1808) Fig. 14:44.

Though more patchy, the distribution of this species is similar to that of *H. planus*. The northernmost record along the east-coast is from Ån: Köpmanholmen (leg. A. Nilsson, 1977). Isolated NW records are known from Jä: Arådalen (leg. J. R. Bergvall, 1972) and To: Abisko (leg. R. Danielsson, 1973).

Occurs chiefly in open, temporary pools. Very common on the alvar grounds of the Baltic Islands. Confined to rock-pools in coastal Me and Ån.

45. *Hydroporus rufifrons* (Müller, 1776) Fig. 14:45.

Distributed all over the country. It seems to have a more local occurrence in the SW parts. An old record (KLEFBECK & SJÖBERG, 1960) from Ds was not possible to confirm.

Preferred habitats include temporary and seasonal ponds of various kinds, mainly densely vegetated or with decaying leaves. Frequently collected along the flooded shores of lakes and rivers.

46. *Hydroporus scalesianus* Stephens, 1828 Fig. 14:46.

The patchy distribution of this species is most probably due to

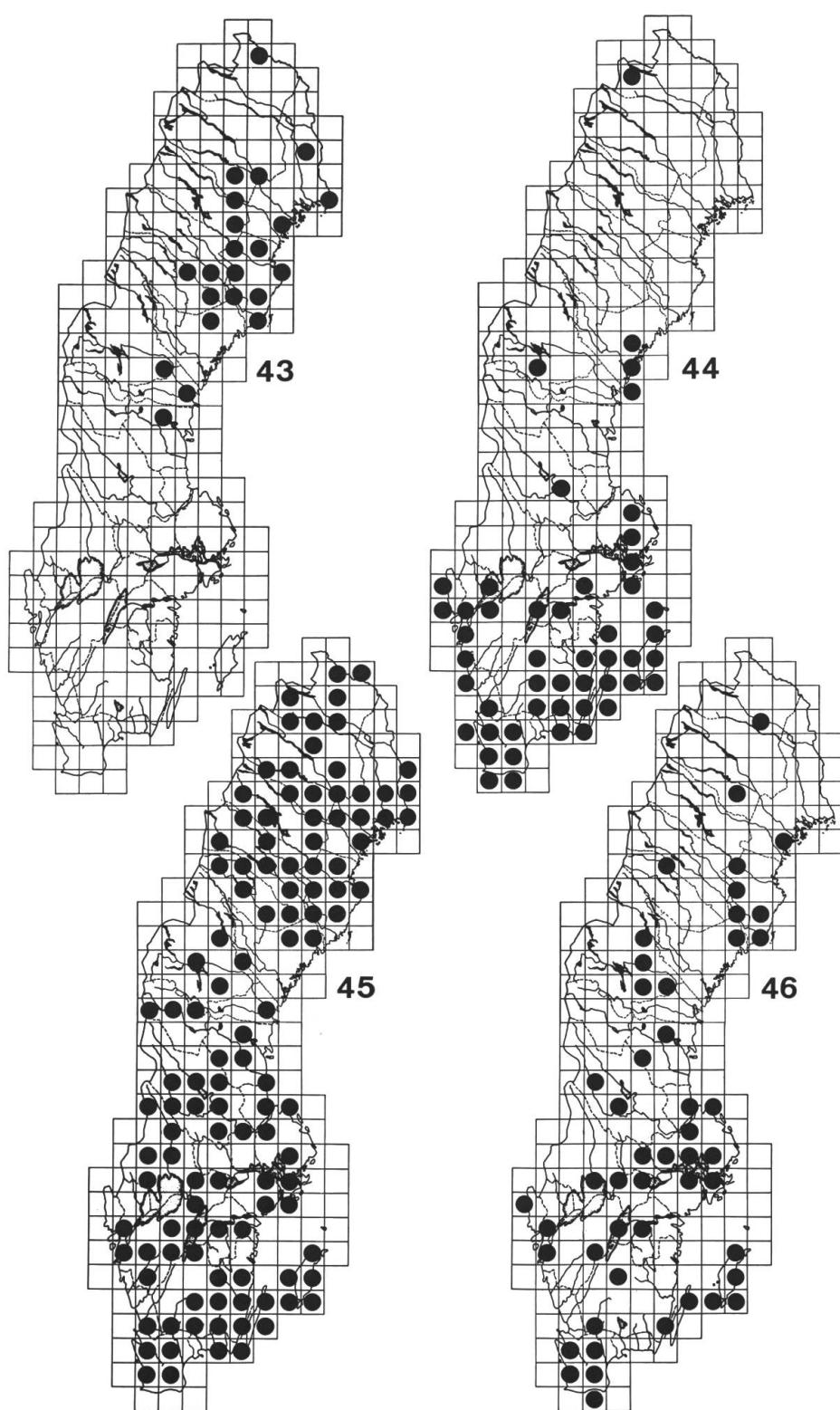


Fig. 14: Distribution in Sweden: 43, *Hydroporus puberulus* LeConte. 44, *H. pubescens* (Gyllenhal). 45, *H. rufifrons* (Müller). 46, *H. scalesianus* Stephens.

oversight. In spite of this it is probably absent from westernmost Lapland. The northernmost record is from To: Svappavaara (leg. L. Hugert).

The main habitat is the outer margins of quagmires surrounding small dystrophic lakes. Found also in aquatic mosses in ponds and at fen margins.

47. **Hydroporus striola** (Gyllenhal, 1826) Fig. 15:47.

Frequently collected all over the country.

It occurs in a wide variety of mainly smaller, stagnant waters.

48. **Hydroporus submuticus** Thomson, 1874 Fig. 15:48.

A northern boreal species known from about ten localities in Sweden. The southernmost records are those from Hs: Los (SJÖBERG, 1962) and Vr (without exact locality, leg. P. Wahlberg, in coll. Thomson, UML).

The main habitat of this species is small, seasonally flooded pools surrounding small forest streams. Found also in forest-ditches and river-lagoons connected with small streams.

49. **Hydroporus tristis** (Paykull, 1798) Fig. 15:49.

Frequently collected all over the country.

It occurs in a wide variety of mainly smaller, stagnant waters. Often very abundant in *Sphagnum* bogs.

50. **Hydroporus umbrosus** (Gyllenhal, 1808) Fig. 15:50.

Frequently collected all over the country.

It is known from all sorts of stagnant waters. Often found in high numbers in lakes and ponds with densely vegetated margins.

51. **Porhydrus lineatus** (Fabricius, 1775) Fig. 16:51.

Very common in S Sweden, and the northernmost record is from Vb: Hjuken (leg. A. Nilsson, 1979). PAYKULL (1798) listed it also from Lapland, but this record has not been possible to confirm.

In S Sweden known from various sorts of stagnant waters, including lakes and ponds with at least some vegetation. To the north it is restricted to lake-shores with sparse vegetation.

52. **Graptodytes bilineatus** (Sturm, 1835) Fig. 16:52.

In Sweden with a markedly disjunct distribution. The main range

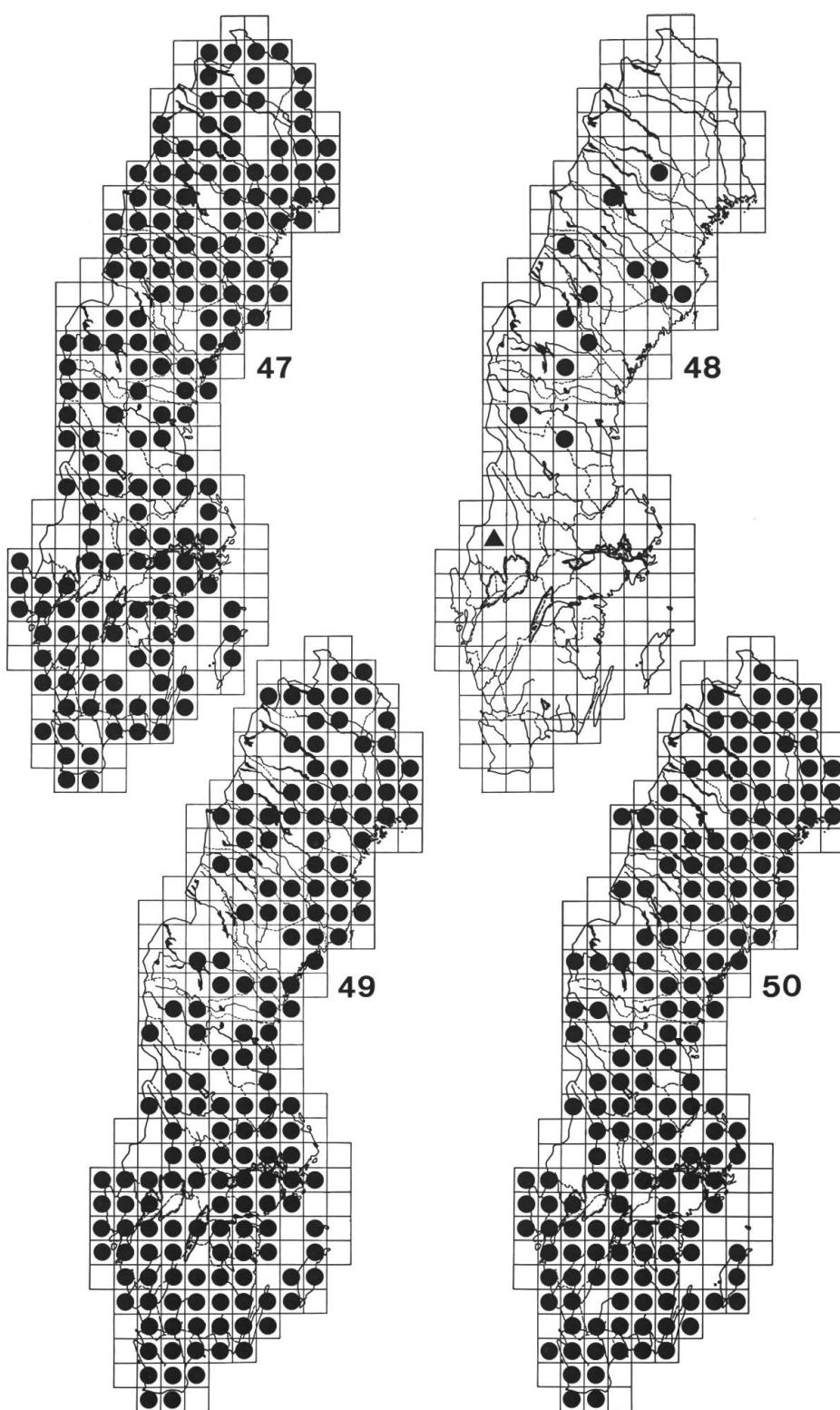


Fig. 15: Distribution in Sweden: 47, *Hydroporus striola* (Gyllenhal). 48, *H. submuticus* Thomson. 49, *H. tristis* (Paykull). 50, *H. umbrosus* (Gyllenhal).

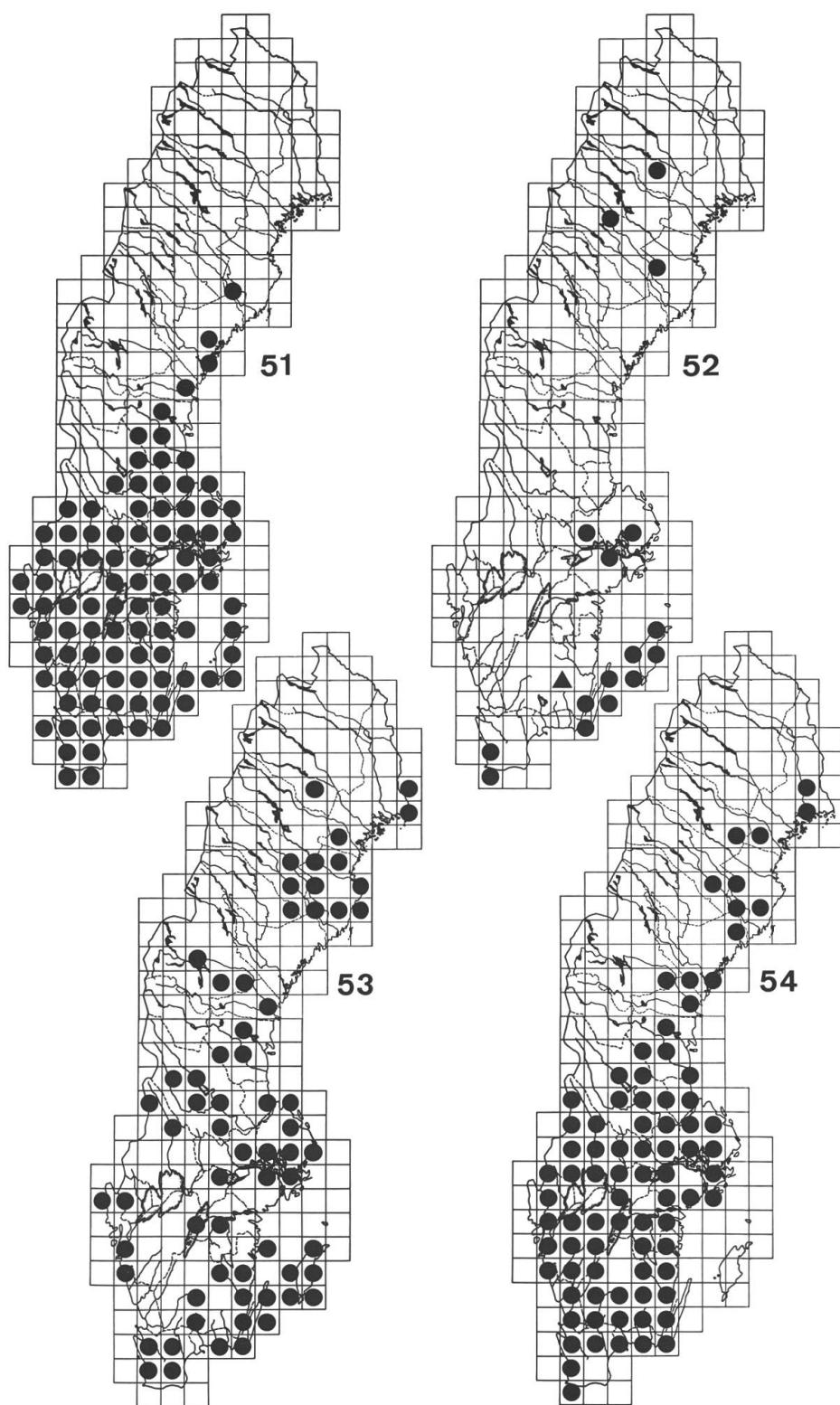


Fig. 16: Distribution in Sweden: 51, *Porhydrus lineatus* (Fabricius). 52, *Graptodytes bilineatus* (Sturm). 53, *G. granularis* (Linnaeus). 54, *G. pictus* (Fabricius).

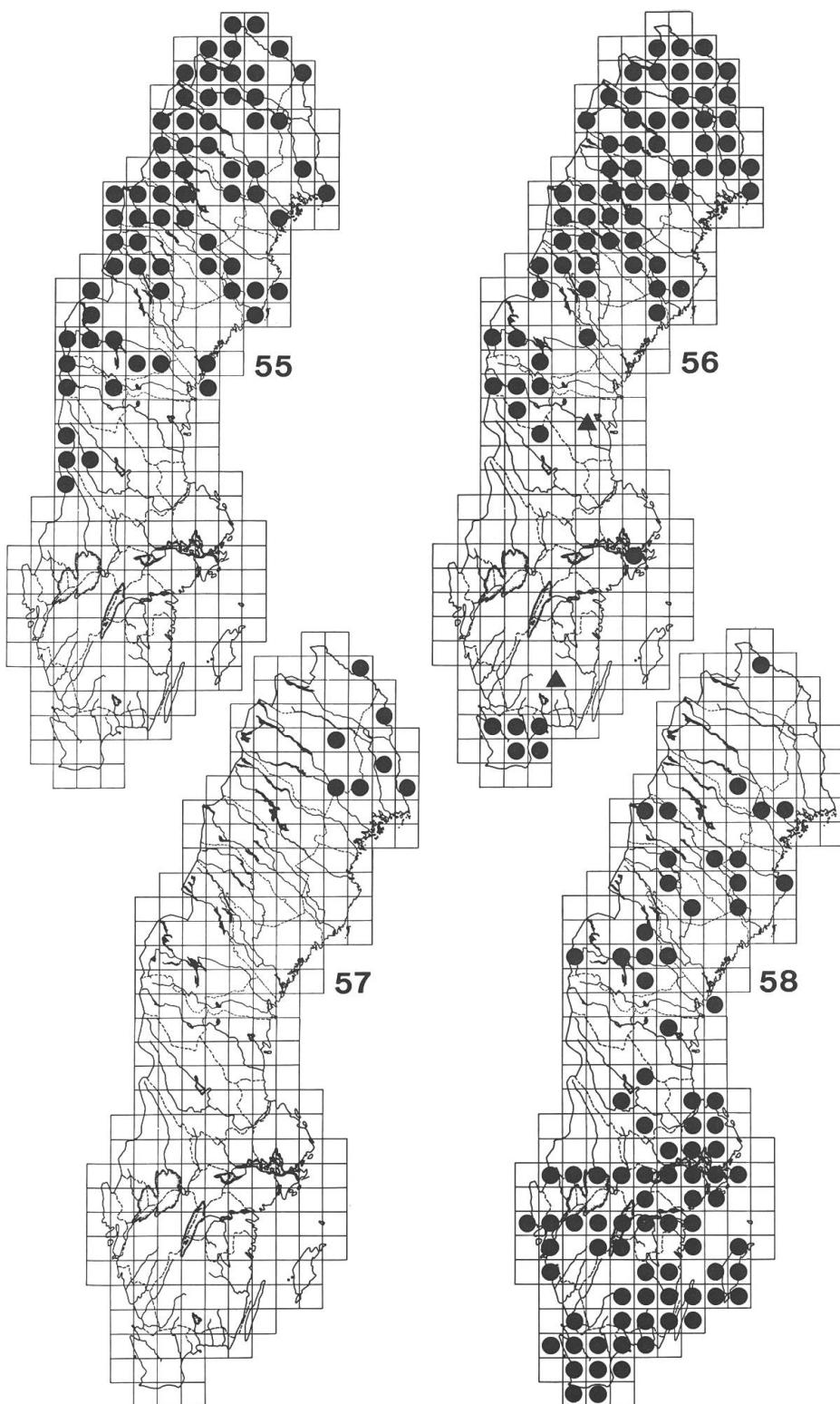


Fig. 17: Distribution in Sweden: 55, *Oreodytes alpinus* (Paykull). 56, *O. sanmarkii* (C.R. Sahlberg). 57, *O. septentrionalis* (Gyllenhal). 58, *Suphrodytes dorsalis* (Fabricius).

includes Sk and the Baltic Islands Öl and Go in the southeast. All records from the Lake Mälaren valley are older, and we know of no record from this region after 1915. The three northern isolated records were given in detail by NILSSON (1986b). The record from Nä given by WÅNGDAHL (1880) has not been possible to confirm.

Often very abundant in shallow, temporary pools on the alvar grounds of the Baltic Islands. In N Sweden confined to small clayish pools on seasonally flooded river-meadows.

53. *Graptodytes granularis* (Linnaeus, 1767)

Fig. 16:53.

Though of rather local occurrence, this species is widespread in Sweden. It is not known from W Lapland and N Nb. The northernmost record is from Lu: Purkijaure (leg. Brinck et al., 1960), just N of the Arctic Circle.

The main habitat is shallow ponds with dense marginal vegetation growing on silt or clay. In N Sweden often found in river-lagoons.

54. *Graptodytes pictus* (Fabricius, 1787)

Fig. 16:54.

This widespread species is in N Sweden confined to the E half, and the northernmost record is from Nb: Överkalix (leg. S. Lundberg). It is not known from Go.

Typically a lake species with a certain preference for more sparsely vegetated shores. It is frequently collected in larger streams, and in N Sweden it is confined to slowrunning parts of larger rivers.

55. *Oreodytes alpinus* (Paykull, 1798)

Fig. 17:55.

Widespread in N Sweden, where it has been most frequently collected along the western mountain range. Known also from several coastal sites, where it has been collected in the Gulf of Bothnia (NILSSON, 1982b). The southernmost record is from Vr: Vingäng (PALM & LINDROTH, 1937).

The main habitats are oligotrophic lakes and rivers, where it occurs on sandy or gravelly bottoms without vegetation. In the sea it is confined to exposed, morainic shores.

56. *Oreodytes sanmarkii* (C. R. Sahlberg, 1826)

Fig. 17:56.

In Sweden with a markedly disjunct distribution. It is widespread in the N half south to Hs (in coll. UML, without a more detailed locality label). In the south it is known from several localities in W Sk. In coll. MNHG there is a single specimen labelled "Sm", and an old record

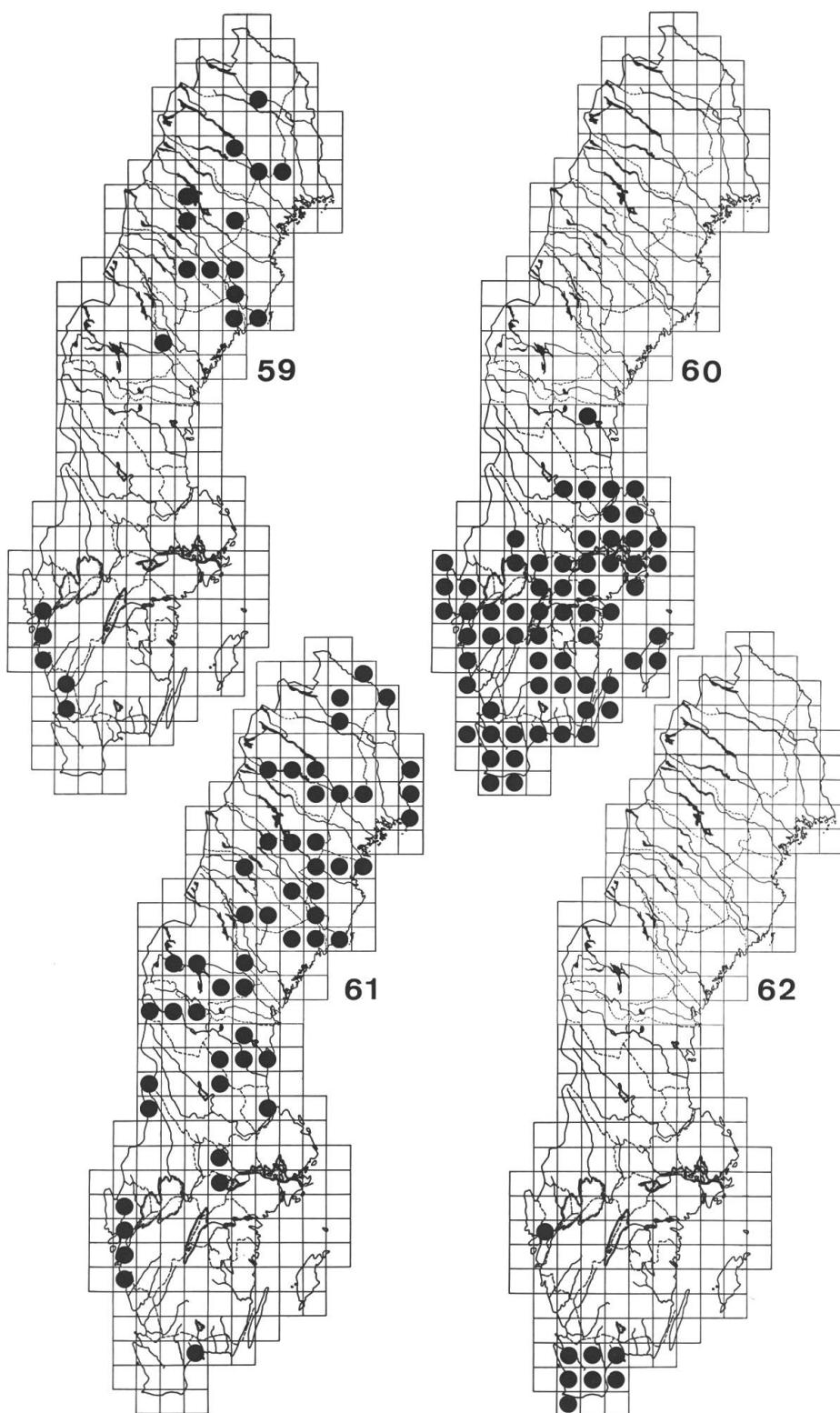


Fig. 18: Distribution in Sweden: 59, *Deronectes latus* (Stephens). 60, *Scarodytes halensis* (Fabricius). 61, *Potamonectes assimilis* (Paykull). 62, *P. canaliculatus* (Lacordaire).

(KLEFBECK & SJÖBERG, 1960) from Öl has been considered erroneous. In coll. NMNH there is a specimen labelled "Sthlm, Winbl."

This species is mainly confined to larger streams and rivers where it occurs on hard bottoms among sand and gravel. Especially in W Lapland, it occurs also along exposed lake shores.

57. *Oreodytes septentrionalis* (Gyllenhal, 1826) Fig. 17:57.

Known only from a few localities in northernmost Sweden. Besides the localities given by NILSSON (1983a) it is known from the Muonio river, near Karesuando in To (leg. Askander & Ulfstrand, 1961, in coll. UML), and in Nb near Kihlanki (leg. E. Engblom & P.-E. Lingdell, 1985). The southernmost records are from the Råneälven river, where it occurs from Klingersel and upwards (leg. A. Nilsson, 1986). Very abundant in the Torneälven river upstream Övertorneå (leg. A. Nilsson, 1987).

A running water species confined to hard bottoms in larger streams and rivers. Often most abundant in small sandy or gravelly pools adjacent to the running water.

58. *Suphrodytes dorsalis* (Fabricius, 1787) Fig. 17:58.

Distributed over most of Sweden, though of a more local occurrence to the north. The distribution of the northern *figuratus*-form was given by NILSSON (1983d).

Found in a wide variety of stagnant waters, most often with a dense vegetation. The N Swedish records are mainly from seasonal or semipermanent ponds.

59. *Deronectes latus* (Stephens, 1829) Fig. 18:59.

With a markedly disjunct distribution in Sweden. It has been collected at several localities along the west-coast from S Ha (Ränneslöv, leg. Mortensen, in coll. MNHG) to Bo: Resteröd (leg. B. Andrén, 1982). In the north it is known from several localities (NILSSON, 1983d), even north of the Arctic Circle. The northernmost record is from To: Siikajoki (leg. E. Engblom & P.-E. Lingdell, 1983).

This species is confined to larger streams and rivers, where it occurs among stones and gravel adjacent to rapids.

60. *Scarodytes halensis* (Fabricius, 1787) Fig. 18:60.

Widespread in S Sweden. The northernmost recent record is from

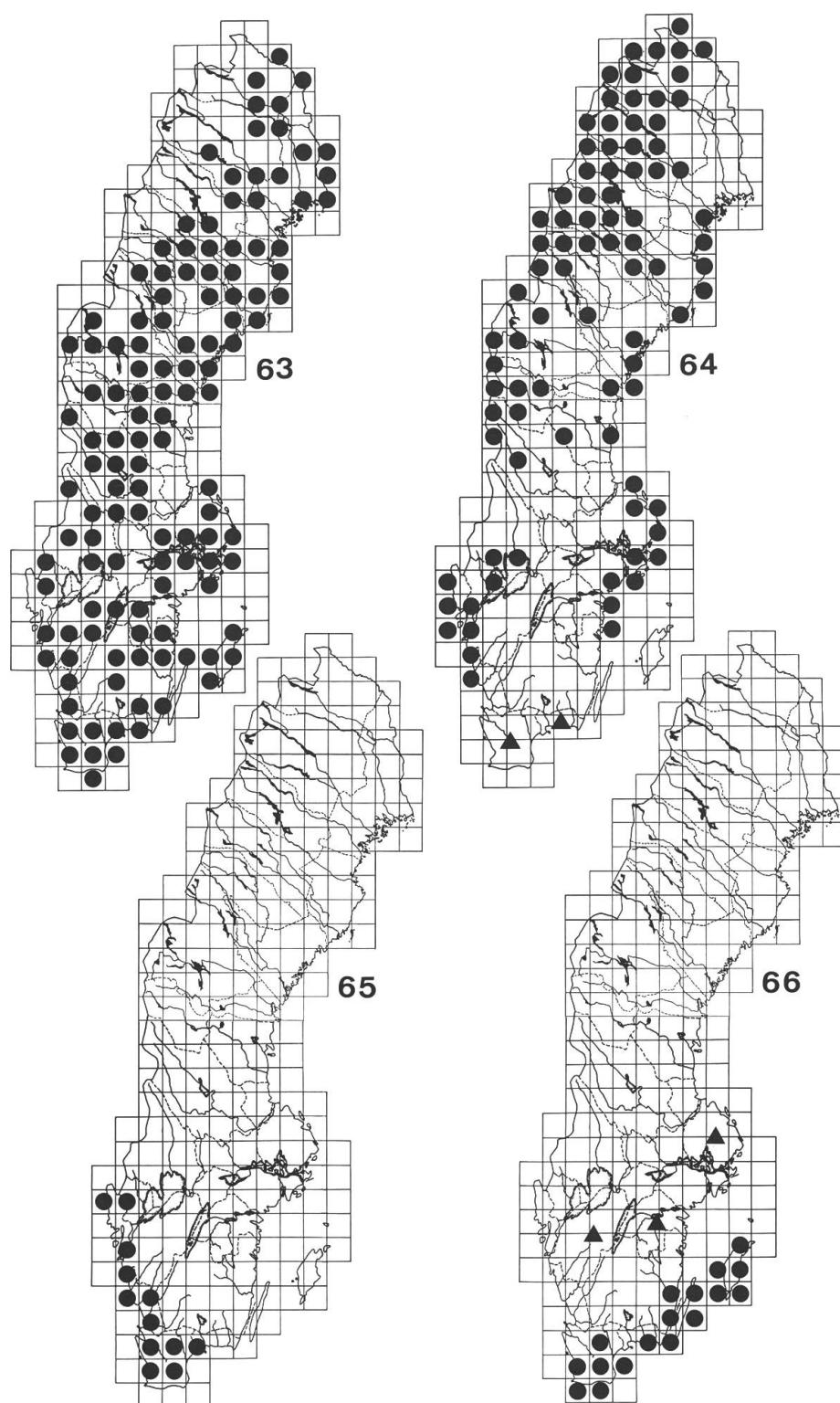


Fig. 19: Distribution in Sweden: 63, *Potamoneutes depressus* (Fabricius). 64, *P. griseostriatus* (DeGeer). 65, *Stictotarsus duodecimpustulatus* (Fabricius). 66, *Copelatus haemorrhoidalis* (Fabricius).

Gä: Ovansjö (leg. B. Ericson, 1972). Before 1900 it was collected at Hs: Delsbo by Rudolphi (in coll. MNHG).

It occurs chiefly in ponds and ditches with silt- or clay-bottoms.

61. *Potamonectes assimilis* (Paykull, 1798)

Fig. 18:61.

Widespread in N Sweden, though not known from the western mountain range. In the south it is known only from few localities, and the southernmost record is from Sk: Villands Vånga (leg. P. Cederström, 1974). In coll. MNHG there are also some specimens labelled "Skåne, Thomson". This is somewhat confusing as they never were mentioned in his writings.

It occurs in lakes and rivers on sandy bottoms with little vegetation. In S Sweden confined to oligotrophic lakes.

62. *Potamonectes canaliculatus* (Lacordaire, 1835)

Fig. 18:62

First collected in Sweden in 1963 (Sk: Hasslarp, leg. F. Olsson). Since then it has been collected at several other localities in this province. Recently it was also found in Bo: Hjärtum (leg. B. Andrén, 1984).

It inhabits silty or sandy ponds of recent origin and almost without vegetation, e.g. abandoned gravel-pit ponds.

63. *Potamonectes depressus* (Fabricius, 1775)

Fig. 19:63.

Widespread in Sweden, seemingly absent only from westernmost Lapland. The northernmost record is from To: Karesuando (leg. Askaner & Ulfstrand, 1961, in coll. UML). An old record (KLEFBECK & SJÖBERG, 1960) from Nä has not been possible to confirm.

It occurs in lakes and larger running waters, most often on hard bottoms with little or no vegetation. Frequently collected also in brackish water on relatively exposed morainic shores.

64. *Potamonectes griseostriatus* (DeGeer, 1774)

Fig. 19:64.

In Sweden with a seemingly disjunct distribution. It is widespread in the N part, and here common in the W mountains and along the Bothnian coast. Between these regions it has a very local occurrence. Most probably the distribution along the east-coast is continuous south to Sm (Västervik, Ekö, leg. S. Persson, 1985). Outside this range it is found along the west-coast and along the shores of the Lake Vänern. It might well be that this disjunction is an artefact due to inadequate collecting in intermediate areas. Old records that have not been possible to locate are

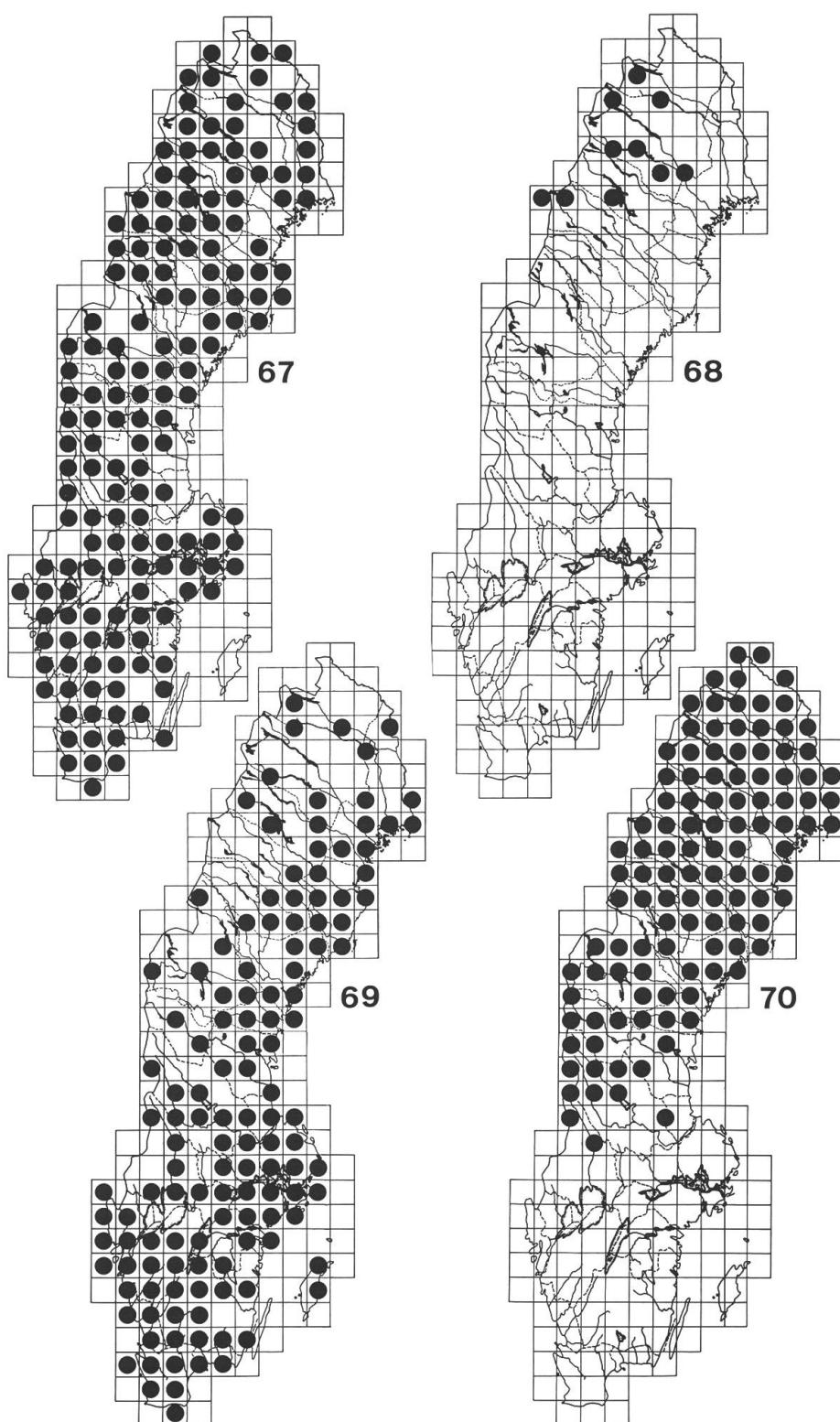


Fig. 20: Distribution in Sweden: 67, *Platambus maculatus* (Linnaeus). 68, *Agabus adpresus* Aubé. 69. *A. affinis* (Paykull). 70, *A. arcticus* (Paykull).

known from Sk (leg. Thomson, in coll. MNHG) and Bl (in coll. Hoffstein, NMNH). The splitting up of this species into subspecies or even species (BRINCK, 1943) is probably not motivated, but should be studied more in detail.

In NW Sweden it inhabits various temporary pools and shallow lakes with little vegetation. At lower altitudes it occurs in river-lagoons and in various ponds of recent origin. In S Sweden and along the east-coast it is confined to rock-pools.

65. *Stictotarsus duodecimpustulatus* (Fabricius, 1792) Fig. 19:65.

In Sweden restricted to the coastal areas of Sk and the SW provinces. Further, PAYKULL (1798) mentioned a record from Bl, though this has not been possible to confirm. Several older records are known from Sk, and it was here recently collected at Degeberga (leg. A. Törnvall, 1976). There are also several recent records from N Ha and the northernmost record is from Bo: Naverstad (coll. MNHG).

It is confined to larger streams, where it occurs among submerged plants in more slow-running parts.

**Colymbetinae** Erichson

66. *Copelatus haemorrhoidalis* (Fabricius, 1787) Fig. 19:66.

In Sweden with a markedly southeastern distribution, and most common in Sk and on the Baltic Islands. Before 1900 it was collected also in Ög (leg. Thomson, in coll. UML), Up and Vg (both in coll. Hoffstein, NMNH). It was also noted by GYLLENHAL (1808) from Vs, though this record has not been possible to locate.

It occurs in open fens with dense vegetation. Frequently collected at the margins of *Cladium*-fens on Go.

67. *Platambus maculatus* (Linnaeus, 1758) Fig. 20:67.

Distributed all over the Swedish mainland. It has not been recorded from Go or Öl.

This species occurs on hard bottoms in lakes and various running waters. Found also in brackish water at relatively exposed sea-shores along the Gulf of Bothnia.

68. *Agabus adpressus* Aubé, 1837 Fig. 20:68.

In Sweden restricted to Lapland, where the southernmost record is

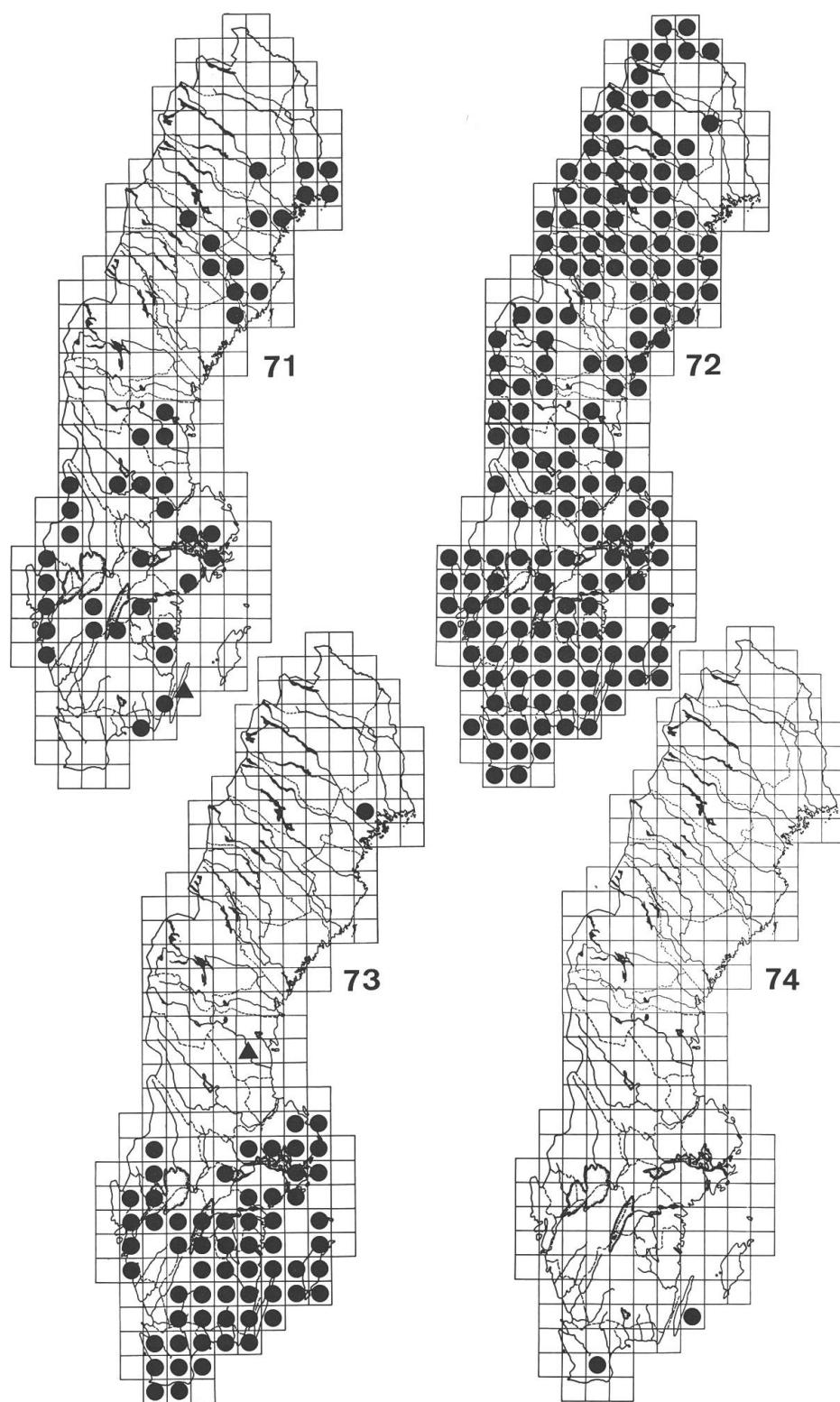


Fig. 21: Distribution in Sweden: 71, *Agabus biguttulus* (Thomson). 72, *A. bipustulatus* (Linnaeus). 73, *A. chalconatus* (Panzer). 74, *A. clypealis* (Thomson).

from Ly: Umfors (FRIDÉN, 1956). An old record from Dr (GRILL, 1896) was shown to be erroneous by KLEFBECK (1957). The record from Pi: Arjeplog was given by THOMSON (1874) as *Gaurodytes angusticollis*. It might here be noted that Thomson in this paper used the name *G. haefneri* for males of *A. opacus* Aubé, and not for *A. adpressus* as stated by FALKENSTRÖM (1929).

This species is confined to exposed lake shores and various running waters. It is usually found among stones and gravel, but also in pools of small streams.

69. **Agabus affinis** (Paykull, 1798)

Fig. 20:69.

Distributed all over the country, though seemingly rare in W Lapland.

It occurs in various waters, most often together with *Sphagnum* moss. Frequently collected on bogs, but also common in small forest-fens.

70. **Agabus arcticus** (Paykull, 1798)

Fig. 20:70.

Very common all over N Sweden. The southernmost record is from Vr: N. Ny (leg. B. Andrén, 1967).

It prefers permanent waters such as lakes and larger running waters. Very common in the more slow-running parts of the large rivers. Frequently collected in shallow lakes above the tree-limit.

71. **Agabus biguttulus** (Thomson, 1867)

Fig. 21:71.

Though widespread, this species is seemingly rare in Sweden. It has never been collected in the southernmost province, Sk, or on the island Go. It is not known from W Lapland. The distributional gap along a part of the east-coast is probably an artefact due to inadequate collecting. The record from Öl (in coll. NMNH) has not been possible to locate.

The main habitat is the seasonally flooded grassy shores of rivers and larger streams. Found also in grassy forest-fens.

72. **Agabus bipustulatus** (Linnaeus, 1767)

Fig. 21:72.

As noted earlier (NILSSON, 1983a) distribution together with the presence of intermediate specimens indicate that *A. bipustulatus* and *A. solieri* Aubé actually are conspecific. As in northern Sweden below the tree-limit both forms are widely distributed their geographical overlap is large. As also the morphological variation is somewhat clinal we

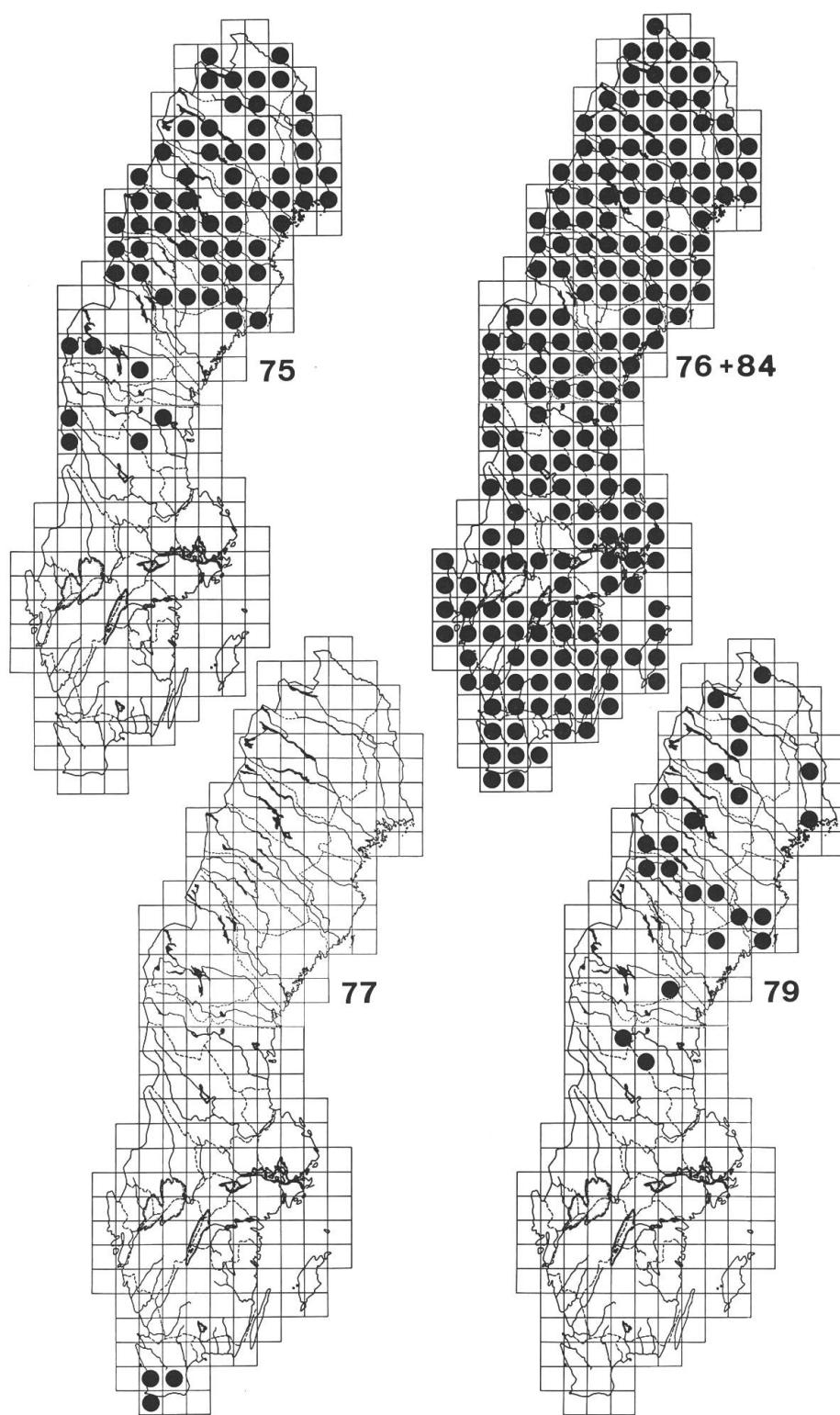


Fig. 22: Distribution in Sweden: 75, *Agabus confinis* (Gyllenhal). 76 + 84, *A. congener* (Thunberg) and *A. lapponicus* (Thomson) combined. 77, *A. conspersus* (Marsham). 79, *A. elongatus* (Gyllenhal).

have decided not to recognize *A. solieri* as a distinct subspecies. Actually, many of the specimens studied from northern Sweden were not possible to identify as *A. solieri* or *A. bipustulatus* (s.str.) based on current knowledge. In its wider sense, this species is distributed all over Sweden. It has been most frequently collected in the south and north-western parts of Sweden.

In S Sweden known from all sorts of waters. Above the tree-limit the main habitat is shallow lakes with stony or silty bottoms. In the boreal region it prefers small running waters, but is also found in springs and ponds with little vegetation.

73. *Agabus chalconatus* (Panzer, 1796)

Fig. 21:73.

Frequently collected all over S Sweden. It has a more or less continuous distribution north to Hs (without more exact locality label, leg. Ströhm, in coll. MNHG). Outside this range there is a single record from the northernmost coast (Nb: Sundom, leg. S. Ringselle, 1969). An old record (RINGSSELLE, 1913) from Dr is considered erroneous, and the record from To: Abisko given by ENGELHARDT (1957) is based on a misidentified specimen of *A. erichsoni* (in the National Collection, Munich). The records from Lapland given by ZETTERSTEDT (1840) are considered erroneous as there are only specimens of four other species placed under this name in his collection (UML).

This species occurs chiefly in open, more or less temporary pools with at least some vegetation. Single adults are often found in more permanent waters.

74. *Agabus clypealis* (Thomson, 1867)

Fig. 21:74.

FALKENSTRÖM (1940) reviewed critically the Swedish records of this species and concluded that it was only known with certainty from the original locality by the Lake Ringsjön in Sk. Recently HOLMEN (1980) published a record from Öl: N. Möckleby.

The habitat is poorly known, but is seemingly open, seasonally flooded margins of small streams and ditches (HOLMEN, 1980).

75. *Agabus confinis* (Gyllenhal, 1808)

Fig. 22:75.

Widespread in N Sweden, though of a seemingly more local occurrence to the south. The southernmost record is from Hs: Los (SJÖBERG, 1962). An old record (KLEFBECK & SJÖBERG, 1960) from Hr has not been possible to confirm. In coll. MNHG there is a single mislabelled specimen from Vg: Hindås (leg. Östrand).

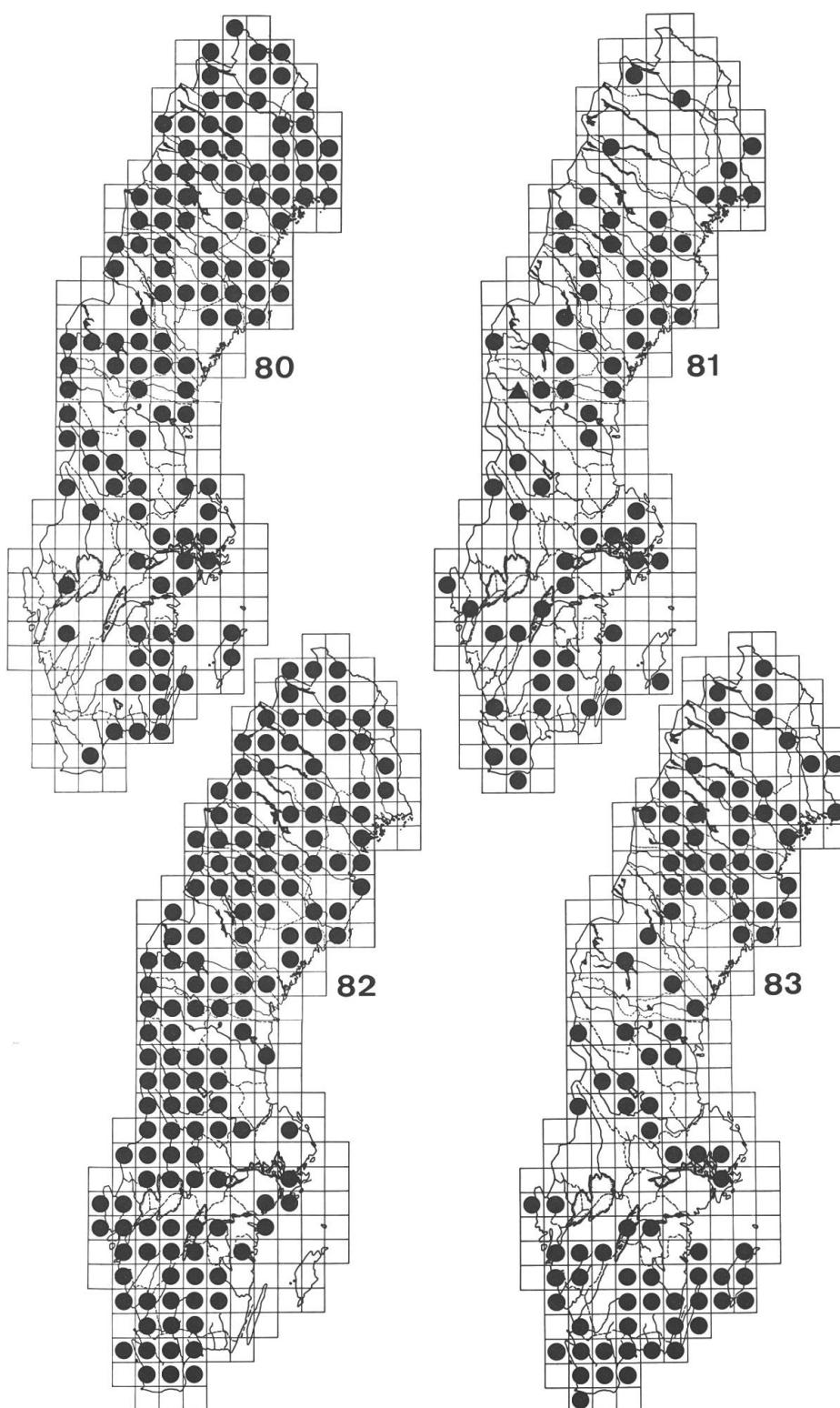


Fig. 23: Distribution in Sweden: 80, *Agabus erichsoni* Gemminger & Harold. 81, *A. fuscipennis* (Paykull). 82, *A. guttatus* (Paykull). 83, *A. labiatus* (Brahm).

It occurs in open, temporary pools and ditches with relatively dense vegetation. Most often at the seasonally flooded margins of small streams.

76. **Agabus congener** (Thunberg, 1794) Fig. 22:76 + 84.

As from the beginning of this study, this species was not separated from *A. lapponicus* (Thomson) records of both species are given collectively on the same map. Further, as single specimens are often impossible to identify to species many records should have been omitted if they were treated individually. Some records of both species were given by NILSSON (1987), and together this species-pair is distributed all over Sweden.

In N Sweden *A. congener* and/or *A. lapponicus* are known from all sorts of waters, also above the tree-limit. The highest abundances are found in seasonal ponds with a relatively rich vegetation of mosses and sedges. In S Sweden *A. congener* occurs in various fens and bogs, often in forest.

77. **Agabus conspersus** (Marsham, 1802) Fig. 22:77.

In Sweden restricted to SW Sk. Several records were listed by LINDBERG (1948). Recent records include about five coastal sites from Skanör to Landskrona.

It occurs in open ponds, often with brackish water, near the sea-shore (LINDBERG, 1948).

78. **Agabus didymus** (Olivier, 1795)

This species was listed from S Sweden in the older faunas and catalogues (e.g. GRILL, 1896; HELLÉN, 1939). It was omitted in the 1960 Catalogus (KLEFBECK & SJÖBERG, 1960) after that PALM (1955) had concluded that no Swedish specimens existed. However, this species was described from S Sweden by PAYKULL (1798) as *Dytiscus vitreus*, and in his collection (in NMNH) there are three specimens. Since then it has not been collected in Sweden, a fact that makes this species the only dytiscid that must be considered extinct in Sweden. Paykull's record was probably from Sk, though the uncertainty of this has made us leave out a map of this species.

On the continent it occurs in slow-flowing parts of various running waters.

79. **Agabus elongatus** (Gyllenhal, 1826) Fig. 22:79.

A northern species, most frequently collected in Lapland. The indi-

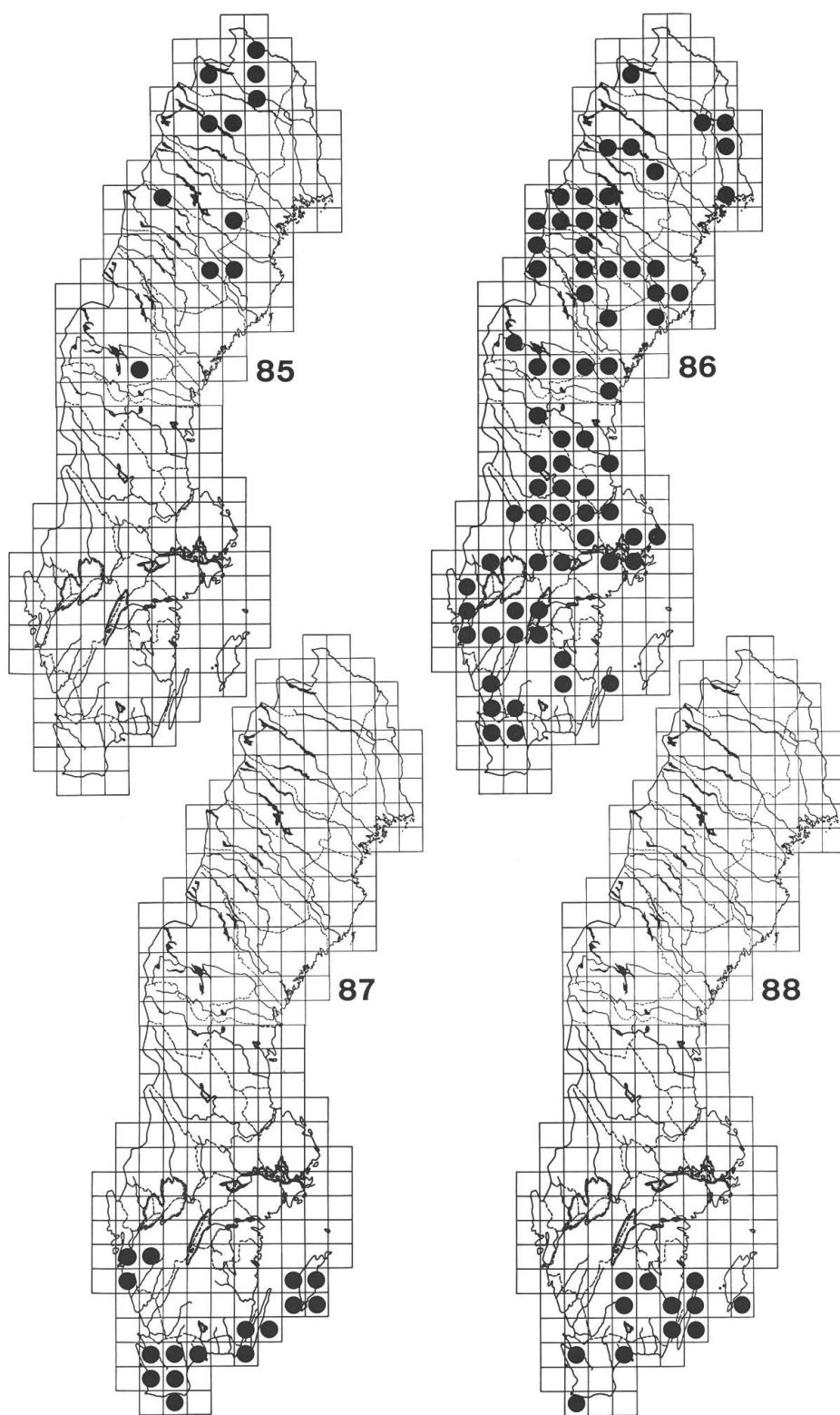


Fig. 24: Distribution in Sweden: 85, *Agabus levanderi* Hellén. 86, *A. melanarius* Aubé. 87, *A. nebulosus* (Forster). 88, *A. neglectus* Erichson.

cated isolation of the central Swedish records is most probably due to inadequate collecting. The southernmost record is from Hs: Los (SJÖBERG, 1962).

It occurs in small, mossy hollows with cold water. Often at mire-margins or under boulders. At higher altitudes also in turf-pools on open mires.

80. *Agabus erichsoni* Gemminger & Harold, 1868 Fig. 23:80.  
[= *nigroaeneus* Erichson, 1837, nec Marsham, 1802].

Though widespread, this species is predominantly northern. It is of quite local occurrence in S Sweden and seemingly rare in the SW part.

It occurs in smaller waterbodies that dry out during summer. To the south more confined to such waters in forest.

81. *Agabus fuscipennis* (Paykull, 1798) Fig. 23:81.

Distributed all over the country, though of a very local occurrence in many parts. The northernmost record is from To: Björkliden (leg. T.-E. Leiler, 1969). The record from Hr (leg. Lundblad, in coll. NMNH) has not been possible to locate.

The main habitats are densely vegetated parts of shallow, more eutrophic lakes and seasonally flooded river-margins. Adults are mainly found during late summer and autumn, in S Sweden also in early summer.

82. *Agabus guttatus* (Paykull, 1798) Fig. 23:82.

Distributed all over the Swedish mainland. It has not been recorded from the Baltic Islands Öl and Go.

The main habitats are springs and various small running waters. Frequently collected under stones in small forest streams and ditches. Found also above the tree-limit.

83. *Agabus labiatus* (Brahm, 1790) Fig. 23:83.

Distributed all over the country though of a seemingly local occurrence in the central part.

It occurs in smaller waterbodies of a more or less temporary character. Often found at seasonally flooded river-margins.

84. *Agabus lapponicus* (Thomson, 1867) Fig. 22:76 + 84.  
See under 76. *A. congener*.

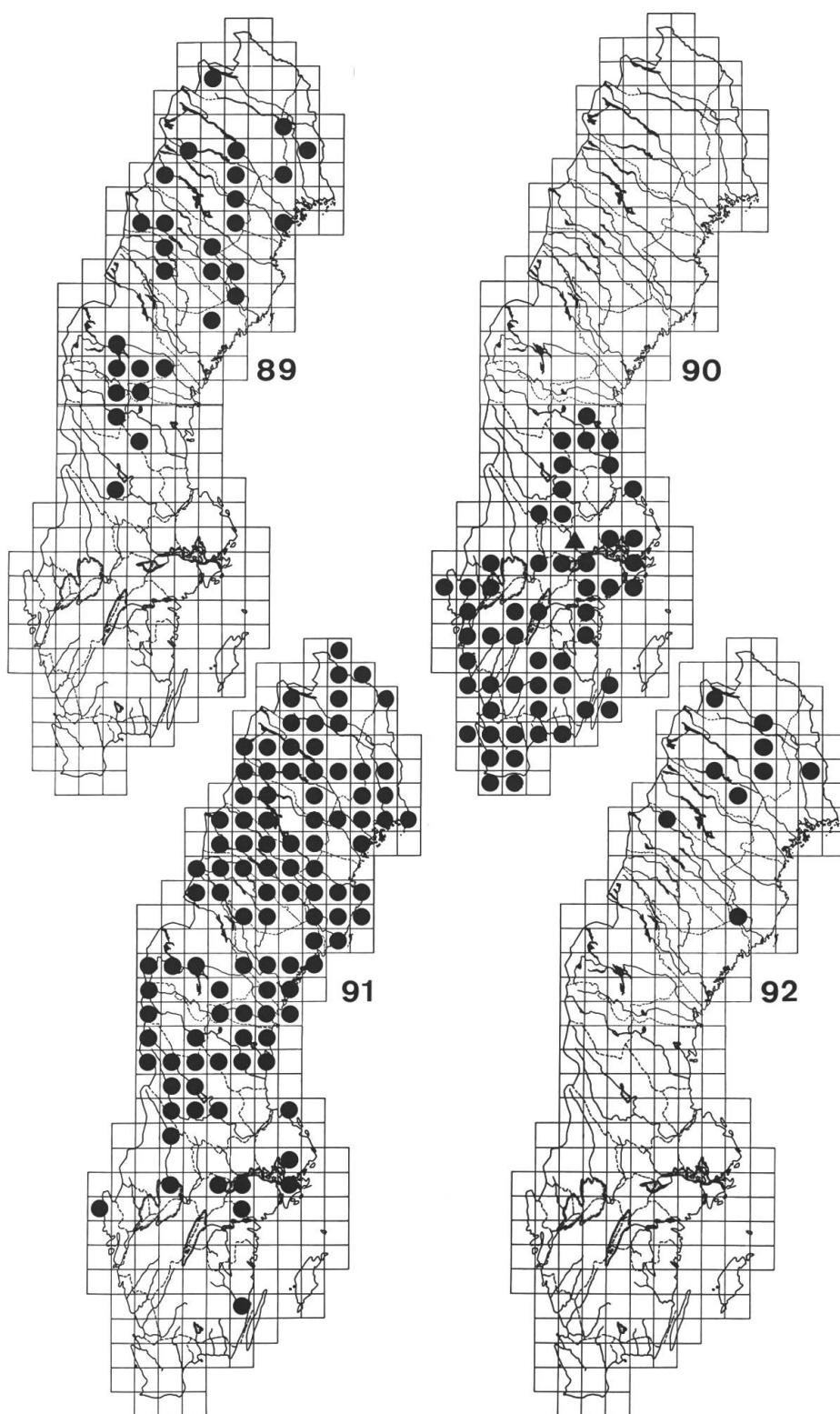


Fig. 25: Distribution in Sweden: 89, *Agabus opacus* Aubé. 90, *A. paludosus* (Fabricius). 91, *A. serricornis* (Paykull). 92, *A. setulosus* (J. Sahlberg).

85. **Agabus levanderi** Hellén, 1929

Fig. 24:85.

[= *approximatus* sensu Nilsson 1981 & 1983a, nec Fall, 1923].

A detailed study of the Holarctic species of *Agabus* (LARSON & NILSSON, 1985) has made clear that this species is not identical with any Nearctic one. Instead, the name *A. levanderi* should be used (NILSSON, 1984b). This is a northern species known from several localities in Lapland. The southernmost record is from Jä: Revsund (leg. A. Dufberg, 1982). The record from Vb given by NILSSON (1983a & d) was wrong, though it later was found also in this province (Mårdsele, leg. A. Nilsson, 1984).

The habitat is small, often brown-water, streams with broad, seasonally flooded, margins.

86. **Agabus melanarius** Aubé, 1837

Fig. 24:86.

Somewhat patchily distributed all over the country. It is not known from Go. The southernmost record is from Sk: Tjörnarp (leg. B. Ericson, 1983), and an old specimen from this province is in coll. Thomson (UML). An old record (KLEFBECK & SJÖBERG, 1960) from Hr has not been possible to confirm.

It occurs in springs, small streams, and other small hollows in forest and at mire-margins. Often in muddy water.

87. **Agabus nebulosus** (Forster, 1771)

Fig. 24:87.

In Sweden with a pronounced southeastern distribution. The records from the west-coast are all from the turn of the century.

It occurs in ponds and pools of mainly recent origin, e.g. in gravel-pits and ditches. Most often found on silt or clay without vegetation.

88. **Agabus neglectus** Erichson, 1837

Fig. 24:88.

This is also a predominantly southeastern species. It has been most frequently collected on the Island of Öl, and is otherwise of very local occurrence.

The main habitat is small, open pools with muddy bottoms and sparse vegetation. Found also in ditches.

89. **Agabus opacus** Aubé, 1837

Fig. 25:89.

A northern species of a relatively local occurrence. The northernmost record is from To: Abisko (BRUNDIN, 1934) and the southernmost one from Hs: Los (SJÖBERG, 1962).

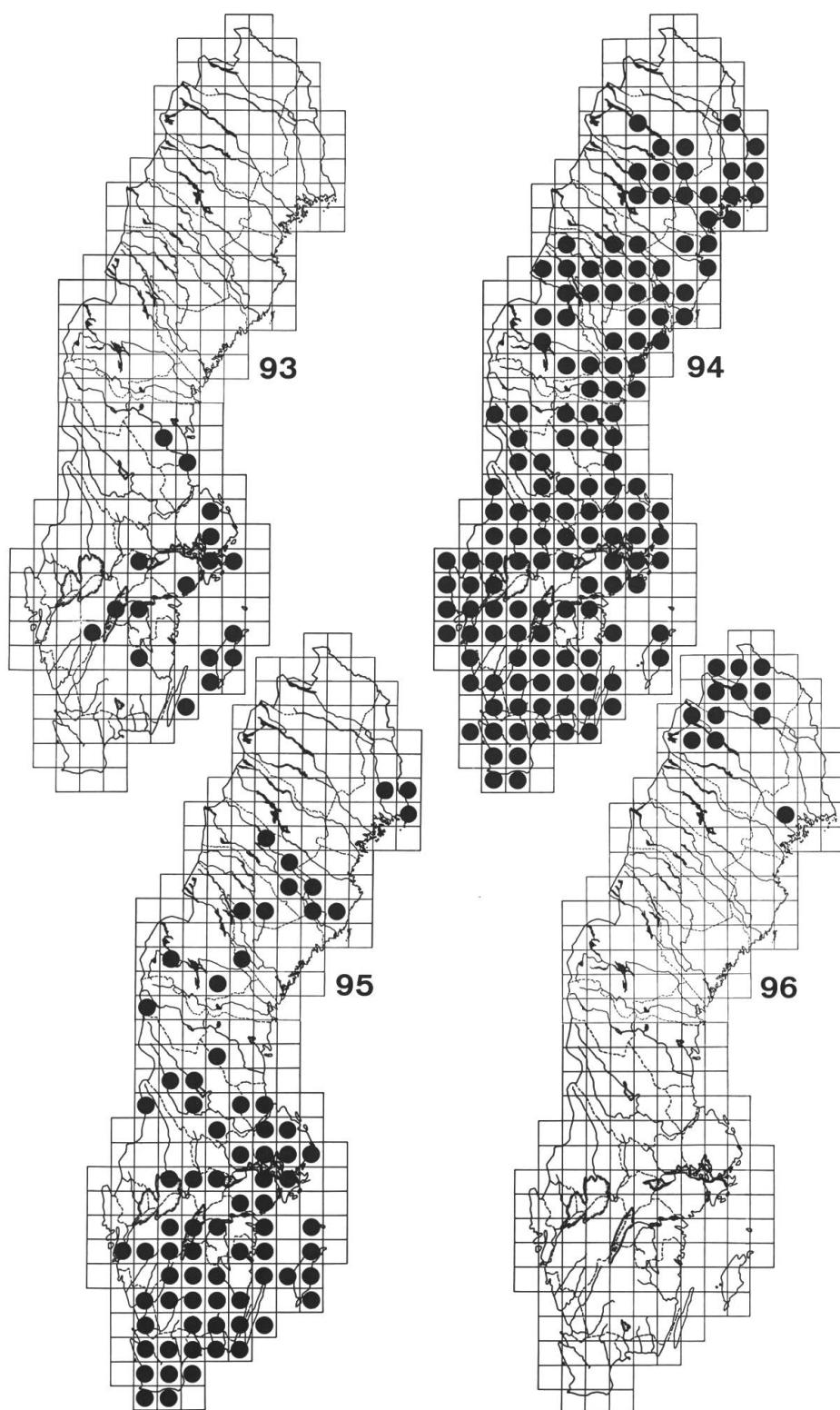


Fig. 26: Distribution in Sweden: 93, *Agabus striolatus* (Gyllenhal). 94, *A. sturmii* (Gyllenhal). 95, *A. subtilis* Erichson. 96, *A. thomsoni* (J. Sahlberg).

The main habitat is small, more or less temporary, pools in spruce forest. Found also in forest and road-side ditches with more or less stagnant water.

90. *Agabus paludosus* (Fabricius, 1801) Fig. 25:90.

Widespread in S Sweden. The northernmost record is from Hs, 20 km N of Ljusdal (NILSSON, 1982a). It has not been recorded from the Island of Go. An old record from Lapland (GAUNITZ, 1928) is considered erroneous.

A running water species mainly found in smaller, open streams.

91. *Agabus serricornis* (Paykull, 1799) Fig. 25:91.

Widespread and frequently collected all over N Sweden. In the central and S parts it is of quite local occurrence, and the southernmost record is from Sm: Strömsrum (leg. P. Cederström, 1976).

It occurs in ponds and lakes with a rich vegetation, also above the tree-limit. In S Sweden confined to very eutrophic lakes.

92. *Agabus setulosus* (J. Sahlberg, 1895) Fig. 25:92.

A relatively rare northern species, known only from N Lapland and Nb, and W Vb. The southernmost record is from Vb: Hällnäs (leg. A. Johansson, 1986). The first Swedish record was from Lu: Vaimat, 15 km S of Jokkmokk (leg. T.B. Engelmark, 1965), though it was collected by Sellman at To: Abisko already in 1917 (in coll. NMNH).

It occurs in small streams and ditches, often on mires. Found among stones or in moss.

93. *Agabus striolatus* (Gyllenhal, 1808) Fig. 26:93.

With a very patchy distribution in the E half of S Sweden. It has been most frequently collected on the Baltic Island of Go, where it is known from about ten localities. The northernmost localized record is from Hs: Bollnäs (in coll. UML, most probably taken before 1900). GRILL (1896) listed it from Lapland, and in coll. UML there are actually two specimens so labelled. We are not sure if this record represents Swedish Lapland.

It occurs in various small waters like ditches and pools with a rich vegetation. Often found in dense moss. Most records are from winter or spring.

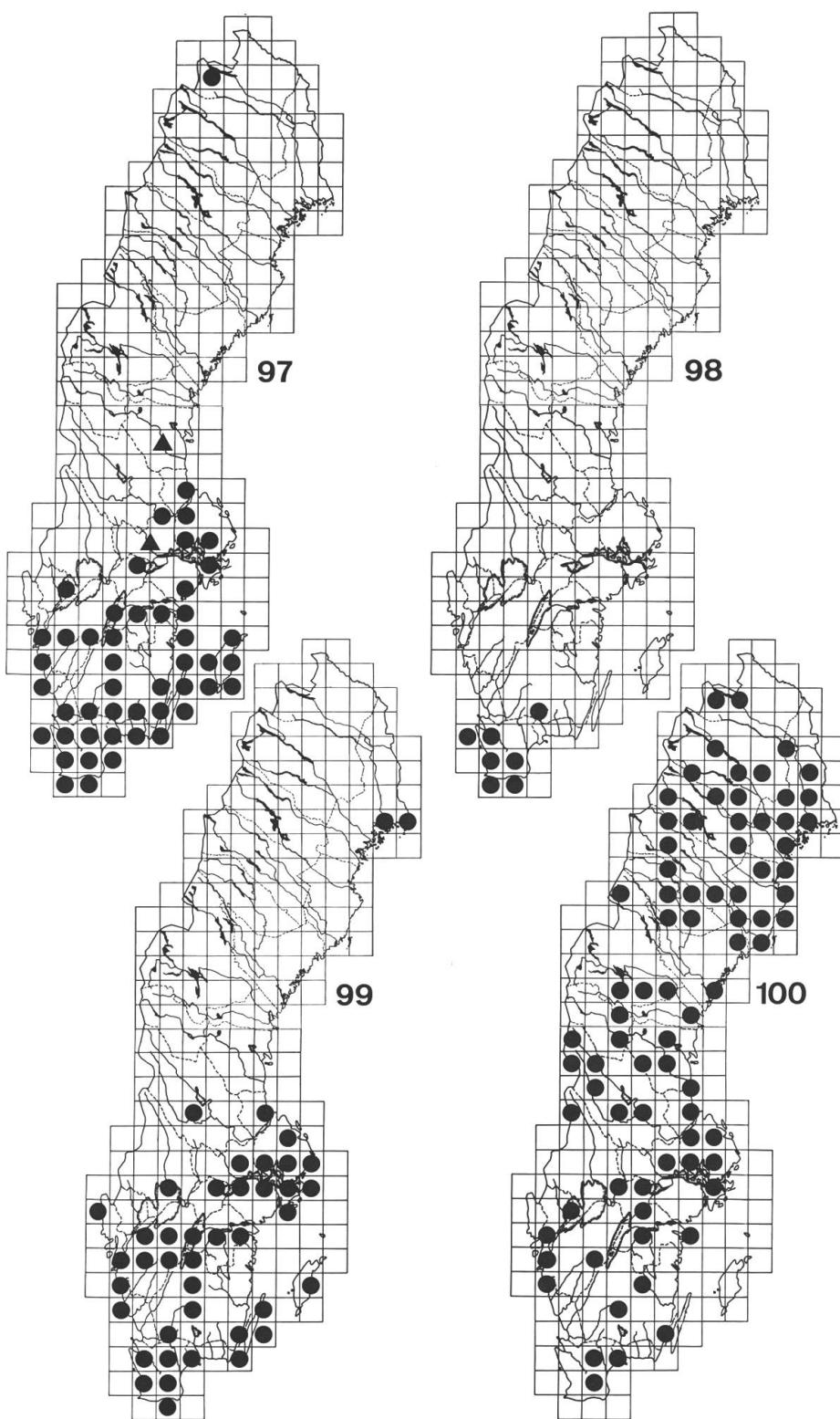


Fig. 27: Distribution in Sweden: 97, *Agabus uliginosus* (Linnaeus). 98, *A.undulatus* (Schrank). 99, *A.unguicularis* (Thomson). 100, *A.wasastjernae* (C.R.Sahlberg).

94. **Agabus sturmii** (Gyllenhal, 1808)

Fig. 26:94.

Widespread in Sweden, though not known from W and northernmost Lapland. The record from To: Jukkasjärvi given by ZETTERSTEDT (1840) has been omitted as there are four different species under this name in his collection (UML).

It occurs in many different kinds of, mainly smaller, waters. One of the dominating species in ponds with decomposing leaves and little vegetation. Otherwise mainly found in dense vegetation.

95. **Agabus subtilis** Erichson, 1837

Fig. 26:95.

Widespread in Sweden. It is most frequent in the SE part and of more local occurrence to the north. The record from To: Abisko given by NILSSON (1983a) was based on a misidentified specimen [= *A. erichsoni*, in coll. NMNH] collected by ENGELHARDT (1957). The northernmost record is from Övertorneå in Nb (LINDROTH & PALM, 1934).

It occurs in more or less temporary pools, often with grassy bottoms. In N Sweden it is confined to seasonally flooded river-margins.

96. **Agabus thomsoni** (J. Sahlberg, 1871)

Fig. 26:96.

After a detailed study of the so called *congener*-complex in a Holarctic view (LARSON & NILSSON, 1985) it was concluded that *A. thomsoni* must be regarded as a valid species. It has a pronounced northwestern distribution in Sweden. A rather isolated record is known from Nb: Boden (leg. Nordström, in coll. Persson). The record from Jä: Kälähög given by THOMSON (1871) has been omitted as the three specimens present in his collection are all labelled "Lap" and belong to *A. levanderi*. We have also excluded the record from Ly: Tärna given by FRIDÉN (1956) as it is based on a single specimen that we have not seen. The separation of *A. thomsoni* from *A. lapponicus* is problematic, and further studies are badly needed.

This species occurs mainly in various smaller waterbodies above the tree-limit. It is typically found in turf-pools, temporary pools or in pools in small streams.

97. **Agabus uliginosus** (Linnaeus, 1761)

Fig. 27:97.

Widespread in S Sweden. It has a continuous distribution north to Hs (about 1880, leg. Wiström, in coll. Nilsson). About 750 km to the north it was found at To: Abisko (leg. R. Danielsson, 1973, in coll. UML).

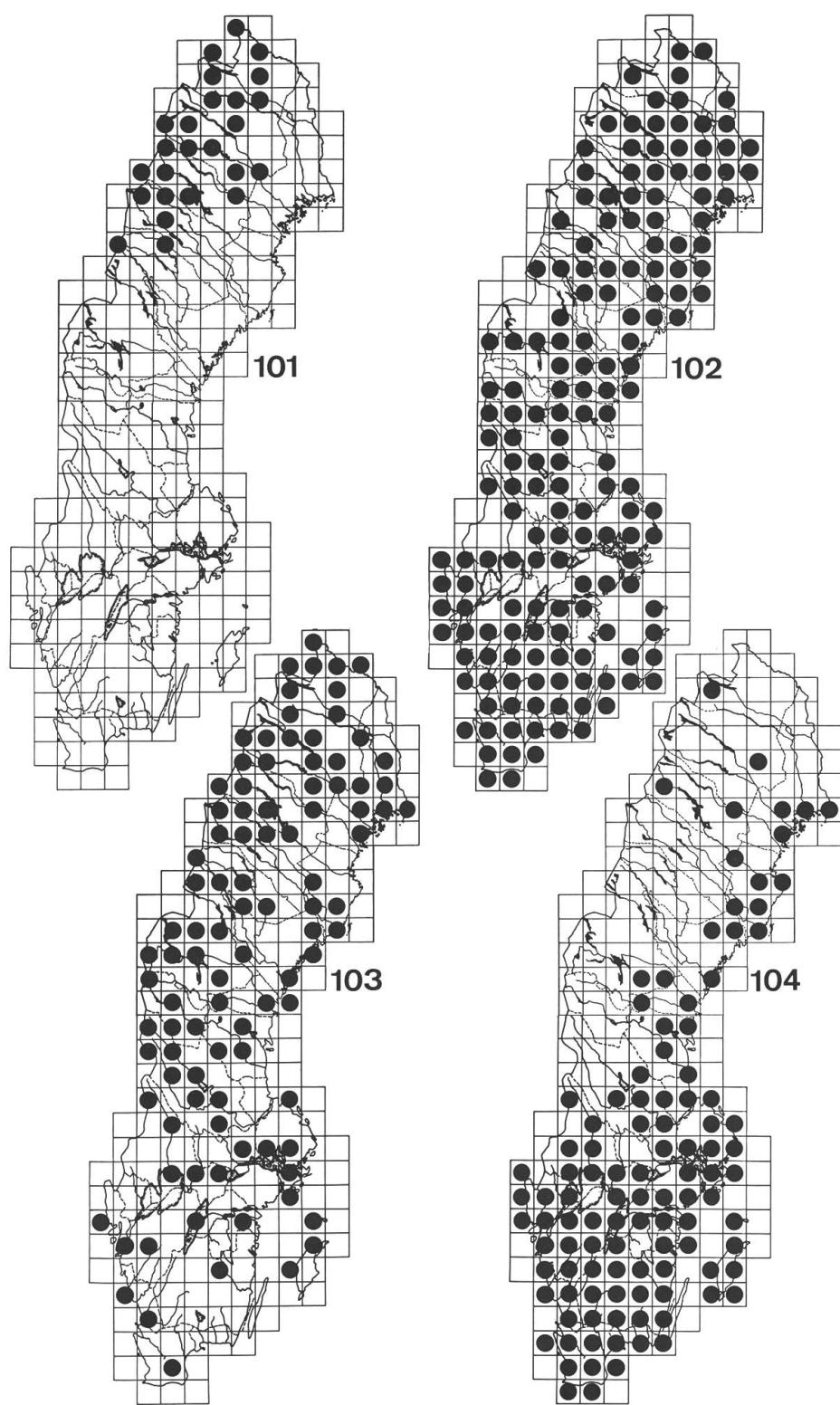


Fig. 28: Distribution in Sweden: 101, *Agabus zetterstedti* Thomson. 102, *Ilybius aenescens* Thomson. 103, *I. angustior* (Gyllenhal). 104, *I. ater* (DeGeer).

It is often found in temporary shallow pools in grassland. Single adults are occasionally found in permanent water.

98. *Agabus undulatus* (Schrank, 1776) Fig. 27:98.

A pronouncedly southern species, most frequently collected in Sk, where it is not too rare. Outside Sk an old record is known from Bl (in coll. Hoffstein, NMNH), and SJÖGREN (1947) collected it in Sm. An old record from Ha (KLEFBECK & SJÖBERG, 1960) has not been possible to confirm, and the record from Vg given by ÖSTRAND (1919) is considered erroneous.

This species occurs in ponds and ditches in open land and less frequent in deciduous forest.

99. *Agabus unguicularis* (Thomson, 1867) Fig. 27:99.

In Sweden with a disjunct distribution. In S Sweden it has a more or less continuous distribution north to Gä: Hille (leg. A. Nilsson, 1985). About 600 km to the north it has been found in Nb (NILSSON, 1983d).

It occurs in dense vegetation at the margins of shallow, eutrophic lakes. Found also in various fens.

100. *Agabus wasastjernae* (C. R. Sahlberg, 1824) Fig. 27:100.

Though widespread, this species is common in the northern part and has a very local occurrence in S Sweden. It is not known from Go. An old specimen from Öl (leg. Ahlrot, in coll. PFPU) is considered mislabelled.

In N Sweden known from various sorts of small, mossy hollows on bogs or in spruce forest. Frequently collected in more stagnant forest ditches. To the south it is more confined to bog margins where it occurs in small, shaded hollows with cold water.

101. *Agabus zetterstedti* Thomson, 1856 Fig. 28:101.

In Sweden only known from Lapland, where it has been most frequently collected at high-altitude sites in the W part. The southernmost record is from Ås: Stekenjåkk (leg. S. Persson).

This species prefers temporary waters, such as small and shallow pools with growth of aquatic mosses as occurring on morainic soils.

102. *Ilybius aenescens* Thomson, 1870 Fig. 28:102.

Frequently collected all over Sweden.

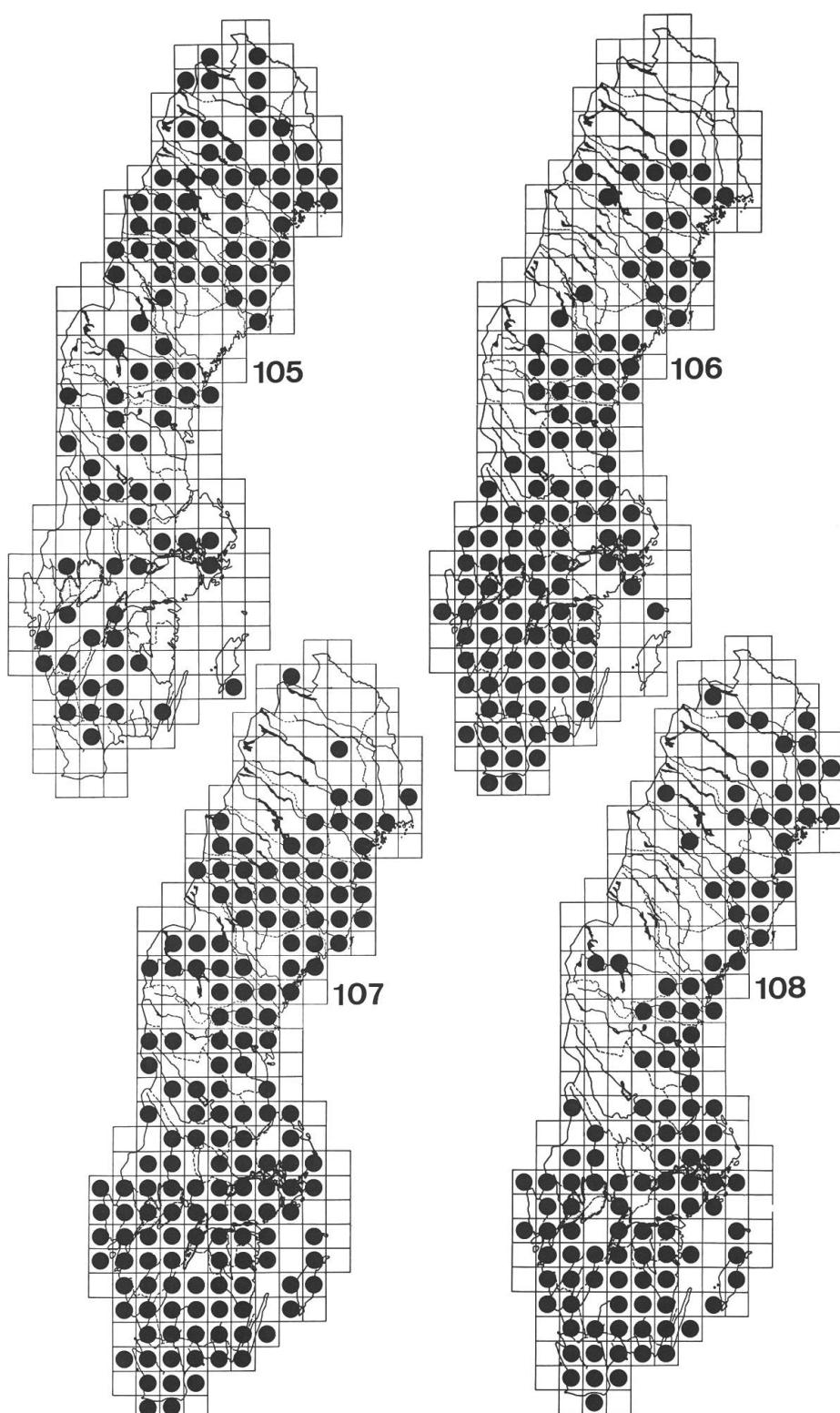


Fig. 29: Distribution in Sweden: 105, *Ilybius crassus* Thomson. 106, *I. fenestratus* (Fabricius). 107, *I. fuliginosus* (Fabricius). 108, *I. guttiger* (Gyllenhal).

An eurytopic species known from most kinds of waters. Often found in peaty habitats in *Sphagnum* moss.

103. *Ilybius angustior* (Gyllenhal, 1808) Fig. 28:103.

Previously mixed up with the very similar *I. picipes* (PERSSON, 1985). The real *I. angustior* is widespread in Sweden, though of a relatively local occurrence to the south. It is not known from Öl.

Frequently collected in different fens, ponds and lakes, often in *Sphagnum* moss. Regularly found above the tree-limit.

104. *Ilybius ater* (DeGeer, 1774) Fig. 28:104.

Though widespread in Sweden, this species is predominantly southern. It has a patchy distribution in the N half, where the northernmost record is from To: Abisko (leg. R. Danielsson, 1973, in coll. UML).

In S Sweden common in most densely vegetated waters, e.g. fens, lakes and ponds. To the north it is more confined to more nutrient-rich ponds and densely vegetated lake-margins.

105. *Ilybius crassus* Thomson, 1856 Fig. 29:105.

Though widespread, this is in Sweden a predominantly northern species. It has a relatively local occurrence in the S half of the country, and the southernmost record is from Sk: Kristianstad (leg. B. Sjögren, 1943, in coll. Persson).

Frequently collected in various *Sphagnum* habitats with cold water, e.g. bog pools, springs and road-side ditches. Found also in coastal rock-pools.

106. *Ilybius fenestratus* (Fabricius, 1781) Fig. 29:106.

A widespread species that has a very local occurrence in Lapland, and is otherwise frequently collected. The record from To: Jukkasjärvi given by ZETTERSTEDT (1840) has been omitted as there are also two other species under this name in his collection (UML). An old record (KLEFBECK & SJÖBERG, 1960) from Go has not been possible to confirm. The northernmost record is from Lu: Högräsk (Leg. S. Ringselle).

Typically a lake species with preference for shores with a relatively sparse vegetation.

107. *Ilybius fuliginosus* (Fabricius, 1792) Fig. 29:107.

A widespread species, frequently collected all over Sweden apart from N Lapland where it is of very local occurrence. The northernmost

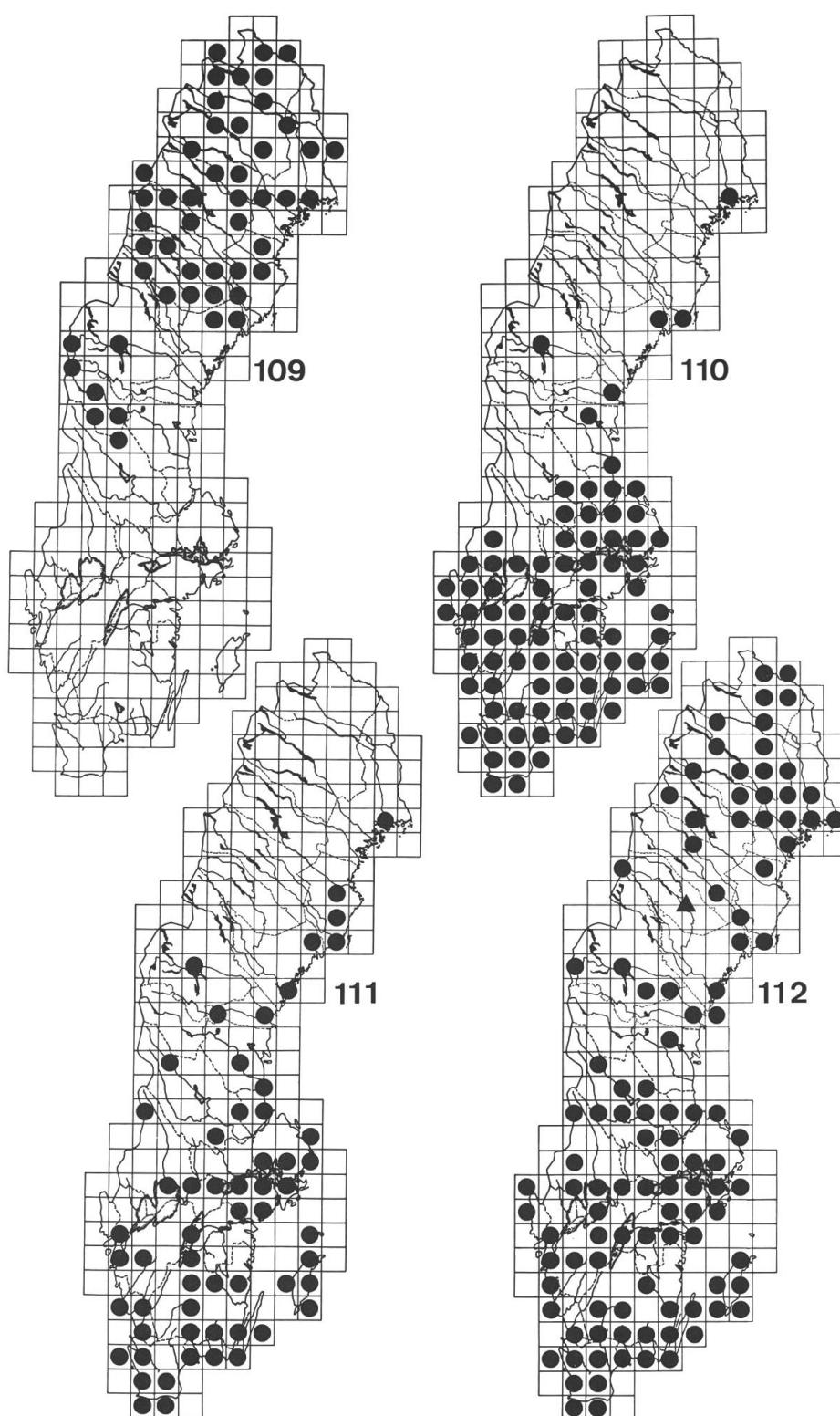


Fig. 30: Distribution in Sweden: 109, *Ilybius picipes* (Kirby). 110, *I. quadriguttatus* (Lacordaire). 111, *I. similis* Thomson. 112, *I. subaeneus* Erichson.

reccord is from To: Djupviken by the Lake Torneträsk (leg. S. Persson, 1968). An old record from Hr (KLEFBECK & SJÖBERG, 1960) has not been possible to confirm.

This is one of the most eurytopic species, known from most kinds of aquatic biotopes. In N Sweden it is often found in larger streams. Frequently collected in brackish water (LINDBERG, 1948).

108. *Ilybius guttiger* (Gyllenhal, 1808)

Fig. 29:108.

Though widespread, this is a predominantly southern species that has been less frequently collected in Lapland. The northernmost record is from To: Abisko (LUNDBLAD, 1950c).

It occurs in more permanent waters with dense vegetation, e.g. lakes and ponds.

109. *Ilybius picipes* (Kirby, 1837)

Fig. 30:109.

A northern species previously mixed up with *I. angustior* (PERSSON, 1985). The distribution is not yet adequately known, but it seems to be common in the N half of the country. The southernmost record is from Hr: Olingsskog (leg. S. Persson, 1986). The habitat differs very little from that of *I. angustior* given earlier. In N Sweden *I. picipes* is more frequently collected in seasonal ponds in forest, and *I. angustior* is more often found at open, more nutrient-rich sites.

110. *Ilybius quadriguttatus* (Lacordaire, 1835)

Fig. 30:110.

Widespread in S Sweden. In the N half it has been collected at a few, mainly coastal sites. The northernmost record is from Nb: Kalix (leg. S. Lundberg).

Frequently collected in floating *Sphagnum*-carpets surrounding lakes. Found also in various other densely vegetated waters of a more permanent character.

111. *Ilybius similis* Thomson, 1856

Fig. 30:111.

A predominantly southern species that in the north is known only from a few, mainly coastal sites. The northernmost record is from Nb: Råneå (Jämtön, leg. S. Ringselle, 1966).

It occurs in floating *Sphagnum*-carpets surrounding lakes. Often together with *I. quadriguttatus* but of a much rarer occurrence.

112. *Ilybius subaeneus* Erichson, 1837

Fig. 30:112.

Though somewhat patchy, this species is distributed all over the

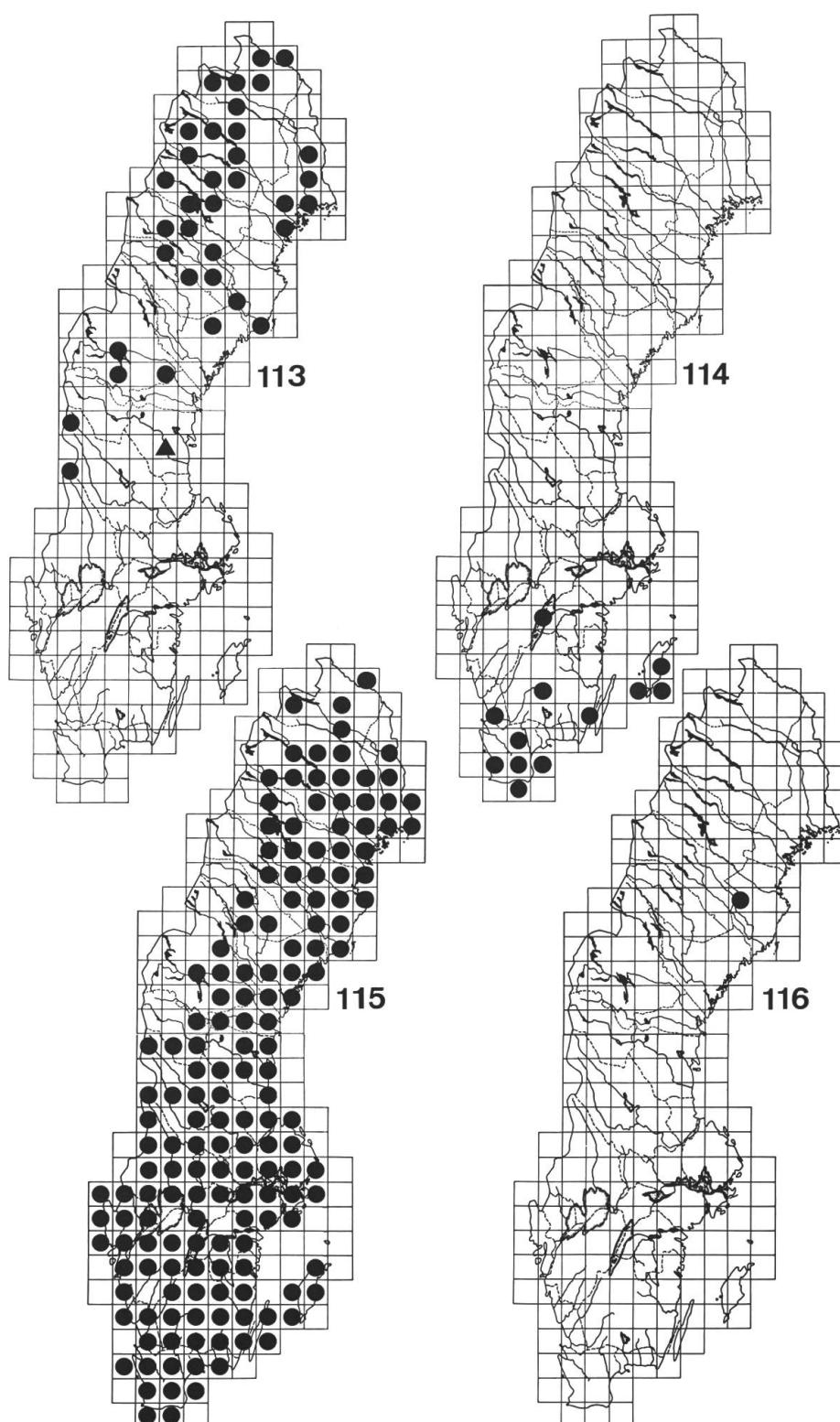


Fig. 31: Distribution in Sweden: 113, *Ilybius vittiger* (Gyllenhal). 114, *Rhantus bistriatus* (Bergsträsser). 115, *R. exsoletus* (Forster). 116, *R. fennicus* Hulden.

country. The record from the island of GS given by KLEFBECK & SJÖBERG (1960) has not been possible to confirm.

It occurs in more permanent waters with dense vegetation, e.g. lakes and ponds. Frequently collected in brackish water in sheltered sea-bays.

**113. *Ilybius vittiger* (Gyllenhal, 1827)**

Fig. 31:113.

A northern species with a very local occurrence outside Lapland. The southernmost record is from Vr: N. Finnskoga (leg. B. Ericson, 1967). A specimen from Dr was found in coll. MNHG (Grövelsjön, 1945). The record from Hs (leg. Ströhm, in coll. MNHG) has not been possible to locate.

It occurs in small stagnant waterbodies shaded by trees or boulders and often with *Sphagnum* moss. Often at mire-margins or, especially in W Lapland, on open mires.

**114. *Rhantus bistriatus* (Bergsträsser, 1778)**

Fig. 31:114.

In Sweden confined to the SE part, where it has been most frequently collected in Sk. The northernmost record is from the Lake Tåkern area in Ög (PALM, 1937). An old record (KLEFBECK & SJÖBERG, 1960) from Vg has not been possible to confirm.

It occurs in shallow pools overgrown with grasses or sedges located in grassland. Often found near eutrophic lakes.

**115. *Rhantus exsoletus* (Forster, 1771)**

Fig. 31:115.

Frequently collected all over the country, though seemingly rare in westernmost Lapland.

This species is confined to permanent waters such as lakes and slow-flowing parts of larger streams and rivers. It prefers shores with at least some vegetation.

**116. *Rhantus fennicus* Huldén, 1982**

Fig. 31:116.

A very rare species recently described from E Finland (HULDÉN, 1982). THE ONLY KNOWN SWEDISH SPECIMENS ARE FROM Vb: MÅRDSELE (NILSSON, 1986c), where it was first found in 1985.

It was here found in a *Phragmites* fen surrounding a brown-water stream.

**117. *Rhantus frontalis* (Marsham, 1802)**

Fig. 32:117.

A predominantly southern species, known only from two isolated

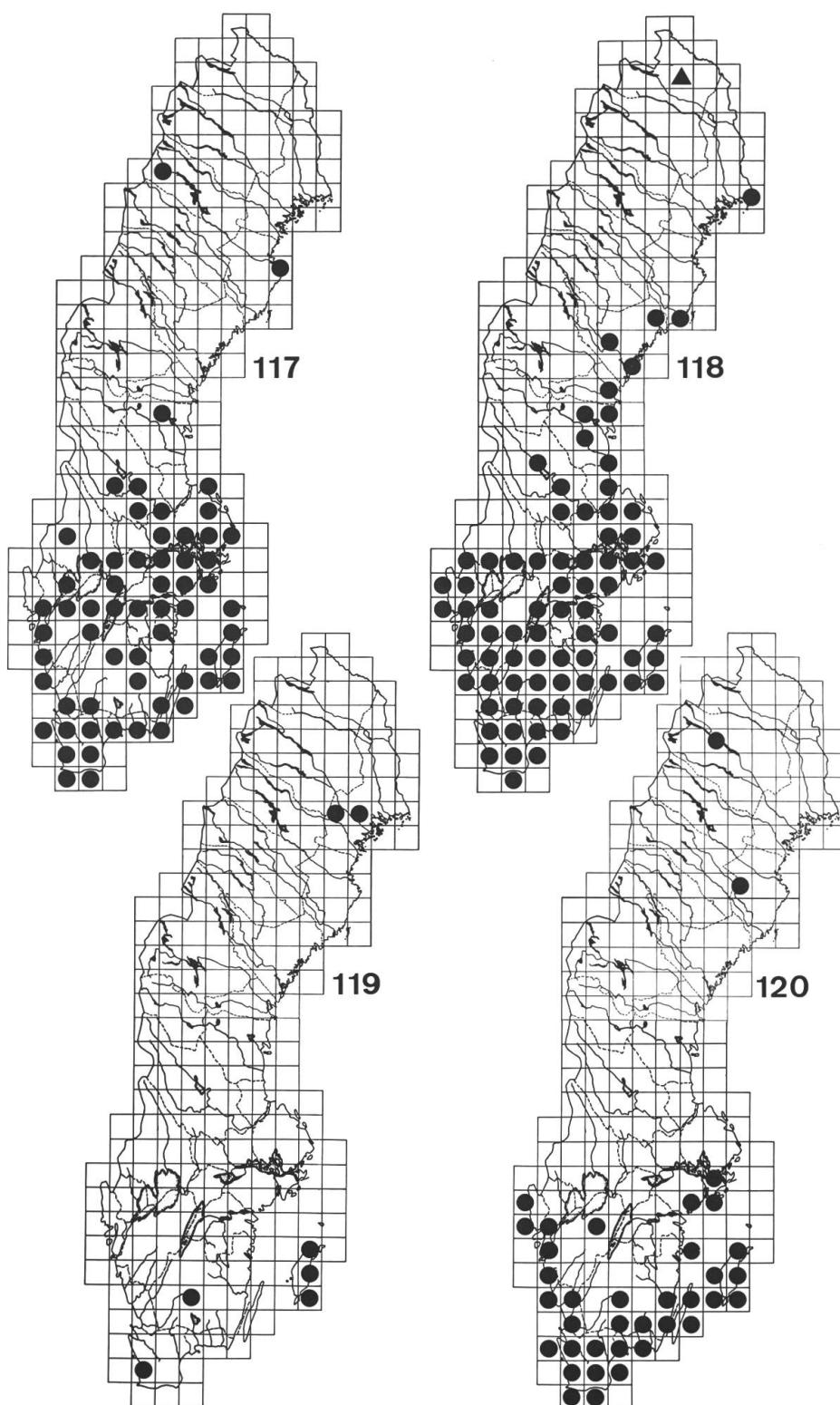


Fig. 32: Distribution in Sweden: 117, *Rhantus frontalis* (Marsham). 118, *R. grapii* (Gyl-lehal). 119, *R. notaticollis* (Aubé). 120, *R. suturalis* (MacLeay).

records in the north. The northernmost record is from Pi: Pieljekaise (LEILER, 1983). The record from Hs is based on a specimen collected by Rudolphi before 1900 (in coll. MNHG). An old record (KLEFBECK & SJÖBERG, 1960) from Nb is considered erroneous.

It occurs in more permanent stagnant waters with dense vegetation, e.g. ponds, lakes and ditches.

118. *Rhantus grapii* (Gyllenhal, 1808)

Fig. 32:118.

A predominantly southern species, known only from a few scattered localities in the north, given in detail by NILSSON (1983d). A more recent record is from Ån: Mjällom (leg. A. Nilsson, 1983). It was described from Lapland, most probably from To: Karesuando.

It occurs among dense vegetation, often with floating *Sphagnum*-carpets, at the margins of ponds and shallow lakes.

119. *Rhantus notaticollis* (Aubé, 1837)

Fig. 32:119.

In Sweden with a markedly disjunct distribution. In the south, specimens have been seen from the provinces Sk: Lund (GRILL, 1896, in coll. Thomson, UML), (Sjögren, 1947, in coll. UML), and Go (NILSSON, 1984a). The record from GS given by KLEFBECK & SJÖBERG (1960) has not been possible to confirm. In the north it is known from two localities by the Luleälven river in Nb (NILSSON, 1983a).

The habitat is poorly known but includes seemingly fens and seasonally flooded lake- and river-margins with a dense vegetation.

120. *Rhantus suturalis* (MacLeay, 1825)

Fig. 32:120.

A southern species, most frequently collected at coastal sites. It has been found from Bo: Kville (leg. B. Andrén, 1959) to Up: Eldgarn, NW of Stockholm (leg. P. Prütz, 1973). Two isolated northern records are known from Vb: Mårdsele (leg. A. Nilsson, 1985) and Lu: Suorva (leg. Å. Kistner, 1949, in coll. NMNH).

Typically found in small clay-pools on coastal meadows, also in brackish water (LINDBERG, 1948). In Vb it was found in a rich fen surrounding a brown-water stream.

121. *Rhantus suturellus* (Harris, 1828)

Fig. 33:121.

Frequently collected all over the country.

A very eurytopic species inhabiting various lakes, fens and ponds. Regularly collected also above the tree-limit.

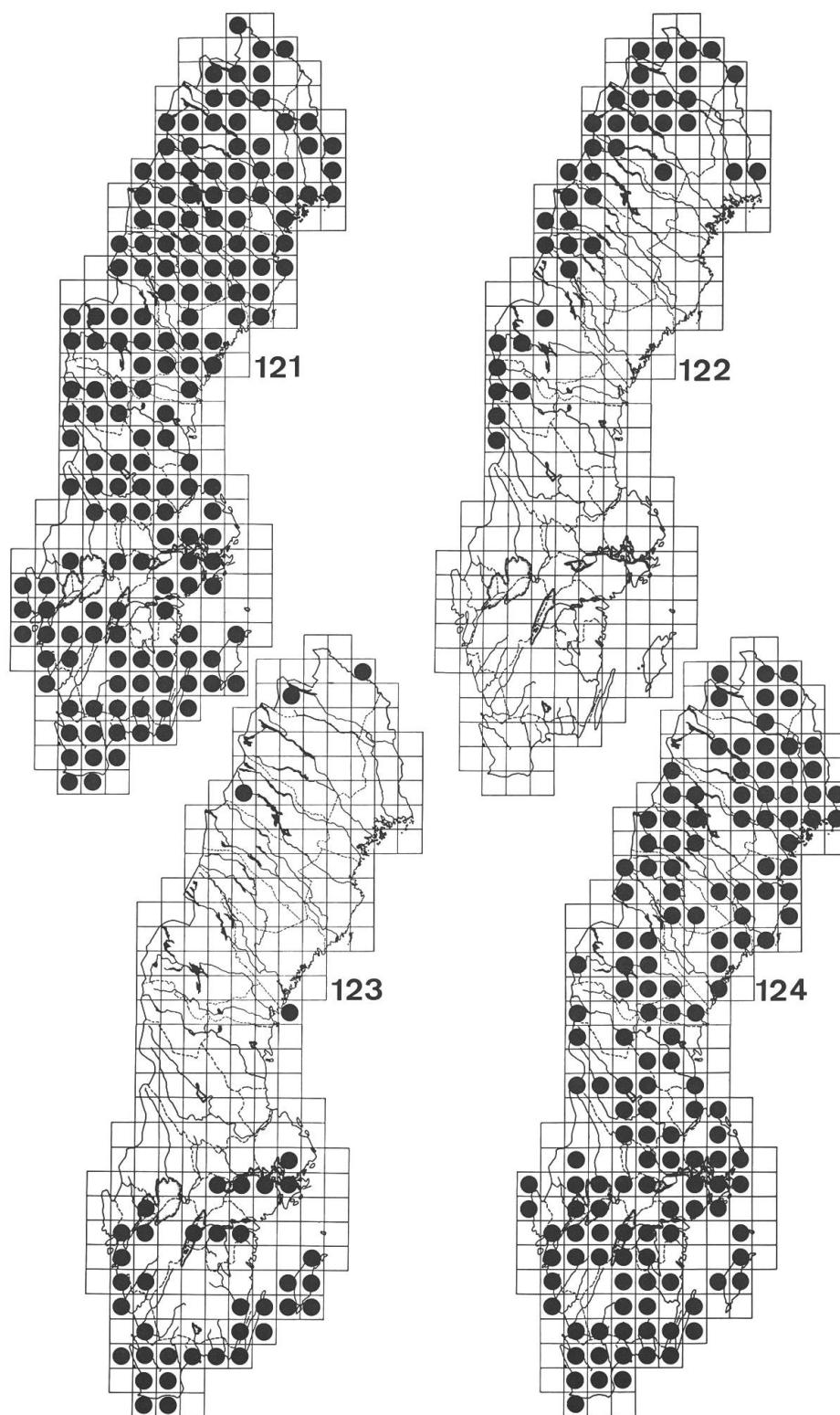


Fig. 33: Distribution in Sweden: 121, *Rhantus suturellus* (Harris). 122, *Colymbetes dolabratus* (Gyllenhal). 123, *C. fuscus* (Linnaeus). 124, *C. paykulli* Erichson.

122. *Colymbetes dolabratus* (Paykull, 1798)

Fig. 33:122.

In Sweden with a northern distribution, and most frequently collected at high-altitude sites above the tree-limit in the western mountain range. The southernmost record is from Dr: Särna (in coll. PFPU). The old records (GRILL, 1896) from Sm and Vg are considered erroneous. This is also the case with the records from Gä, Ån and Vb given by KLEFBECK & SJÖBERG (1960).

It occurs in various ponds and shallow lakes at high altitudes. At lower elevations found mainly in river-lagoons.

123. *Colymbetes fuscus* (Linnaeus, 1758)

Fig. 33:123.

A predominantly southern species with some coastal affinities. It has been most frequently collected in the SE part, though found also along the west-coast north to Bo: Uddevalla (in coll. UML). Along the east-coast it reaches Up: Uppsala (leg. E. Arwidsson, 1924) and Ån: Härnösand (leg. Fredlin, 1917, in coll. UML). Old records (KLEFBECK & SJÖBERG, 1960) from Vr and Gä have not been possible to confirm. In Lapland it was first collected by ZETTERSTEDT (1840) at To: Karesuando (in coll. DEU there is one specimen labelled "Lapp.", and also four unlabelled specimens in the "Insecta Lapponica" collection, UML). Later also found at To: Abisko (leg. B. Berry, 1906, in coll. MNHG), and recently LEILER (1983) found it at Pi: Pieljekaise.

It occurs in open clay-ponds with more or less vegetation. Often found on coastal meadows.

124. *Colymbetes paykulli* Erichson, 1837

Fig. 33:124.

Frequently collected all over the country.

The main habitat is more or less temporary pools in forest. Adult specimens are regularly found outside this habitat, in lakes, streams, etc.

125. *Colymbetes striatus* (Linnaeus, 1758)

Fig. 34:125.

A widespread species that is of very local occurrence in Lapland. The northernmost record is from Lu: Saltoluokta (LEILER, 1969).

Chiefly a lake and pond species with a preference for dense vegetation. In N Sweden it is very abundant in river-lagoons.

## Laccophilinae Bedel

126. *Laccophilus biguttatus* Kirby, 1837

Fig. 34:126.

Recently, ROUGHLEY & NILSSON (in press) have shown *L. strohmi*

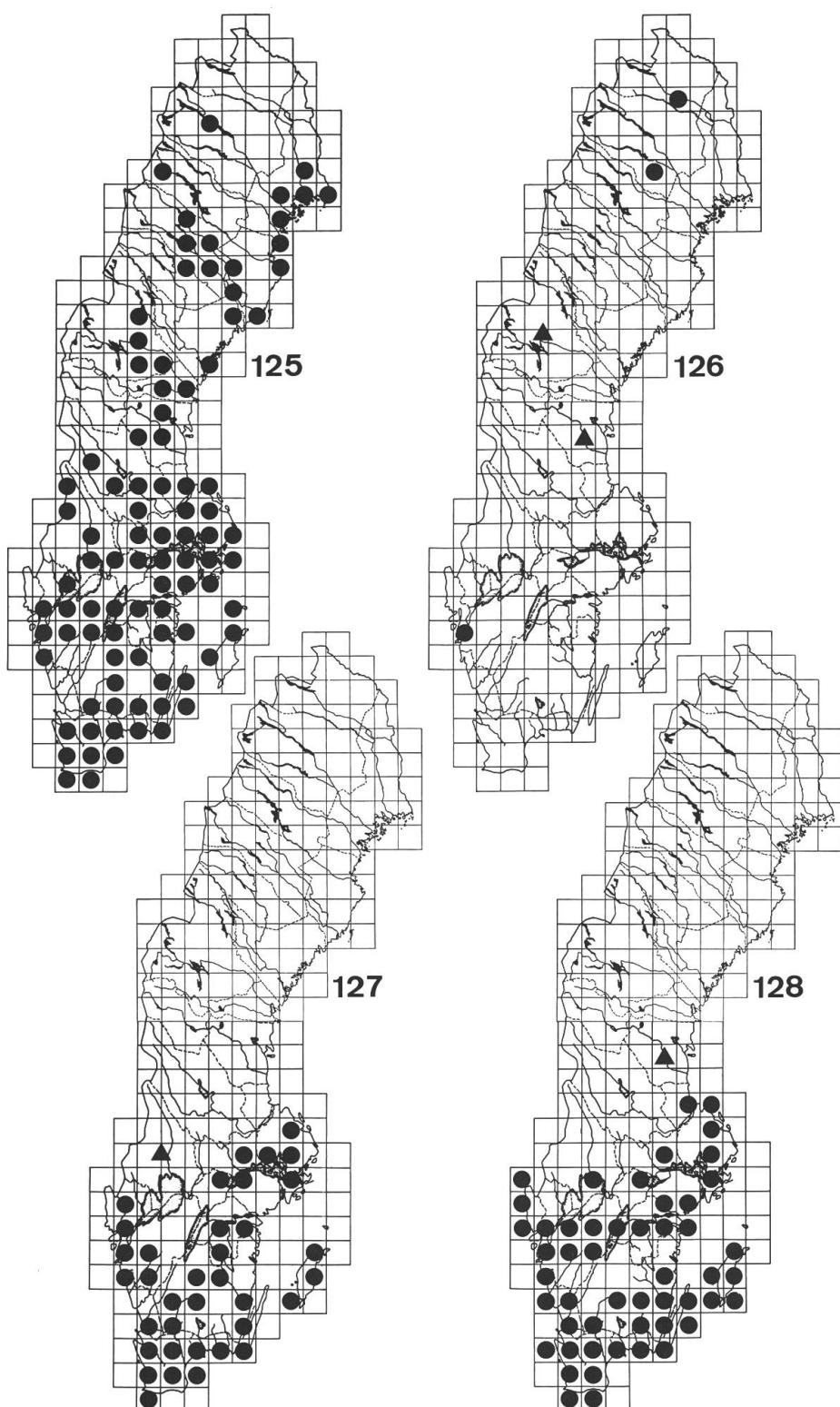


Fig. 34: Distribution in Sweden: 125, *Colymbetes striatus* (Linnaeus). 126, *Laccophilus biguttatus* Kirby. 127, *L. hyalinus* (DeGeer). 128, *L. minutus* (Linnaeus).

Thomson to be identical to, and thus a junior synonym of, the Nearctic *L. biguttatus*. It is only known from four localities in the N half of the country, and a few isolated records from the west-coast. It was first collected before 1900 by Ströhm in Hs and by Möller in Jä, but the exact localities are unknown. Later records include Lu: Jokkmokk (GSCHWENDTNER, 1939, as *L. minutus*) and To: Sappisaasi (leg. T. Karlsson, 1966, coll. UML) in Lapland. In Bo it was recently found in three lakes near Spekeröd (leg. L. Henrikson, 1981, B. Andrén, 1984, and E. Engblom & P.-E. Lingdell, 1985).

In Bo and S Norway it is abundant in some oligotrophic lakes. Specimens occur on sandy bottoms with a sparse *Phragmites* vegetation. Acidified lakes with reduced fish populations may be preferred.

127. *Laccophilus hyalinus* (DeGeer, 1774) Fig. 34:127.

Confined to S Sweden, and reaches Up: Gimo (Olandsån, leg. T.-E. Leiler, 1971) to the north. From Vr only a single specimen (in coll. UML) collected before 1900 and without a more detailed locality-label is known.

Mainly found in larger streams with a low current and some marginal vegetation. Found also in lakes and ponds.

128. *Laccophilus minutus* (Linnaeus, 1758) Fig. 34:128.

Distributed as the preceding species, though reaching Gä (Valbo, leg. B.J. Andersson) and Hs (an old record from about 1880, leg. Wisström, in coll. Nilsson) to the north.

Occurs in stagnant waters of all sizes. Abundant in lakes, abandoned gravel- and marl-pit ponds etc., with a modest vegetation.

129. *Laccophilus ponticus* Sharp, 1882 Fig. 35:129.

Known only from single localities in S Sweden, where most records are from Bl. Outside this province a single record is known from Vg: Skövde (leg. S. Erlandsson, 1926). An old specimen from Öl in coll. PFPU (leg. Ahlrot) is considered mislabelled, and the record from this island given by BRUCE (1964) actually refers to *L. minutus* (in coll. UML). In coll. NMNH there is a single old specimen from Ög. An old record from Sm (KLEFBECK & SJÖBERG, 1960) has not been possible to confirm.

The habitat is known only for the records from Bl. Here the species occurs along sheltered sea-shores on silty bottoms with relatively dense growth of *Phragmites* and *Scirpus* (LINDBERG, 1948).

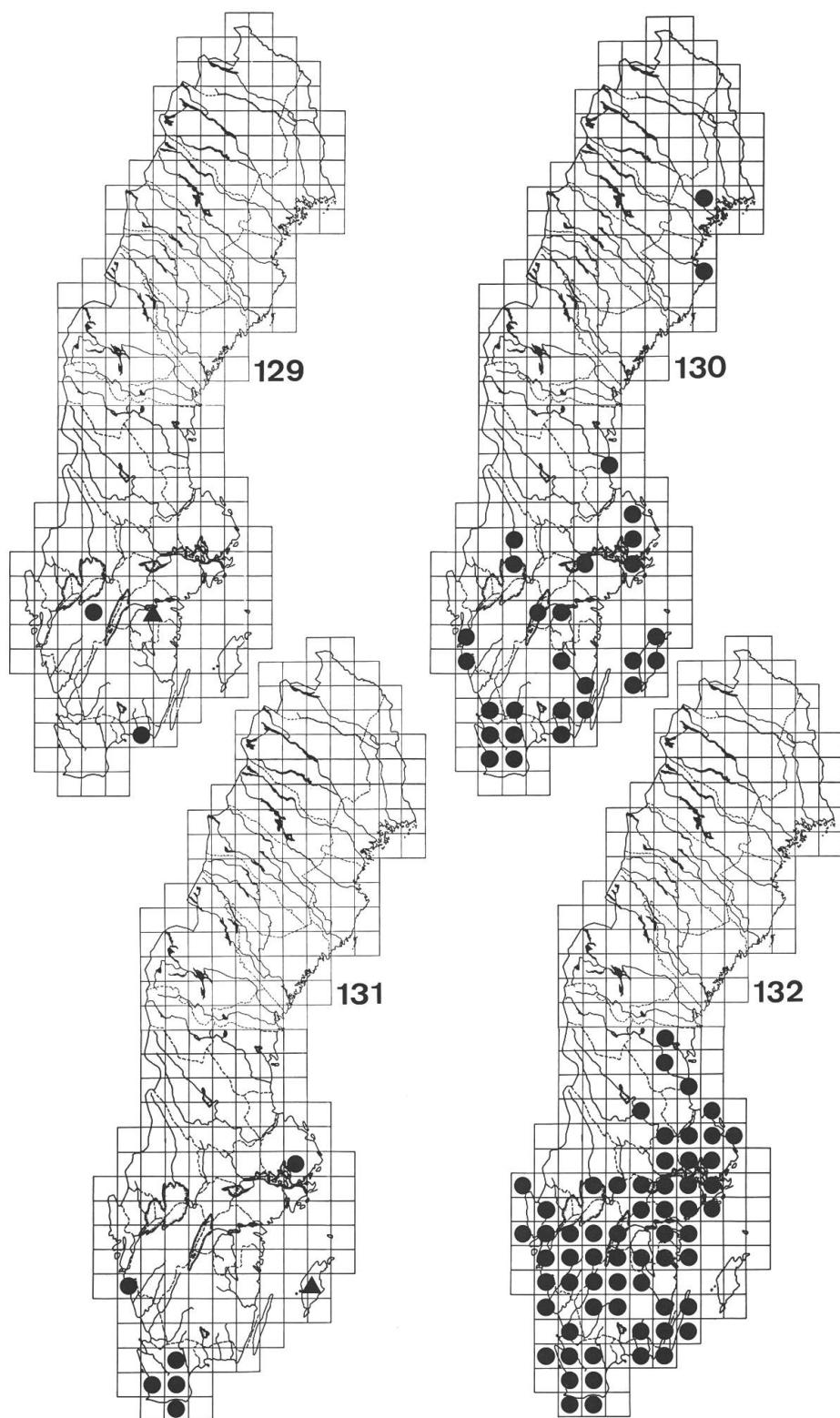


Fig. 35: Distribution in Sweden: 129, *Laccophilus ponticus* Sharp. 130, *Hydaticus aruspex* Clark. 131, *H. continentalis* J.Balfour-Browne. 132, *H. seminiger* (DeGeer).

## Dytiscinae Leach

130. *Hydaticus aruspex* Clark, 1864

Fig. 35:130.

In Sweden with a seemingly disjunct distribution. It has its main occurrence in the S half, where it has been most frequently collected in Sk and Go. In the north it is known from a few localities in Vb (Örviken, leg. S. Backman, 1975) and Nb (three records from the Luleå-region). The females of this species are frequently misidentified as *H. continentalis*.

It occurs in bog-pools with aquatic mosses.

131. *Hydaticus continentalis* J. Balfour-Browne, 1944

Fig. 35:131.

A very rare species that frequently has been mixed up with the preceding one. Thus the old records (KLEFBECK & SJÖBERG, 1960) from Bl, Öl and Ög are considered erroneous. An old record from Stockholm (LAMPA, 1894) has not been possible to confirm. It has most frequently been collected in Sk, where it still can be found (Revinge, leg. B. Andrén, 1981). In Ha it was taken by I.B. Ericson before 1900 (Fjärås, in coll. UML). The northernmost record is from Up: Ultuna where it was found first 100 years ago (WÅNGDAHL, 1880) and later by S. Erlandsson 1929 (in coll. NMNH). From Go only one old record is known (a single female in coll. Hoffstein, NMNH).

It occurs in seasonal ponds in grassland with a dense vegetation.

132. *Hydaticus seminiger* (DeGeer, 1774)

Fig. 35:132.

Widespread in S Sweden. The northernmost record is from Hs: Delsbo, where it was collected by Rudolphi before 1900 (in coll. UML). A more recent record from this province is from Edsbyn (leg. B. Henriks-son, 1975) only about 40 km to the south. It is not known from Go.

It occurs in different kinds of waters, mainly with a dense vegetation. Frequently collected in bog-pools.

133. *Hydaticus transversalis* (Pontoppidan, 1763)

Fig. 36:133.

Widespread in S Sweden. The northernmost record is from Gå: Österfärnebo (PALM, 1942).

Found mainly in more permanent waters with dense vegetation outside forests, e.g. lakes, ponds and ditches.

134. *Graphoderus austriacus* (Sturm, 1834)

Fig. 36:134.

A pronouncedly southern species that in Sweden is known only from S Sk. Several recent records are known.

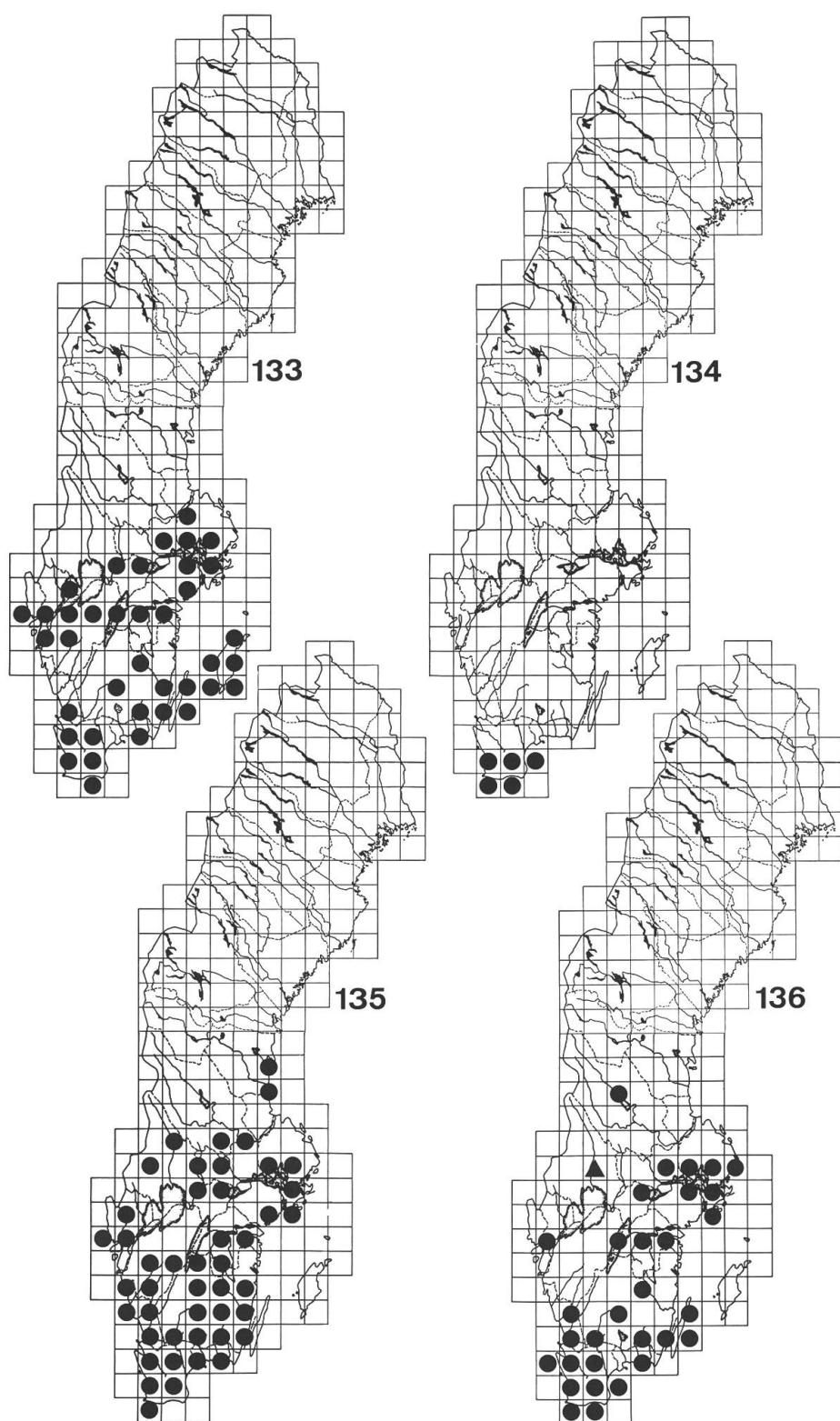


Fig. 36: Distribution in Sweden: 133, *Hydaticus transversalis* (Pontoppidan). 134, *Graphoderus austriacus* (Sturm). 135, *G. bilineatus* (DeGeer). 136, *G. cinereus* (Linnaeus).

It occurs in more or less temporary shallow ponds with dense vegetation in open land, often near the seashore.

135. **Graphoderus bilineatus** (DeGeer, 1774) Fig. 36:135.

Widespread in S Sweden. It is not known from Go. The northernmost record is from Hs: Forsa (an old specimen in coll. NMNH).

It occurs in various stagnant waters of a more permanent character, e.g. sparsely vegetated lake margins.

136. **Graphoderus cinereus** (Linnaeus, 1758) Fig. 36:136.

Though widespread in S Sweden, this species has been frequently collected only in Sk. It is not known from Go. The northernmost record is from Dr: Sollerön (leg. A. Johansson, 1986). From Vr is known only a single male without a more detailed locality label (in coll. DEU). PAYKULL (1798) gave also Vg, but he used this name for the next species.

This is mainly a pond or lake species, with a preference for dense vegetation. Occasionally very abundant in shallow eutrophic lakes.

137. **Graphoderus zonatus** (Hoppe, 1795) Fig. 37:137.

According to NILSSON (1986a) this species is in Sweden represented by the two races *G.z. zonatus* and *G.z. verrucifer* (C. R. Sahlberg, 1824), and *G. piciventris* Thomson, 1868, is a junior synonym of the latter. The distribution of these two races were given by NILSSON (1986a), and together they occupy most of Sweden, though seemingly locally distributed in the S highland and in W Lapland except for the northernmost part. A granulate female of *G.z. verrucifer* from Öl (leg. Ahlrot, in coll. PFPU) is considered mislabelled.

It occurs in small lakes and ponds with dense marginal vegetation.

138. **Acilius canaliculatus** (Nicolai, 1822) Fig. 37:138.

A widespread species that in the N half of the country is of a very local occurrence in the NW part. The northernmost record is from To: Karesuando (ZETTERSTEDT, 1840).

Frequently collected in most kinds of stagnant waters, such as fens, ponds and lakes.

139. **Acilius sulcatus** (Linnaeus, 1758) Fig. 37:139.

Distributed all over the country, though seemingly less frequently collected in the northernmost part. The northernmost record is from To: Abisko (leg. M. Holmen, 1970).

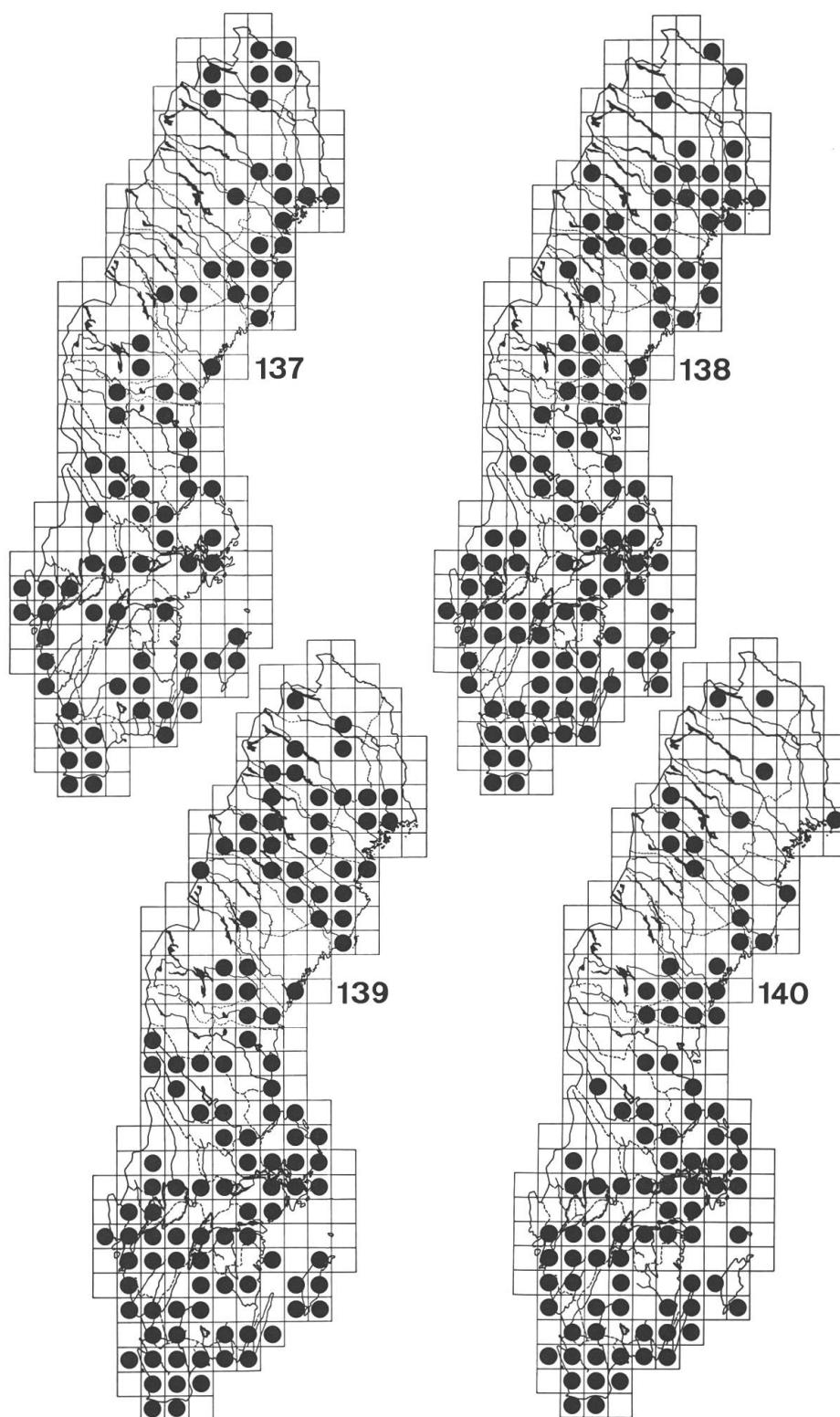


Fig. 37: Distribution in Sweden: 137, *Graphoderus zonatus* (Hoppe). 138, *Acilius canaliculatus* (Nicolai). 139, *A. sulcatus* (Linnaeus). 140, *Dytiscus circumcinctus* Ahrens.

Frequently collected in most kinds of stagnant waters, such as fens, ponds and lakes.

140. *Dytiscus circumcinctus* Ahrens, 1811

Fig. 37:140.

Widespread in Sweden, though not very frequently recorded in the N half. The northernmost record is from To: Abisko (BRUNDIN, 1934). An old record (KLEFBECK & SJÖBERG, 1960) from Hr has not been possible to confirm.

It occurs in lakes and larger ponds, preferably with a richer vegetation.

141. *Dytiscus circumflexus* Fabricius, 1801

Fig. 38:141.

This pronouncedly southern species has been most frequently collected in W Sk. It is otherwise known from Öl (Alböke, leg. B. J. Andersson, 1969, & Halltorp, leg. G. Gillerfors, 1972), from Sm: Aneboda (NYHOLM, 1937), and from Vg: V. Frölunda (1944, in coll. UML). Old records (KLEFBECK & SJÖBERG, 1960) from Vs and Gä have not been possible to confirm.

It occurs in open ponds with dense marginal vegetation, also in fish-ponds.

## 142. *Dytiscus dimidiatus* Bergsträsser, 1778

Fig. 38:142.

Chiefly a southeastern species frequently collected only in Sk and Öl. The northernmost record is from Stockholm (FALKENSTRÖM, 1941). An old record from Vg (ÖSTRAND, 1921) is considered erroneous. From Ha only a single specimen from the turn of the century is known (in coll. Hoffstein, NMNH).

It occurs in various ponds and fens, mainly in open land, but also in deciduous forest.

143. *Dytiscus lapponicus* Gyllenhal, 1808

Fig. 38:143.

Though predominantly northern, this species is widespread in Sweden south to Sk. It is not known from a large part of SE Sweden, including the Baltic Islands. An old record (KLEFBECK & SJÖBERG, 1960) from Gä has not been possible to confirm.

Frequently collected above the tree-line in shallow lakes and ponds. At lower elevations in similar habitats.

#### 144. *Dytiscus latissimus* Linnaeus, 1758

Fig. 38:144.

Widespread in Sweden, though not known from Öl or from western

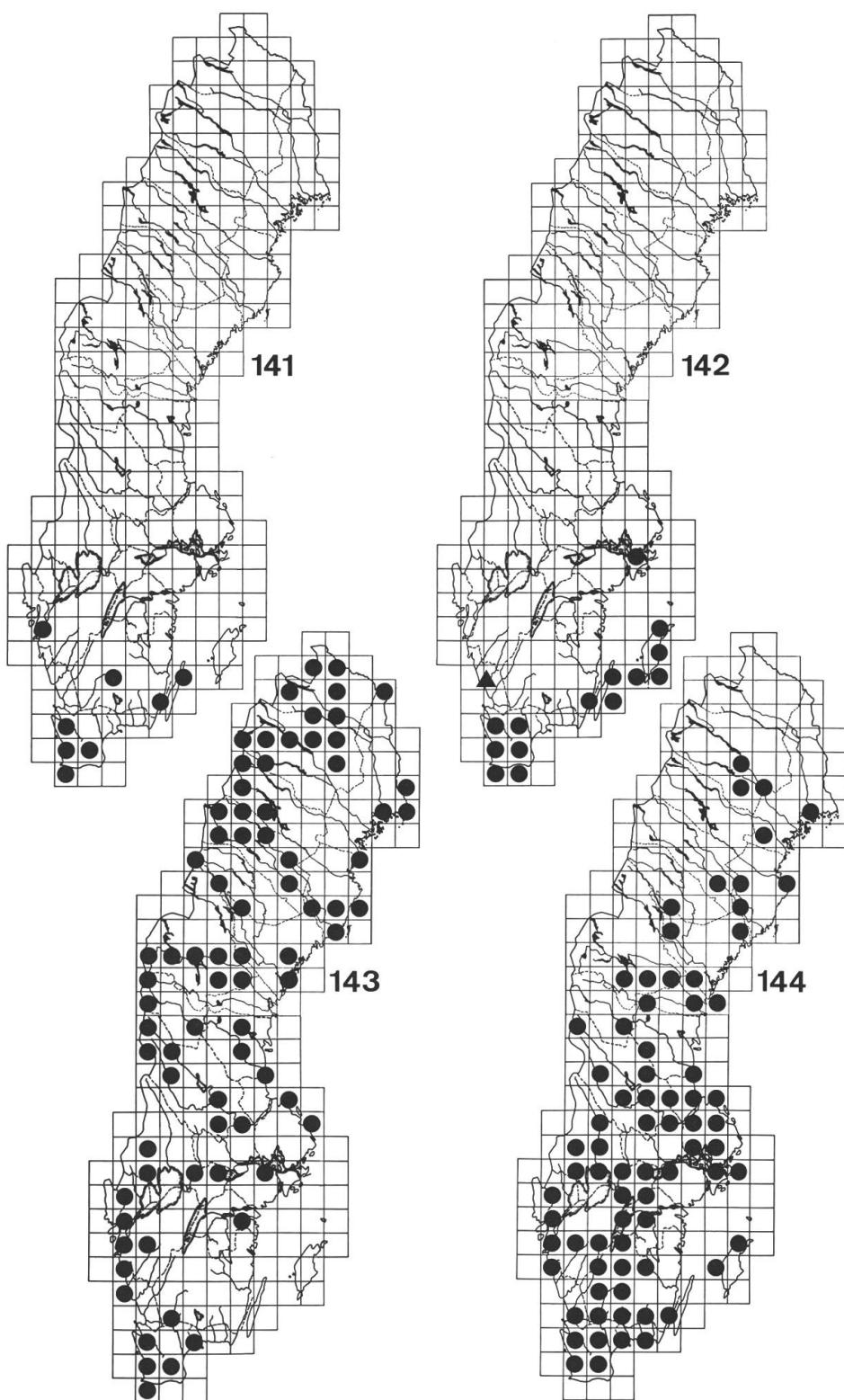


Fig. 38: Distribution in Sweden: 141, *Dytiscus circumflexus* Fabricius. 142, *D. dimidiatus* Bergsträsser. 143, *D. lapponicus* Gyllenhal. 144, *D. latissimus* Linnaeus.

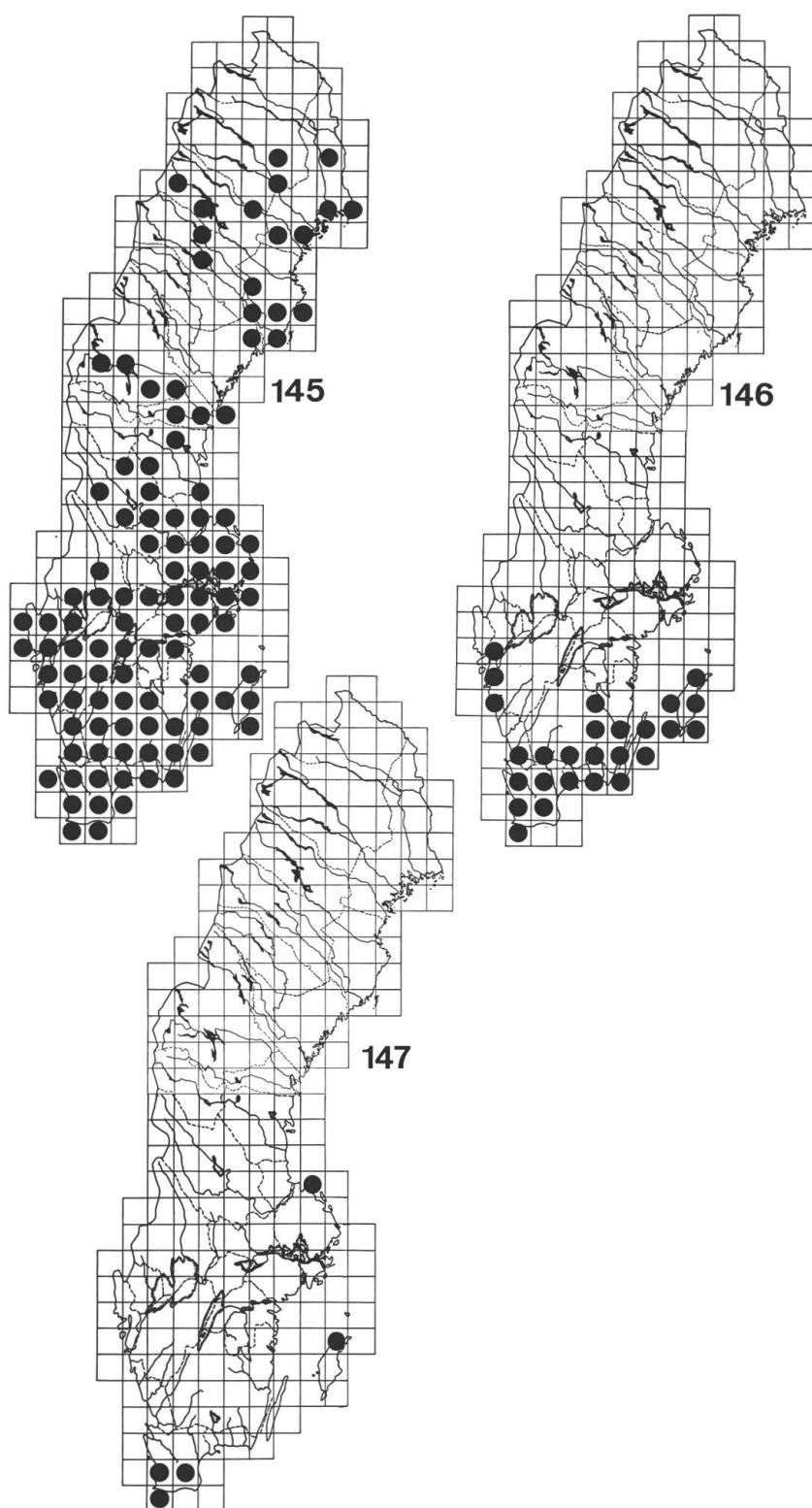


Fig. 39: Distribution in Sweden: 145, *Dytiscus marginalis* Linnaeus. 146, *D. semisulcatus* Müller. 147, *Cybister lateralimarginalis* (DeGeer).

and northernmost Lapland. The northernmost record is from Lu: Mudus (leg. P. Domeij, 1975, in coll. Henriksson), slightly N of the Arctic Circle.

It occurs in ponds and lakes with dense marginal vegetation. Frequently collected in fishponds.

**145. *Dytiscus marginalis* Linnaeus, 1758**

Fig. 39:145.

A widespread species frequently collected all over the country, though of a seemingly local occurrence in Lapland. The northernmost record is from Lu: Messaure (LUNDBERG, 1974), slightly N of the Arctic Circle.

Known from all kinds of stagnant waters of not too limited size.

**146. *Dytiscus semisulcatus* (Müller, 1776)**

Fig. 39:146.

Chiefly a southeastern species, especially frequent on the Baltic Islands Öl and Go. Along the west-coast it has been collected N to Bo: Orust (leg. Grönvall, in coll. UML). PAYKULL's (1798) record from Up was based on a misidentification of DeGeer's *Dytiscus lateralimarginalis*.

It occurs in ponds and fens with dense vegetation. Frequently collected at the margins of *Cladium*-fens on Go.

**147. *Cybister lateralimarginalis* (DeGeer, 1774)**

Fig. 39:147.

The Swedish distribution of this rare, southern species was recently mapped by LEMDAHL & NILSSON (1982). Besides the type locality in Up: Lövstabruk there is a single record from Go: Fårö (HUGGERT, 1974) and several old and recent records from S Sk.

It occurs in ponds and small lakes with dense marginal vegetation.

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#### Note added in proof

The record of 73. *Agabus chalconatus* from Nb: Sundom was based on a single teneral female. After the examination of this specimen by Dr H. Fery, Berlin, we agree that it belongs to 88. *Agabus neglectus*. Consequently, the record in square 25L should be transferred from *A. chalconatus* to *A. neglectus*. In UZM a single female of *A. chalconatus* from Muonio in Finnish Lapland (LkW) collected by J. Sahlberg was found (misidentified as *A. subtilis*). Seemingly, both *A. chalconatus* and *A. neglectus* may occur locally in northern Fennoscandia.

The isolated record of 96. *Agabus thomsoni* from Nb: Boden is doubtful and should be deleted from square 25L on the map (Fig. 26:96). Populations of *A. lapponicus* from the Torneälven river valley near Övertorneå in the same region seemingly include large and narrow individuals reminiscent of *A. thomsoni* (NILSSON, A.N. 1989. Mellersta Tornedalens vattenskalbaggar – utbredning och habitatval. Natur i Norr, Umeå 8:1–16). Thus, the specimen from Boden probably belongs to *A. lapponicus*. The separation of these two species should be studied further.

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