

An annotated list of the Dutch Scydmaenidae (Coleoptera)

OSCAR VORST

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Abstract: A check list of the Dutch species of Scydmaenidae is presented. The list includes 31 species of which *Neuraphes imitator*, *N. ruthenus*, *Scydmoraphes helvolus* and *Euconnus claviger* are reported from The Netherlands for the first time. The presence of *Neuraphes carinatus* on the Dutch list was based on misidentifications. The present status in The Netherlands and the occurrence in each of the twelve Dutch provinces is given for each species. Distribution maps based on the 10 × 10 km UTM-grid are included for most species. Distribution patterns and changes in the abundance during the last century are analyzed. Endangered species are listed.

Poortstraat 55, 3572 HD Utrecht, The Netherlands.

Introduction

A faunistic revision of the Dutch Scydmaenidae is badly needed for many years. Their small size and brown coloration and difficulties with identification have contributed to the modest popularity of this moderate-sized family of beetles. In the early days of Dutch coleopterology the family was even completely overlooked. In his 'Naamlijst van de schildvleugelige insecten' in which Snellen van Vollenhoven (1848) records 752 species of Coleoptera as indigenous, not a single species of Scydmaenidae was included. In the next list (Snellen van Vollenhoven, 1854) only a single species, *Scydmaenus godarti*, is mentioned. Moreover, this record was based on a misidentification (Everts, 1875). In 1870 the number of known species had increased to nine (Snellen van Vollenhoven, 1870). Of these only seven survived the critical eye of Everts, who in 1875 published an overview of the Dutch Coleoptera. In the years that followed, the knowledge of Dutch Coleoptera increased considerably under his guidance. In 'De nieuwe naamlijst' (Everts, 1925) 24 species were mentioned from The Netherlands. The most recent overview enumerates 26 species (Brakman, 1966). Since then two species are reported as new for our fauna: *Euconnus pubicollis* (Berger & Poot, 1972) and *Neuraphes plicicollis* (Vorst, 1988).

In the present check list 31 species are recognized, of which four, *Neuraphes imitator*, *N. ruthenus*, *Scydmoraphes helvolus* and *Euconnus claviger* are reported from The Netherlands for the first time. A single species mentioned by Brakman (1966), *Neuraphes carinatus* (Mulsant), had to be removed from the Dutch list, because its presence on the list was based on misidentifications.

The nomenclature is according to Silfverberg (1992), except for the use of the name *Nevraphes*. Although the original spelling (Thomson, 1859) is *Nevraphes*, it since then has been interpreted as *Neuraphes*, even by Thomson in the next volumes of the same work (Thomson, 1862, 1866, 1867, 1868). *Nevraphes* is clearly a misspelling due to the use of an italic font that has a lower case 'u' very similar to a 'v'. For taxa lacking in Silfverberg's list Lucht (1987) was followed. For identification the keys of Besuchet (1971, 1989) and Franz (1971) were used.

Faunistic data from literature references that could not be checked were not used. For every species the presence in each of the twelve Dutch provinces is presented in table 1 by a large dot; when only recorded before 1900 the presence is marked with a small dot. Provincial records mentioned by Brakman (1966), based on material that was not studied, are indicated by a circle. The following abbreviations of the

Table 1. Check list of Dutch Scydmaenidae. ● records since 1900; ● records before 1900 only; ○ record by Brakman (1966) that could not be checked.

	Fr	Gr	Dr	Ov	Fl	Ge	Ut	NH	ZH	Ze	NB	Li
<i>Eutheia</i> Stephens												
1 <i>plicata</i> (Gyllenhal)	.	.	.	●	.	●	●	●	.	.	.	.
2 <i>schaumii</i> Kiesenwetter	.	.	.	.	.	.	.	.	.	.	.	●
3 <i>scydmaenoides</i> Stephens	.	●	●	.	.	●	●	.	●	.	●	●
<i>Cephenium</i> P.W.J. Müller & Kunze												
4 <i>thoracicum</i> P.W.J. Müller & Kunze	.	.	.	●	.	●	●	●	●	.	●	●
5 <i>gallicum</i> Ganglbauer	.	.	.	.	.	.	.	.	●	●	●	●
<i>Neuraphes</i> C.G. Thomson												
6 <i>elongatulus</i> (P.W.J. Müller & Kunze)	●	●	●	●	.	●	●	●	●	.	●	●
7 <i>angulatus</i> (P.W.J. Müller & Kunze)	●	.	.	.	.	●	●	●	●	●	●	●
8 <i>imitator</i> Blattny	.	.	.	.	.	●	.	.	.	.	.	●
9 <i>rubicundus</i> (Schaum)	.	.	.	.	.	.	.	○	.	.	.	●
10 <i>ruhenus</i> Machulka	.	.	.	●	.	●	●	●	●	.	●	●
11 <i>talparum</i> Lokay	.	.	.	.	.	.	.	.	.	.	.	●
12 <i>plicicollis</i> Reitter	.	.	.	.	.	●	●	●	●	.	●	●
13 <i>praeteritus</i> Rye	.	.	.	.	.	●	.	●	.	.	.	●
<i>Scydmorephes</i> Reitter												
14 <i>sparshalli</i> (Denny)	.	.	.	.	.	.	.	.	.	.	.	●
15 <i>helvolus</i> (Schaum)	.	.	.	.	.	●	●	●	●	●	●	●
<i>Stenichnus</i> C.G. Thomson												
16 <i>scutellaris</i> (P.W.J. Müller & Kunze)	●	●	●	●	.	●	●	●	●	●	●	●
17 <i>pusillus</i> (P.W.J. Müller & Kunze)	.	.	.	●	.	●	.	.	●	.	.	●
18 <i>godarti</i> (Latreille)	.	.	.	.	.	●	.	.	.	.	.	●
19 <i>collaris</i> (P.W.J. Müller & Kunze)	●	●	●	●	.	●	●	●	●	●	●	●
20 <i>bicolor</i> (Denny)	.	.	.	●	.	●	●	●	●	.	●	●
<i>Microscydms</i> Saulcy & Croissandeau												
21 <i>nanus</i> (Schaum)	.	.	.	.	.	.	.	.	.	.	.	●
<i>Euconnus</i> C.G. Thomson												
22 <i>pubicollis</i> (P.W.J. Müller & Kunze)	.	.	.	.	.	●	.	.	.	.	.	●
23 <i>claviger</i> (P.W.J. Müller & Kunze)	.	.	.	.	.	.	.	.	.	.	.	●
24 <i>wetterhallii</i> (Gyllenhal)	.	.	.	.	.	.	.	.	.	.	.	●
25 <i>denticornis</i> (P.W.J. Müller & Kunze)	.	.	.	.	.	●	.	.	.	.	●	●
26 <i>rutilipennis</i> (P.W.J. Müller & Kunze)	●	.	●	●	.	●	.	●	●	●	●	●
27 <i>hirticollis</i> (Illiger)	●	.	●	●	.	●	●	●	●	.	●	●
28 <i>fimetarius</i> (Chaudoir)	●	.	●	.	.	●	●	●	●	●	●	●
<i>Scydmaenus</i> Latreille												
29 <i>tarsatus</i> P.W.J. Müller & Kunze	●	●	●	●	.	●	●	●	●	●	●	●
30 <i>rufus</i> P.W.J. Müller & Kunze	.	.	.	.	.	●	.	.	●	.	.	.
31 <i>perrisii</i> (Reitter)	.	.	.	.	.	.	.	.	.	.	.	●
Total number of species	8	5	8	11	0	22	14	15	17	8	16	29
Number of species since 1900	8	5	8	9	0	18	14	14	13	8	16	27

provinces are used: Fr: Friesland; Gr: Groningen; Dr: Drenthe; Ov: Overijssel; Fl: Flevoland; Ge: Gelderland; Ut: Utrecht; NH: Noord-Holland; ZH: Zuid-Holland; Ze: Zeeland; NB: Noord-Brabant; Li: Limburg (fig. 1).

In the remarks section the number of specimens examined, the number of records and the number of 10 × 10 km UTM squares are given for each species, as well as relevant literature references and present status. For rare species

(less than 11 UTM squares) all records are presented. In addition distribution maps are presented for most species. All specimens collected (by one or more collectors) from the same locality and at the same date (or overlapping periods) are considered as a single record.

A total of 3870 specimens was examined. These include the Dutch material of the following museums and private collections: National Museum of Natural History, Leiden (NNM; including the collections of Ch. J. M. Berger, J. A. Blokland, P. J. Brakman, E. Everts, H. J. van der Krift and J. Veth); Zoological Museum, Amsterdam (ZMA; including the collections D. Mac Gillavry and P. van der Wiel); Department of Entomology of Wageningen Agricultural University, Wageningen (LUW; including the collection D. L. Uyttenboogaart); R. Beenen, Nieuwegein; J. G. M. Cuppen, Ede; B. Drost, Wadenoijen; H. T. Edzes, Nijmegen; G. van Ee, Haarlem; Th. Heijerman, Wageningen; Y. Jongema, Wageningen; F. van Nunen, Vianen; P. Poot, Maastricht (PO); J. C. P. M. van de Sande, Amsterdam; M. Schilthuizen, Heesum; F. C. F. Sterrenburg, Den Haag; A. P. J. A. Teunissen, Vlijmen; O. Vorst, Utrecht (VO).

Remarks

1. *Eutheia plicata*

Material: 20 specimens, 9 records, 5 squares - Ov: Ommen, Eerder Achterbroek, 1.vi.1997, Vorst - Ge: Hoge Veluwe, 5.v.1966, 30.v.1967, Brakman (NNM, PO); Nunspeet, 5.viii.1922, 28.vii.1923, Mac Gillavry, Reclaire (ZMA; Everts, 1923) - Ut: Soest, Pijnenburg, 26.ii.1985, Vorst - NH: Hilversum, 7.iv.1923, 27.v.1923, 8.vii.1923, Reclaire (NNM, ZMA; Everts, 1923).

Notes: Rare and local species, confined to the central part of the country (fig. 2).

2. *Eutheia schaumii*

Material: Li: Valkenburg, .viii., 1 ♀, Rüschkamp (NNM; Everts, 1924a).

3. *Eutheia scydaenoides*

Material: 56 specimens, 25 records, 17 squares.

Notes: Rare, scattered records throughout the country (fig. 3).

4. *Cephennium thoracicum*

Material: 429 specimens, 122 records, 47 squares

Notes: Not uncommon in the southern half of the country, seemingly absent in the northern provinces (fig. 4). Material from Bergen op Zoom (Everts, 1909b) is *C. gallicum*.

5. *Cephennium gallicum*

Material: 143 specimens, 72 records, 14 squares.

Notes: This species shows a remarkable distribution pattern, its northern limit just reaching the south-western part of the country (fig. 5). Rather common in southern Limburg (Berger & Poot, 1972). In Zeeland this species seems to replace *C. thoracicum*. Both *Cephennium*-species were often confused.

6. *Neuraphes elongatulus*

Material: 529 specimens, 256 records, 88 squares.

Notes: One of our common species. Restricted, however, almost completely to the pleistocene part of the country, rare in the coastal dune area and absent from the West Frisian Islands (fig. 6).

7. *Neuraphes angulatus*

Material: 60 specimens, 42 records, 27 squares.

Notes: An uncommon species (fig. 7). There is a remarkable concentration of records from the lowland peat area of Amsterdam and surroundings. The specimen from Ootmarsum (4.viii.1986) recorded by Sterrenburg (1989) belongs to *Stenichnus collaris*; the specimens from Winterswijk, vi.1902, mentioned by Everts (1902), are *Neuraphes elongatulus*.

[*Neuraphes carinatus* (Mulsant)]

Notes: Does not occur in The Netherlands. All specimens that were studied belonged to other

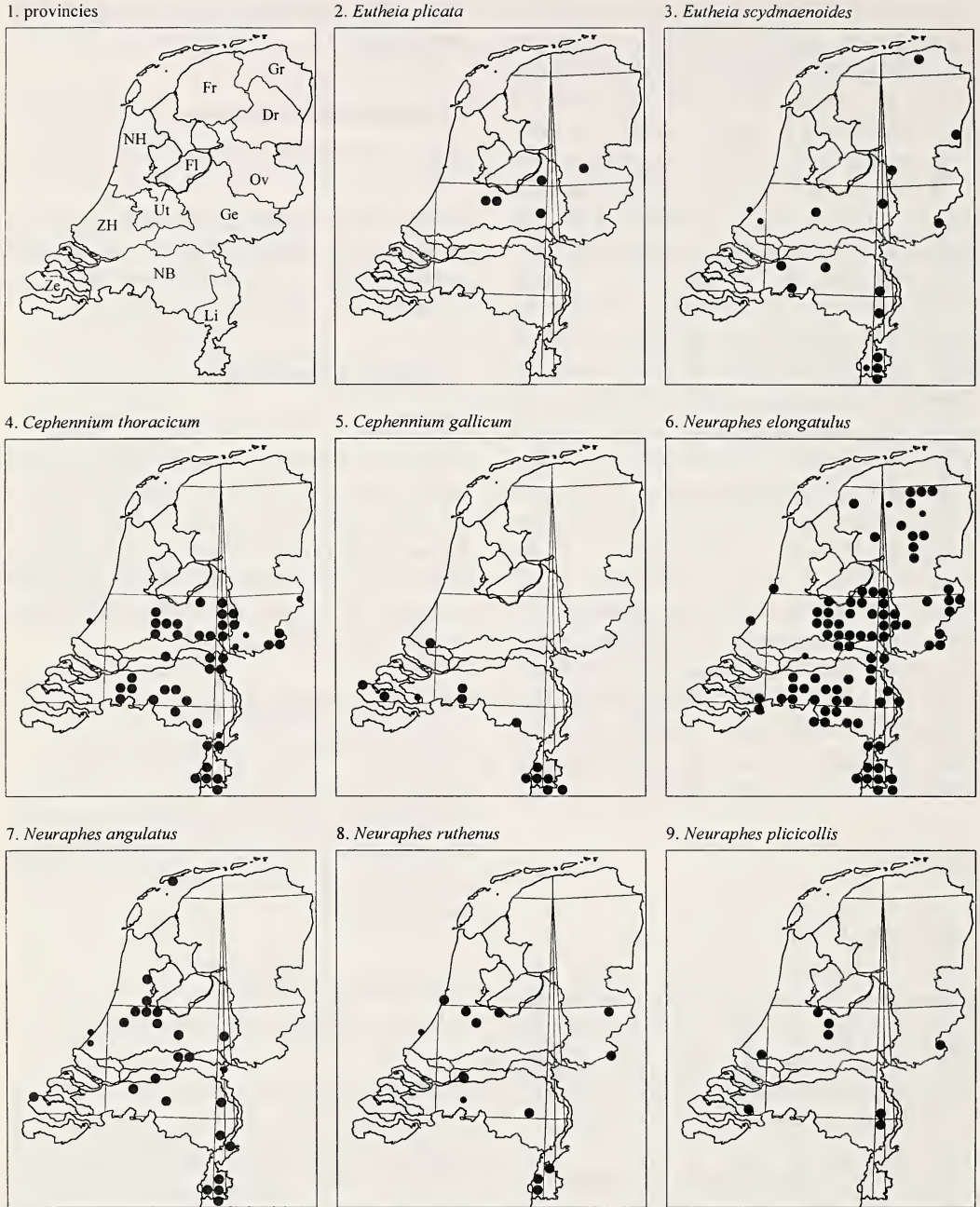


Fig. 1. The twelve Dutch provinces. Figs. 2-9. Distribution of Scydmaenidae in The Netherlands. Small dots, records before 1900 only; large dots, records since 1900.

species, most often *N. imitator* and *N. plicicollis*. The specimens from Arnhem and Valkenburg (.vii.; Everts, 1917, 1922) are *N. imitator*; from Bergen op Zoom and Baarn (.v.; Everts, 1922) are *N. plicicollis*.

8. *Neuraphes imitator* f. nov. spec.

Material: 3 specimens, 3 records, 2 squares - Ge: Arnhem, .vii., Veth (Everts, 1922, as *N. carinatus*) - Li: Valkenburg, .vii., Everts (Everts, 1917, 1922, as *N. carinatus*); Ibidem, .vii.1888, Veth.

Notes: Very rare. This species was not recognized until now. Two of the three specimens were mistaken for *N. carinatus*. Most recent record dating before 1922.

9. *Neuraphes rubicundus*

Material: 2 specimens, 2 records, 2 squares - Li: Cadier en Keer, .vi.1956, Berger; Vijlen, .iii.1970, Berger.

Notes: Very rare. Many specimens identified as *N. rubicundus* were shown to belong to other *Neuraphes*-species, including *N. elongatulus* and *N. ruthenus*. The specimen from Winterswijk (.vi., NNM; Everts, 1922) belongs to *N. plicicollis*. Records from Den Haag and Arnhem (Everts, 1898) were withdrawn later (Everts, 1922).

10. *Neuraphes ruthenus* f. nov. spec.

Material: 50 specimens, 23 records, 14 squares.

Notes: Rather rare, throughout the country (fig. 8). Not recognized until now. Most specimens were identified as either *N. rubicundus* or *N. talparum*.

11. *Neuraphes talparum*

Material: 25 specimens, 10 records, 5 squares - Li: Heer, 8.xii.1968, Poot; Heerlen, 11.v.1969, 15.v.1969, 6.ix.1969, 9.i.1971, Blokland, Poot (NNM, PO); Maastricht, 7.iii.1964, Poot; Schin op Geul, 2.i.1937, Kruseman, Van der Wiel (ZMA); Sittard, Schmitz (NNM; Everts, 1921, 1922); Ibidem, .iv., .vii. Heselhaus (NNM; Everts, 1921).

Notes: Rare, confined to the south of Limburg. The specimens from Amsterdamsche Bosch (11.ii.1959, 10.ii.1960, ZMA) mentioned by Nonnekens (1961) are *N. ruthenus*. In fact most specimens standing under *N. talparum* belong to this species, including the specimens from Den Haag (.ix., NNM), Valkenburg and Burgst mentioned by Everts (1921, 1922). Everts (1922) gives Elsloo and Nuth in addition.

12. *Neuraphes plicicollis*

Material: 51 specimens, 11 records, 8 squares - Ge: Win-

terswijk, .vi., Everts (Everts, 1922, as *N. rubicundus*); Ibidem, .vi.1965, Berger - Ut: Baarn, 10.iv.1921, 22.iv.1921, 28.iv.1921, Mac Gillavry, Van der Wiel (LUW, NNM, PO, ZMA); Driebergen, Borna, 11.viii.1985, Vorst (Vorst, 1988) - NH: Naardermeer, Visserij, 9.iv.1994, Vorst - ZH: Oude Leede, Ackerdijk, 29.ix.1995, Van de Sande - NB: Bergen op Zoom, .vii.1908, Mac Gillavry (Everts, 1922, as *N. carinatus*) - NB: Helenaveen, .iii.1977, Berger - Li: Griendtsveen, Driehonderd Bunders, 6.xii.1996, Vorst.

Notes: Rare (fig. 9). Until recently many specimens of *N. plicicollis* were not recognized as such. Most of them were standing under *N. carinatus*.

13. *Neuraphes praeteritus*

Material: 7 specimens, 7 records, 5 squares - Ge: Tiel, 20.xi.1895, Uyttenboogaart (NNM; Everts, 1898) - NH: Amsterdam, .v.1864, Kinker (NNM; Everts, 1922, as *N. longicollis* (Motschulsky)) - Li: Gronsveld, .vi., Leesberg (NNM); Raren, Malensbosch, 1.vi.1991, Huijbregts (VO); Sittard, .iv., Heselhaus (NNM); Valkenburg, .vi., Everts (Everts, 1924b); Zuid-Limburg, .vi.1909, Uyttenboogaart (LUW; Uyttenboogaart, 1910, as *N. longicollis*).

Notes: Rare. Nonnekens (1961; as *N. longicollis*) mentions Amsterdamsche Bosch in addition, Everts (1898) gives Arnhem.

14. *Scydmorephes sparshalli*

Material: 4 specimens - Li: Plasmolen, Geuldert, 10.v.1997, Vorst.

Notes: All specimens hitherto identified as *S. sparshalli* belong to *S. helvolus*, the 'true' *S. sparshalli* was discovered only recently.

15. *Scydmorephes helvolus* f. nov. spec.

Material: 20 specimens, 14 records, 13 squares.

Notes: Rather rare (fig. 10). This species was not recognized as indigenous; until now confused with *S. sparshalli*. The latter species is however much rarer.

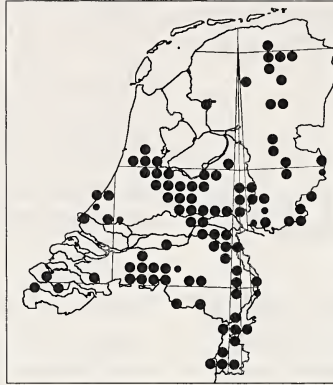
16. *Stenichnus scutellaris*

Material: 374 specimens, 241 records, 100 squares.

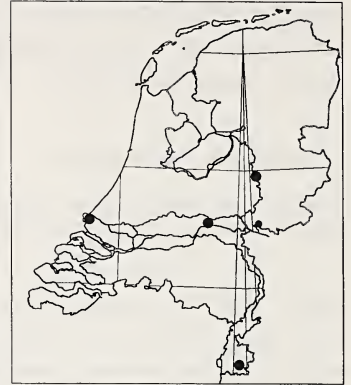
10. *Scydmorephes helvolus*



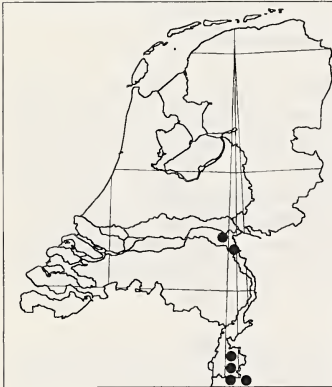
11. *Stenichnus scutellaris*



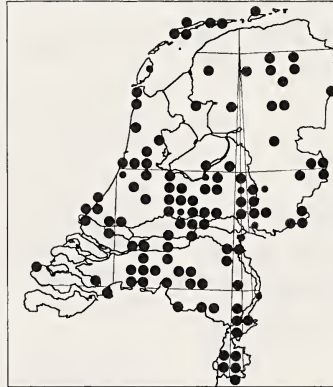
12. *Stenichnus pusillus*



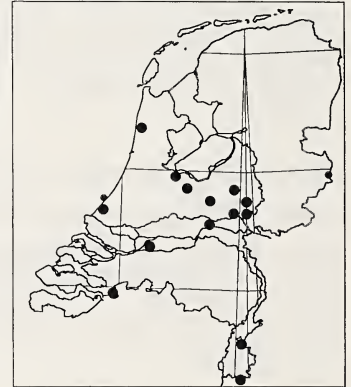
13. *Stenichnus godarti*



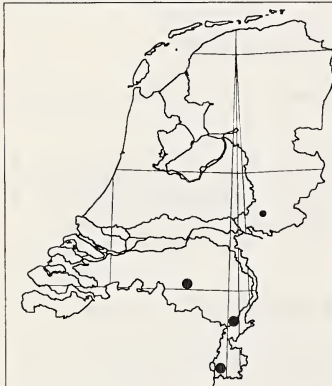
14. *Stenichnus collaris*



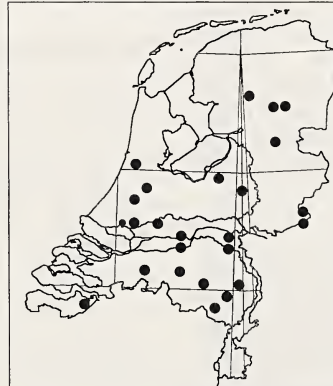
15. *Stenichnus bicolor*



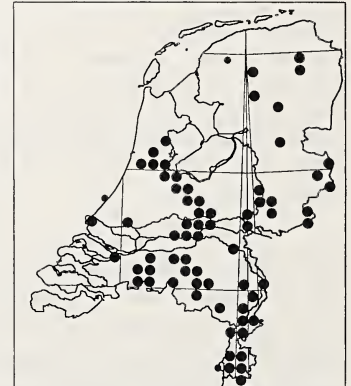
16. *Euconus denticornis*



17. *Euconus rutilipennis*



18. *Euconus hirticollis*



Figs 10-18. Distribution of Scydmaenidae in The Netherlands.

Notes: Common, but absent from the West Frisian Islands (fig. 11).

17. *Stenichnus pusillus*

Material: 12 specimens, 10 records, 5 squares - Ov: Deventer, .i.1920, Kerkhoven (NNM) - Ge: Herwen, .i.,

Scholten (NNM); Leeuwen, .iii.1917, Mac Gillavry (NNM; Everts, 1922) - ZH: Hoek van Holland, .ii.1902, De Vos (NNM) - Li: Colmont, 31.iii.1961, 4.iv.1961, 2.iv.1963, 16.iv.1964, 8.iv.1967, Poot; Ibidem, .vii.1968, Berger.

Notes: Rare (fig. 12). All specimens from Amsterdamsche Bosch (18.x.1952, 28.x.1952,

26.ii.1953, 22.iii.1954, 23.vii.1955, 18.xi.1955, 16.i.1956, ZMA) mentioned by Nonnekens (1961) are *S. scutellaris*.

18. *Stenichnus godarti*

Material: 24 specimens, 18 records, 6 squares - Ge: Nijmegen, Kopse Hof, 18.iii.1985, Van de Sande - Li: Colmont, 18.iv.1964, Poot (NNM); Epen, 24.v.1951, 16.vi.1958, 28.vi.1959, Van der Wiel (Van der Wiel, 1956); Ibidem, .vi.1962, .vi.1965, .vi.1966, Berger (NNM, PO); Ibidem, 12.vi.1971, Blokland; Eys, Cartils, 3.v.1986, Beenen; Plasmolen, 10.v.1997, Vorst; Vaals, .vi.1956, Berger (PO); Ibidem, 6.vi.1956, Van der Wiel; Ibidem, 16.vi.1958, Brakman (PO); Voerendaal, 11.vii.1952, 1.vi.1953, .vi.1955, Berger (PO); Van der Wiel, 1956); Ibidem, 24.vi.1955, Van der Wiel.

Notes: Rare, only in the southern part of Limburg and near Nijmegen (fig. 13). Van der Wiel (1956) also mentioned Gulpen (6.vii.1952).

19. *Stenichnus collaris*

Material: 621 specimens, 296 records, 114 squares.

Notes: Common throughout the whole country, also on the West Frisian Isles (fig. 14).

20. *Stenichnus bicolor*

Material: 71 specimens, 29 records, 16 squares.

Notes: Rather rare, seemingly absent in the northern provinces (fig. 15).

21. *Microscydmus nanus*

Material: 4 specimens, 4 records, 2 squares - Li: Epen, 24.v.1951, Van der Wiel; Houthem, 17.ix.1934, Van der Wiel; Valkenburg, .iv.1919, Rüschkamp (NNM; Everts, 1922); Ibidem, 15.ix.1956, Van der Wiel.

Notes: Very rare, limited to the southern part of Limburg.

22. *Euconnus pubicollis*

Material: 5 specimens, 4 records, 3 squares - Ge: Aalten, 't Klooster, 16.iii.1996, Heijerman - Li: Elsloo, 17.iv.1968, Poot (Berger & Poot, 1972); Heerlen, 31.i.1968, Blokland

(NNM; Berger & Poot, 1972); Hussenberg, 29.iv.1990, Vorst.

Notes: Very rare, in the southern part of Limburg and Gelderland. There are no older records available from this characteristic species.

23. *Euconnus claviger* f. nov. spec.

Material: 1 specimen - Li: Horst, Mariapeel, 1.iv.1975, Van de Sande.

24. *Euconnus wetterhallii*

Material: 7 specimens, 6 records, 4 squares - Li: Colmont, .v.1955, Berger; Ibidem, 31.iii.1959, 16.iv.1964, Poot; Sittard, .xi., Heselhaus (NNM; Everts, 1922); Susteren, 7.v.1972, Poot; Valkenburg, .vii.1888, Veth.

Notes: Very rare, only known from the southern part of Limburg.

25. *Euconnus denticornis*

Material: 12 specimens, 10 records, 4 squares - Ge: Doetinchem, 23.vii.1899, Van der Hoop (ZMA) - NB: Oirschot, .vii., Everts (Everts, 1909a, 1922); Ibidem, .vii.1908, Mac Gillavry - Li: 't Rooth, 9.iv.1963, 16.vi.1963, Poot; Cadier en Keer, 26.vi.1985, Poot; Houthem, .vii.1893, Versluys (NNM); St Odiliënberg, .iv.1959, Brakman; Ibidem, .iii.1961, Berger; Valkenburg, .vi., .vii., Everts (Everts, 1922, 1924b).

Notes: Very rare in the south-eastern part of the country (fig. 16).

26. *Euconnus rutilipennis*

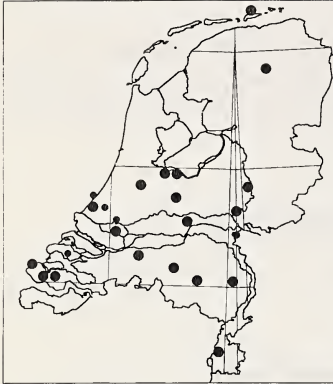
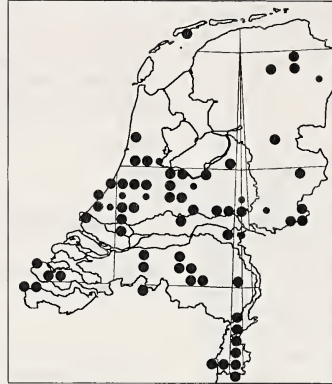
Material: 77 specimens, 43 records, 25 squares.

Notes: Not uncommon, but absent from southern Limburg (fig. 17).

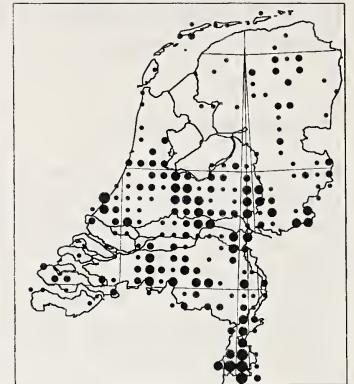
27. *Euconnus hirticollis*

Material: 544 specimens, 172 records, 71 squares.

Notes: A common species, but not on the West Frisian Islands (fig. 18). *Euconnus hirticollis* and *E. fimetarius* were often not properly separated. Not in Zeeland, all specimens from this province belonged to *E. fimetarius*.

19. *Euconnus fimetarius*20. *Scydmaenus tarsatus*

21. Scydmaenidae



Figs 19-21. Distribution of Scydmaenidae in The Netherlands. 21, The number of scydmaenid species recorded from each square is indicated by the size of the dot. From small to large they represent 1-2, 3-5, 6-10, 11-20 taxa, respectively.

28. *Euconnus fimetarius*

Material: 96 specimens, 42 records, 25 squares.

Notes: Not uncommon, in Zeeland the most common *Euconnus* species (fig. 19); also on the West Frisian Island of Schiermonnikoog.

Voerendaal, vi.1955, 25.vi.1955, Berger, Brakman, Van der Wiel (NNM, ZMA, PO; Van der Wiel, 1956).

Notes: Very rare, only in the southern part of Limburg.

29. *Scydmaenus tarsatus*

Material: 535 specimens, 165 records, 69 squares.

Notes: Common, also on the West Frisian Island of Terschelling (fig. 20).

Discussion

Scydmaenidae are mostly ground-living beetles and can be found in moss, leaf litter, under stones and pieces of wood. This is the case for all our more common species, including *Cephennium thoracicum*, *Neuraphes elongatulus*, *Stenichnus scutellaris* and *S. collaris*. *Neuraphes angulatus*, *Euconnus rutilipennis* and *E. hirticollis* share a pronounced preference for more humid and marshy places. Some species inhabit more specialized habitats: *Eutheia scydmaenoides*, *Scydmaenus tarsatus* and *Euconnus fimetarius* live in decaying vegetable matter, *Stenichnus bicolor* under bark. A relatively large number is more or less associated with ants' nests and/or burrows of rodents and moles: *Eutheia plicata*, *Neuraphes ruthenus*, *N. talparum*, *N. plicicollis*, *Scydmoraphes helvolus*, *Euconnus claviger* and *Scydmaenus perrisii*. Whenever present, scydmaenids form only a limited contribution, both in terms of species and of individuals, to the total beetle community.

30. *Scydmaenus rufus*

Material: 22 specimens, 7 records, 2 squares - Ge: Arnhem, .viii., Veth (Everts, 1898) - ZH: Den Haag, (Dierentuin), .iii., .iv., .v., .vi., .ix., .x., Everts (Everts, 1922).

Notes: Very rare. The occurrence at Den Haag was associated with the local zoo (Everts, 1922); probably the species was introduced here.

Due to their small body size, unattractive appearance and relative scarceness scydmaenids are underrepresented in most collections.

31. *Scydmaenus perrisii*

Material: 41 specimens, 6 records, 4 squares - Li: Bemelen, viii.1946, 7.viii.1946, Berger, Van der Wiel (NNM, ZMA; Van der Wiel, 1956); Epen, I.vii.1957, Van der Wiel; Ibidem, .vi.1970, Berger; Ibidem, 12.vi.1971, Blokland; Rimborg, .vi.1956, Berger; Ibidem, 5.vi.1956, Brakman, Van der Wiel (NNM, ZMA);

For this reason our knowledge of their occurrence in The Netherlands is still limited. Obviously the number of species recorded from each 10×10 km UTM square, as presented in figure 21, will be an underestimation of the actual number present in almost every square. This seems especially true for the northern part of the country, where from most of the squares no Scydmaenidae are recorded at all.

Distribution patterns

From the distributional data presented in table 1 and the figures it will be clear that many of the 31 Dutch scydmaenid beetles only have a limited distribution; the province of Limburg in particular is rich in these species. Twenty-nine species occur in this province, of which eight, *Eutheia schaumii*, *Neuraphes rubicundus*, *N. talparum*, *Scydmorephes sparshalli*, *Microscydmus nanus*, *Euconnus claviger*, *E. wetterhallii* and *Scydmaenus perrisii*, are even confined to this part of the country. Except for *E. claviger* and *S. sparshalli* all species are confined to the extreme southern part of the province. This particular part of the country is well-known for its richness in, often more southern, plant and animal species. Not surprisingly the 10×10 km square supporting the largest number of species (20) is situated in southern Limburg: FS93, near Valkenburg. Apart from strict 'Limburgian' species there are also species that are most common in southern Limburg but can as well be found on a few localities outside this region: *Stenichnus godarti* (fig. 13), *Euconnus pubicollis* and *E. denticornis* (fig. 16); all three are, however, confined to the south-eastern part of the country. *Euconnus rutilipennis* is the only widespread species that lacks in southern Limburg, probably due to the absence of its habitat, extended swamp areas and reed beds rich in accumulated vegetable matter.

The only species characteristic for the pleistocene central, eastern and southern part of the country is probably *Eutheia plicata* which is strictly associated with the ant *Formica exsecta* Nylander. *Neuraphes elon-*

gatulus is almost confined to this area and southern Limburg, where it is one of the commonest species, but is also recorded from the coastal dunes of Holland, Wommels and De Weerribben. Most probably this pattern can be explained by its association with forests, especially those on sand and peat soils.

The holocene coastal area possesses the poorest scydmaenid fauna. Only 15 species are reported from this area during this century; characteristic species are even completely absent. *Stenichnus collaris*, our most common species, is one of the few species that is abundant everywhere, even on the West Frisian Islands. The only other species occurring here are: *Neuraphes angulatus* (Terschelling), *Euconnus fimetarius* (Schiermonnikoog) and *Scydmaenus tarsatus* (Terschelling).

Cephennium thoracicum (fig. 4) and *C. gallicum* (fig. 5) both reach the limit of their distribution within The Netherlands and are clearly restricted to a certain part of the country: *C. thoracicum* is widespread in the southern part of the pleistocene district, but absent in the three northern provinces and a large part of Overijssel; *C. gallicum* is restricted to the south-west of the country, including southern Limburg, southern Brabant, Zeeland and Rotterdam. Although the distribution of *C. gallicum* most probably can be explained by climatic factors, this seems not to be the case for *C. thoracicum*. The area that this species occupies seemingly does not coincide with any biotic or abiotic factor. The preferred habitat of *C. thoracicum*, broadleaf woodlands, especially of beech (*Fagus sylvatica* L.), certainly is present in other parts of the country.

The finding of three specimens of *Neuraphes imitator* is remarkable, since until now this species has not been reported from North-West Europe. The nearest sites where it occurs are located in Switzerland, Austria, south-east Germany and the Czech Republic (Besuchet, 1980; Horion, 1949; Jelínek, 1993). Franz (1971) figures the aedeagus of this species (as *N. besucheti*). The most recent Dutch record dates from before 1922.

Table 2. Trends in time. Number of 10 x 10 km UTM squares and, between parentheses, relative abundance (*a*, *b*, *c*) during each of the three periods, respectively. A species is considered to show an increase in time when $a < b < c$; a strong increase when both $a < b < c$ and $c > 2a$; a decrease when $a > b > c$; and strong decrease when both $a > b > c$ and $c < a/2$ are true. Only those species reaching a relative abundance of at least 4% in one of these periods are presented.

	...-1899	1900-1949	1950-...
Strong increase			
<i>Neuraphes elongatulus</i>	15 (23)	22 (29)	78 (47)
Increase			
<i>Euconnus rutilipennis</i>	4 (6.2)	7 (9.3)	18 (11)
Decrease			
<i>Cephennium thoracicum</i>	18 (27)	16 (21)	30 (18)
Strong decrease			
<i>Neuraphes praeteritus</i>	4 (6.2)	1 (1.3)	1 (0.6)
<i>Euconnus denticornis</i>	3 (4.6)	1 (1.3)	2 (1.2)
<i>Euconnus fimetarius</i>	11 (17)	10 (13)	11 (6.6)
Scydmaenidae	65 (100)	75 (100)	166 (100)

Changes in abundance

To enable the analysis of possible changes in abundance three periods are discerned: pre-1900, 1900-1949 and from 1950 onward. The relative abundance was calculated for each period as the number of 10 x 10 km UTM-squares a species is recorded from, divided by the total number of squares from which Scydmaenidae are recorded during that period (*a*, *b* and *c* respectively; Vorst, 1995). Species showing a consistent trend in time, either increasing or decreasing, are enumerated in table 2. Only *Neuraphes elongatulus* shows a strong increase, its relative abundance since 1950 (47%) being two times higher than in the period before 1900. This forest-dwelling species probably profited from the expansion of the Dutch woods during this century. Moreover this species seems rather catholic concerning the moisture content of its habitat and is able to survive in dry situations. Remarkably, the abundance of an other forest-dwelling species, *Cephennium thoracicum*, shows an opposite trend, a slight decrease in abundance (from 27% to 18%; table 2).

Three species show a strong decrease, *Neuraphes praeteritus*, *Euconnus denticornis* and *E. fimetarius*. However, they were never abundant; *E. fimetarius* is the most widespread and has been recorded throughout the

country. It is commonly encountered in compost heaps and other decaying vegetable matter, but also occurs under more natural circumstances, in marshy places. *Neuraphes praeteritus* probably is associated with dead wood.

Endangered species

Three species not encountered since 1950 are considered to be extinct in The Netherlands: *Eutheia schaumii*, *Neuraphes imitator* and *Scydmaenus rufus* (table 3), which were always extremely rare. Species are considered as endangered if their relative abundance in

Table 3. Red list. Species are listed as extinct when not recorded since 1950. Species are listed as endangered when they reach a relative abundance of 4% in at least one of the three periods and the abundance since 1950 (*c*) is at least three times lower than during one of the two former periods ($c/a < 1/3$ or $c/b < 1/3$); the smallest of these ratios is presented. The year of the most recent records is given in the last column.

Extinct		
<i>Eutheia schaumii</i>		<1924
<i>Neuraphes imitator</i>		<1922
<i>Scydmaenus rufus</i>		<1922
Endangered		
<i>Neuraphes praeteritus</i>	0.10	1991
<i>Stenichnus pusillus</i>	0.10	1968
<i>Euconnus denticornis</i>	0.26	1985

the last period (since 1950) is at least three times lower than during one of the preceding periods (Vorst, 1995). According to these criteria *Neuraphes praeteritus*, *Stenichnus pusillus* and *Euconnus denticornis* are endangered species in The Netherlands. Of *N. praeteritus*, a woodland species, only a single post-1950 record is available. The occurrence of *S. pusillus* since 1950 is restricted to southern Limburg. Until the beginning of this century the species was recorded from several sites along the rivers Rijn and IJssel.

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