

An annotated list of the Dutch Pselaphidae (Coleoptera)

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Abstract: A check list, treating the Dutch species of Pselaphidae, is presented. The list includes 48 species, of which *Batrisodes buqueti*, *B. unisexualis*, *Biblopectus pusillus*, *B. tenebrosus*, *Bibloporus minutus*, *Euplectus bescidicus*, *E. infirmus* and *Tychus monilicornis* are recorded from The Netherlands for the first time. Five species formerly considered to be indigenous are removed from the list: *Brachygluta haemoptera*, *B. perforata*, *Bythinus securiger*, *Euplectus brunneus* and *Grammoplectus spinolae*. The present status in The Netherlands and the occurrence in each of the twelve Dutch provinces is given for every species. For many species distribution maps based on the 10 × 10 km UTM-grid are included. Distribution patterns and the changes in abundance during the last century are analyzed. Endangered species are listed.

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Introduction

Pselaphid beetles do not gain much attention of Dutch coleopterists, and never did. The first Dutch check list of Coleoptera contained only two species of Pselaphidae (Snellen van Vollenhoven, 1848). After two more lists by the same author (Snellen van Vollenhoven, 1854, 1870) a more complete overview, comprising 13 pselaphid species, was presented by Everts in 1875. During the next decades the knowledge of Dutch Coleoptera increased considerably. In 'De nieuwe naamlijst' (Everts, 1925) forty species were mentioned from The Netherlands. The most recent overview covering the Dutch Pselaphidae enumerates 46 species (Brakman, 1966).

The present check list contains 48 species, eight of which are reported from The Netherlands for the first time: *Batrisodes buqueti*, *B. unisexualis*, *Biblopectus pusillus*, *B. tenebrosus*, *Bibloporus minutus*, *Euplectus bescidicus*, *E. infirmus* and *Tychus monilicornis*. *Brachygluta haemoptera* (Aubé), *B. perforata* (Aubé), *Bythinus securiger* (Reichenbach), *Euplectus brunneus* (Grimmer) and *Grammoplectus spinolae* (Aubé), mentioned by Brakman (1966), are omitted, because their presence on his list was based on misidentifications. *Rybaxis laminata* (Motschulsky), also

in the list of Brakman (1966), is nowadays considered a male variety of *R. longicornis* (Besuchet, 1989). The status of *Batrisodes adnexus* as a Dutch species is still an open question; the identity of some females possibly belonging to this species is uncertain.

The nomenclature follows Pope (1977) and Lucht (1987); the sequence of the taxa is according to Lucht (1987). For identification the keys of Besuchet (1974) and Hansen (1968) were used. Females of the *Batrisodes venustus*-group were identified with Besuchet (1988); most of these specimens (those present in the collections of NNM and ZMA) were checked by Dr C. Besuchet. Female specimens of *Tychus* were identified with Secq (1989).

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 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.

Table 1. Check list of Dutch Pselaphidae. ● records after 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>Biboporus</i> C. G. Thomson												
1 <i>bicolor</i> (Denny)	.	.	●	●	.	●	●	.	.	.	.	●
2 <i>minutus</i> Raffray	.	.	.	●	.	●	●	●	.	.	●	●
<i>Biblopectus</i> Reitter												
3 <i>tenebrosus</i> (Reitter)	.	.	.	.	.	●	●	●	.	●	●	●
4 <i>ambiguus</i> (Reichenbach)	●	.	●	.	.	●	.	●	.	●	●	●
5 <i>pusillus</i> (Denny)	.	.	.	.	.	●	.	.	.	.	.	.
<i>Euplectus</i> Leach												
6 <i>nanus</i> (Reichenbach)	.	.	.	.	.	.	○	○	.	.	.	●
7 <i>piceus</i> Motschulsky	●	.	.	●	.	●	●	.	.	.	.	●
8 <i>infirmus</i> Raffray	.	.	.	.	.	.	.	.	.	.	.	●
9 <i>bescidicus</i> Reitter	.	.	.	.	.	●	.	.	.	.	.	.
10 <i>sanguineus</i> Denny	.	○	●	.	.	●	●	●	●	●	.	●
11 <i>signatus</i> (Reichenbach)	●	.	.	.	.	●	●	.	●	.	●	.
12 <i>punctatus</i> Mulsant	.	.	●	●	.	●	●	.	●	.	.	.
13 <i>karsteni</i> (Reichenbach)	.	.	.	●	.	●	●	●	.	●	●	●
14 <i>fauxi</i> (Guillebeau)	.	.	.	.	.	●	.	●	●	●	○	.
15 <i>duponti</i> Aubé	.	.	.	.	.	○	.	.	●	.	.	.
<i>Plectophloeus</i> Reitter												
16 <i>erichsoni</i> (Aubé)	.	.	.	.	.	.	.	.	.	.	.	●
17 <i>nitidus</i> (Fairmaire)	.	.	.	.	.	●	.	.	.	○	.	●
18 <i>fischeri</i> (Aubé)	.	.	.	.	.	.	.	.	.	.	.	●
<i>Trimium</i> Aubé												
19 <i>brevicorne</i> (Reichenbach)	.	.	.	.	.	.	.	.	.	.	.	●
<i>Trichonyx</i> Chaudoir												
20 <i>sulcicollis</i> (Reichenbach)	.	.	.	.	.	.	.	●	.	.	.	●
<i>Amauronyx</i> Reitter												
21 <i>maerkeli</i> (Aubé)	.	.	.	.	.	○	.	●	.	.	.	●
<i>Batrisus</i> Aubé												
22 <i>formicarius</i> Aubé	.	.	.	.	.	.	.	.	.	.	.	●
<i>Batrisodes</i> Reitter												
23 <i>delaporti</i> (Aubé)	.	.	.	.	.	.	.	.	.	.	.	●
24 <i>venustus</i> (Reichenbach)	.	.	.	.	.	.	.	.	.	.	.	●
<i>adnexus</i> (Hampe)	.	.	.	?	.	.	.	.	.	.	.	?
25 <i>buqueti</i> (Aubé)	.	.	.	.	.	.	.	.	.	.	.	●
26 <i>unisexualis</i> Besuchet	.	.	.	.	.	.	.	.	.	.	.	●
27 <i>oculatus</i> (Aubé)	.	.	.	.	.	.	●	.	.	.	.	●
<i>Bythinus</i> Leach												
28 <i>macropalpus</i> Aubé	.	.	●	.	.	●	●	●	●	●	●	●
29 <i>burrelli</i> Denny	.	.	.	.	.	●	.	.	.	.	.	●
<i>Bryaxis</i> Kugelann												
30 <i>puncticollis</i> (Denny)	.	.	●	●	.	●	●	.	.	○	●	●
31 <i>curtisi</i> (Leach)	.	.	●	.	.	.	.	.	.	.	.	●
32 <i>bulbifer</i> (Reichenbach)	●	●	●	●	.	●	●	●	●	●	●	●
33 <i>clavicornis</i> (Panzer)	.	.	.	●	.	●	.	.	●	.	●	.

	Fr	Gr	Dr	Ov	Fl	Ge	Ut	NH	ZH	Ze	NB	Li
<i>Tychus</i> Leach												
34 <i>niger</i> (Paykull)	●	.	○	●	.	●	●	●	●	●	●	●
35 <i>monilicornis</i> Reitter	.	.	.	.	.	.	.	.	.	.	●	.
<i>Rybaxis</i> Sauley												
36 <i>longicornis</i> (Leach)	●	.	.	●	.	●	●	●	●	●	●	●
<i>Brachygluta</i> C. G. Thomson												
37 <i>fossulata</i> (Reichenbach)	●	●	●	●	.	●	●	●	●	●	●	●
38 <i>haematica</i> (Reichenbach)												
a ssp. <i>haematica</i> (Reichenbach)	.	.	.	.	.	●	.	●	.	.	.	●
b ssp. <i>simplicior</i> Raffray	.	.	.	.	.	.	.	●	●	●	●	.
c ssp. <i>sinuata</i> (Aubé)	.	.	.	●	.	●	.	●	.	.	.	●
39 <i>simplex</i> (G. R. Waterhouse)	.	.	.	.	.	.	.	.	.	●	.	.
40 <i>helpferi</i> (Schmidt-Goebel)	●	.	.	.	.	.	.	●	●	●	●	.
<i>Reichenbachia</i> Leach												
41 <i>juncorum</i> (Leach)	●	●	.	○	.	●	●	●	●	●	●	●
<i>Trissemus</i> Jeannel												
42 <i>impressus</i> (Panzer)	●	●	●	●	.	●	.	●	.	●	●	●
<i>Pselaphaulax</i> Reitter												
43 <i>dresdensis</i> (Herbst)	●	.	●	.	.	●	.	●	.	.	●	●
<i>Pselaphus</i> Herbst												
44 <i>heisei</i> Herbst	●	.	●	●	.	●	●	●	●	●	●	●
<i>Chennium</i> Latreille												
45 <i>bituberculatum</i> Latreille	.	.	.	.	.	.	.	.	.	.	.	●
<i>Tyrus</i> Aubé												
46 <i>mucronatus</i> (Panzer)	.	.	.	.	.	●	.	.	.	.	.	.
<i>Claviger</i> Preyssler												
47 <i>testaceus</i> Preyssler	.	.	.	.	.	.	.	.	.	.	.	●
48 <i>longicornis</i> P. W. J. Müller	.	.	.	.	.	●	.	.	.	.	.	●
Total number of species	12	4	13	18	0	32	18	21	24	16	22	41
Number of species since 1900	11	4	13	14	0	29	17	19	15	15	18	37

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 and present status. For rare species (less than 11 UTM-squares) all records are presented. In addition distribution maps are presented for many 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.

In total 4901 specimens were examined. Material of the following Dutch museums and

private collections is included: National Museum of Natural History, Leiden (NNM; including the collections of J.A. Blokland, P.J. Brakman, E. Everts, H.J. van der Krift, F. Rüschkamp 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); J.G.M. Cuppen, Ede; B. Drost, Wadenoijen; G. v. Ee, Haarlem; Th. Heijerman, Wageningen; F. v. Nuenen, Vianen; P. Poot, Maastricht (PO); C. van de Sande, Amsterdam; F.C.F.

Sterrenburg, Den Haag; A.P.J.A. Teunissen, Vlijmen; W.J. Veldkamp, Eibergen (VE); O. Vorst, Utrecht.

Remarks

1. *Bibloporus bicolor*

Material: 35 specimens, 20 records, 9 squares - Dr: Assen, 23.v.1931, van der Wiel - Ov: Denekamp, 3.viii.1932, van der Wiel - Ge: Doorwerth, 23.viii.1958, Brakman; Renkum, vii.1931, Uyttenboogaart (LUW); Winterswijk, 13.vi.1993, Vorst - Ut: Werkhoven, 1.iv.1988, Vorst - Li: Epen, 9.vii.1952, 2.vii.1957, van der Wiel; Ibid., 8.vi.1964, Brakman; Ibid., 12.vi.1971, Blokland; Vaals, 15.vi.1958, van der Wiel; Ibid., 16.vi.1968, Brakman; Vijlen, 9.ix.1956, Brakman, van der Wiel; Ibid., 19.vi.1963, Brakman, Berger (NNM, VE); Ibid., 26.vi.1965, 14.vii.1965, 7.x.1965, 10.iii.1968, Poot (NNM, PO); Ibid., 11.ix.1966, 8.v.1967, Brakman.

Notes: Not uncommon in the southern part of Limburg. Rare in the rest of the country. Until now not separated from *B. minutus*.

2. *Bibloporus minutus* f. nov. spec.

Material: 77 specimens, 29 records, 20 squares.

Notes: Widespread and not uncommon (fig. 1). See also *B. bicolor*.

3. *Biblopectus tenebrosus* f. nov. spec.

Material: 35 specimens, 15 records, 14 squares.

Notes: Widespread and not uncommon. No records from the northern part of the country (fig. 2). See also *B. ambiguus*.

4. *Biblopectus ambiguus*

Material: 117 specimens, 32 records, 23 squares.

Notes: Widely distributed, not uncommon (fig. 3). Revision of the material identified as *B. ambiguus* revealed the presence of two additional species new to the fauna: *B. tenebrosus* and *B. pusillus*. Because of their, even for a pselaphid, very small body size, the members of this genus seem seriously overlooked

and their actual distribution will be much wider than can be concluded from the data given here. The results presented here are entirely based on males, as females can not be identified reliably.

5. *Biblopectus pusillus* f. nov. spec.

Material: 24 specimens, 10 records, 6 squares - Ge: Leeuwen, 18.iii.1917, 10.iii.1918, 23.iii.1919, van der Wiel (NNM, ZMA); Ibid., iii.1917, iv.1918, Mac Gillavry; Ibid., 20.v.1919 (PO); Wamel, .iii., Schuyt (NNM); Ibid., 10.iii.1918, van der Wiel - Ut: Driebergen, Six (ZMA) - ZH: Den Haag, iv.1875, Veth - NB: Breda, .ii., Bosscha (NNM); Burgst, .xii., Smits van Burgst (NNM) - Li: Steijl, .xii., Berchmans (NNM).

Notes: Not recorded since 1919. Mainly along the large rivers (fig. 4). See also *B. ambiguus*.

6. *Euplectus nanus*

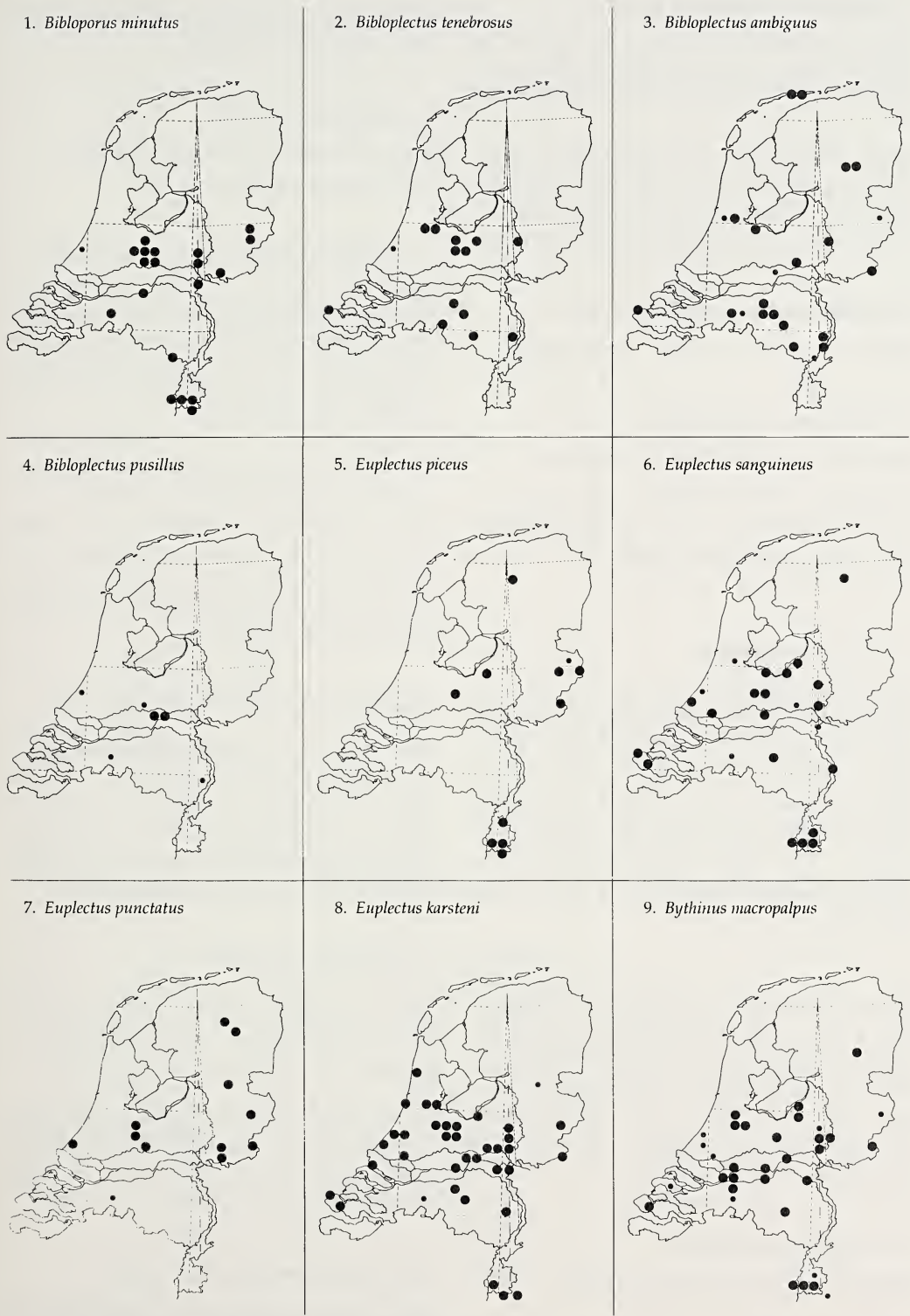
Material: 10 specimens, 8 records, 5 squares - Li: Bemelen, 26.v.1954, van der Wiel; Bocholtz, 4.vi.1967, Poot; Cadier en Keer, 6.vii.1957, van der Wiel; Epen, 28.vi.1959, van der Wiel; Ibid., vi.1959, Poot; Gulpen, 6.vii.1952, van der Wiel; Nuth, 27.iv.1956, Poot; Slenaken, 13.v.1947, van der Wiel; Voerendaal, 1.vi.1953, Berger (PO).

Notes: Rare, only in the southern part of the province of Limburg. All specimens identified as *E. nanus* and collected outside the province of Limburg belong to other species. The specimens in the collection Everts labelled Den Haag that probably correspond to those mentioned by him from Delft (Everts, 1898) are *E. sanguineus*, as no specimens labelled Delft could be traced.

7. *Euplectus piceus*

Material: 42 specimens, 20 records, 11 squares.

Notes: Rather rare in the southern and eastern part of the country, seemingly absent in the coastal area (fig. 5). Often overlooked and standing under *E. sanguineus*. Everts (1898) mentions furthermore Delft, .viii.; however, no specimen labelled as such could be traced.



Figs 1-9. Distribution of Pselaphidae in The Netherlands. Small dots: recorded before 1900 only; large dots: recorded since 1900.

8. *Euplectus infirmus* f. nov. spec.

Material: 8 specimens, 3 records, 3 squares - Ov: De Lutte, .vi., Everts - ZH: Den Haag, .iii., Everts - Li: Houthem, ix.1915, Mac Gillavry (Everts, 1922, as *E. falsus*).

Notes: Might be less rare than the few old records suggest because it was not recognized until now. Most specimens were identified as *E. karsteni*, to which this species is very close.

9. *Euplectus bescidicus* f. nov. spec.

Material: Ge: Eerbeek, viii.1924, 1 ♂, Weber (ZMA).

10. *Euplectus sanguineus*

Material: 252 specimens, 56 records, 24 squares.

Notes: Not uncommon (fig. 6). The specimens recorded from Winterswijk, .vi., as *E. sanguineus* var. *fraudulentus* Hubenthal (Everts, 1922) all belong to *E. piceus*.

11. *Euplectus signatus*

Material: 53 specimens, 13 records, 10 squares - Fr: Beetsterzwaag, .vi., Everts - Ge: Groesbeek, vii.1890, Veth (Everts, 1898); Velp, .x., 5.iv.1913, de Vos (NNM, ZMA) - Ut: Soest, 17.i.1937, van der Wiel - ZH: Den Haag, .viii., Everts (ZMA); Ibid., ii.1877, Leesberg (ZMA); Noordwijk aan Zee, 10.ii.1918, van der Wiel (LUW, NNM, ZMA); Rotterdam, ii.1911, Uyttenboogaart (LUW) - NB: Bostel, 16.v.1983, van de Sande; Eindhoven, Berger (PO); Nuenen, 25.x.1946, van der Wiel - Li: Exaeten, x.1888, Wasmann (Everts, 1898; NNM, ZMA).

Notes: Rather rare, throughout the country; only a few recent records. Many of the specimens standing under *E. signatus* appeared to belong to other species of this genus, including those mentioned by Everts from Loosduinen (Everts, 1898), Ommen and Valkenburg (Everts, 1922).

12. *Euplectus punctatus*

Material: 25 specimens, 14 records, 12 squares.

Notes: Rather rare, no records from the province of Limburg (fig. 7). A poorly recognized

species, many specimens being wrongly identified, mostly as *E. karsteni*.

13. *Euplectus karsteni*

Material: 300 specimens, 79 records, 37 squares.

Notes: Rather common (fig. 8).

14. *Euplectus fauveli* (= *E. falsus* Bedel)

Material: 17 specimens, 5 records, 4 squares - Ge: Eerbeek, vi.1919, Uyttenboogaart, Weber (LUW, ZMA) - NH: Amsterdam, 2.iii.1936, Kruseman (Reclaire & Van der Wiel, 1948, as *E. karsteni* var. *tomlini* Joy; ZMA) - ZH: Den Haag, .vi., .viii., Everts; Ibid., vi.1909, Veth - Ze: Nisse, 4.vii.1965, Brakman.

Notes: Rare. The specimen from Houthem, ix.1915, mentioned by Everts (1922) is *E. infirmus*; those from Arnhem and Den Haag (Everts, 1898) are *E. karsteni*; specimens from Putten (17.ix.1932, ZMA) recorded as *E. karsteni* var. *fauveli* by Reclaire and Van der Wiel (1948) are also *E. karsteni*.

[*Euplectus brunneus* (Grimmer)]

Notes: Has to be removed from the Dutch list. All available material (Den Haag, .v. (Everts, 1922), Valkenburg, .vii. (Everts, 1898) and Eerbeek, viii.1924) belongs to *E. duponti* or *E. bescidicus*. Material from Aalbeek, mentioned by Everts (1922), could not be traced.

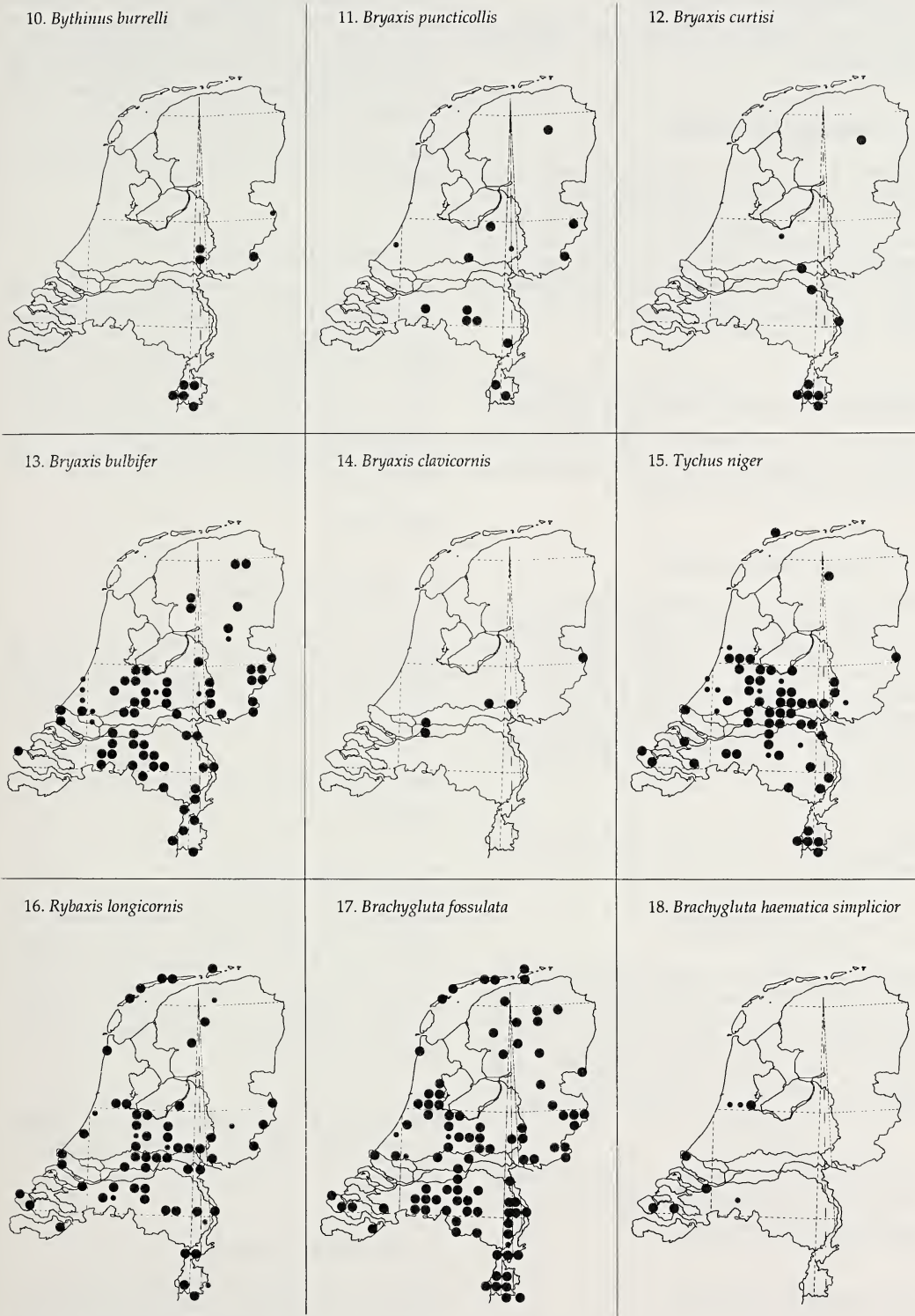
15. *Euplectus duponti*

Material: 10 specimens, 7 records, 2 squares - ZH: Den Haag, .v., Everts (Everts, 1898, as *E. brunneus*); Ibid., .vii., .viii., .ix., .x., Everts; Ibid., iv.1928, Leesberg (ZMA) - Li: Valkenburg, .vii., Veth (Everts, 1898, as *E. brunneus*).

Notes: Extremely rare. The specimens from Beetsterzwaag (6.viii.1926, Reclaire, ZMA) mentioned by Everts (1928, as *E. aubeanus* Reitter) belong to *E. piceus*.

[*Grammoplectus spinolae* (Aubé)]

Notes: The only published record (Reclaire & Van der Wiel, 1948) refers to a ♀ of *E. karsteni* (Putten, 17.ix.1932, ZMA).



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

16. *Plectophloeus erichsoni*

Material: Li: Valkenburg, iii.1920, 1 ♂, Rüşchkamp (Everts, 1922).

17. *Plectophloeus nitidus*

Material: 32 specimens, 10 records, 5 squares - Ge: Leeuwen, iii.1918, iv.1918, Mac Gillavry; Ibid., v.1920, van der Wiel; Wamel, .iii., iii.1917, 17.iii.1917, Schuyt, van der Wiel, Mac Gillavry (Everts, 1922; NNM, ZMA); Ibid., 8.iii.1918, 9.iii.1918, van der Wiel (LUW, NNM, ZMA) - ZH: Leiden, hortus botanicus, .vi., Everts - Li: Epen, 24.v.1951, 28.vi.1959, van der Wiel; Schin op Geul, 11.ii.1951, van der Wiel.

Notes: Rare. The specimen mentioned by Brakman (1961) from Nisse (Ze) could not be traced. A ♀ from Nuenen (25.x.1946, van der Wiel), mentioned in the same publication, belongs to *Euplectus signatus*.

18. *Plectophloeus fischeri*

Material: 26 specimens, 15 records, 3 squares - Li: Epen, vi.1956, Berger (ZMA); Ibid., vi.1963, Berger (PO); Ibid., xii.1967, Brakman; Ibid., 6.v.1968, Veldkamp; Vaals, 9.ix.1956, Brakman, van der Wiel (Van der Wiel, 1962); Ibid., vi.1958, Berger (VE); Vijlen, 9.ix.1956, van der Wiel (Van der Wiel, 1962; NNM, ZMA); Ibid., 19.vi.1963, 30.iv.1967, 6.v.1967, 8.v.1967, 20.v.1967, Brakman; Ibid., 14.vii.1965, 27.iv.1967, Poot; Ibid., 22.iii.1970, Blokland.

Notes: Rare, only in the southern part of Limburg.

19. *Trimium brevicorne*

Material: 17 specimens, 11 records, 5 squares - Li: Epen, 14.ix.1935, 30.v.1936, van der Wiel; Heerlen, 1.xii.1968, Poot (Berger & Poot, 1970); Houthem, ix.1915, Mac Gillavry; Ibid., 14-19.vi.1923, 24.v.1926, 17.ix.1934, van der Wiel (NNM, ZMA); Ibid., 26.iii.1937, Reclaire (ZMA); Sittard, Roelofs (Everts, 1922; NNM); Slavante, 20.x.1950 (NNM); Slenaken, 13.v.1947, van der Wiel.

Notes: Rare, only in the southern part of Limburg. Valkenburg, in addition, is mentioned by Everts (1922).

20. *Trichonyx sulcicollis*

Material: 46 specimens, 7 records, 5 squares - Ge: Arnhem, .v., v.1887, Veth (Everts, 1898; NNM, ZMA) -

NH: Amsterdamsche Bosch, 11.ii.1959, Nonnekens (Nonnekens, 1961; ZMA) - ZH: Rotterdam, .vii., Veth (Everts, 1898) - Li: Bemelen, .vii., Maurissen (Everts, 1898; NNM); Cadier en Keer, 3.vi.1956, Brakman, van der Wiel; Valkenburg, .vii., Everts (Everts, 1898); Voerendaal, 21.vi.1953, Berger, Poot (ZMA, PO).

Notes: Rare. Everts (1898) records Zutphen in addition.

21. *Amauronyx maerkeli*

Material: 11 specimens, 11 records, 8 squares - NH: Amsterdam, 6.vii.1936, Kruseman (ZMA); Amsterdamsche Bosch, 11.ii.1959, 10.ii.1960, 27.i.1961, Nonnekens (ZMA) - ZH: Rotterdam, 28.iv.1888, Everts (Everts, 1922) - Li: Colmont, 2.vi.1962, Poot; Maastricht, 3.iv.1934, Scholte (ZMA); Nuth, .viii., Heselhaus (Everts, 1922; NNM); Roermond, Zürcher (NNM); Valkenburg, 21.vi.1911, Rüşchkamp (Everts, 1922); Ibid., v.1920, Uyttenboogaart (LUW).

Notes: Rare.

22. *Batrisus formicarius*

Material: 13 specimens, 5 records, 3 squares - Li: Aalbeek, .vii., Wasmann (NNM); Bemelen, 7.viii.1946, van der Wiel (Van der Wiel, 1956); Kerkrade, 28.v.1954, Berger (PO); Voerendaal, 10.vii.1952, 25.vi.1955, Brakman, van der Wiel.

Notes: Rare, only in the southern part of Limburg.

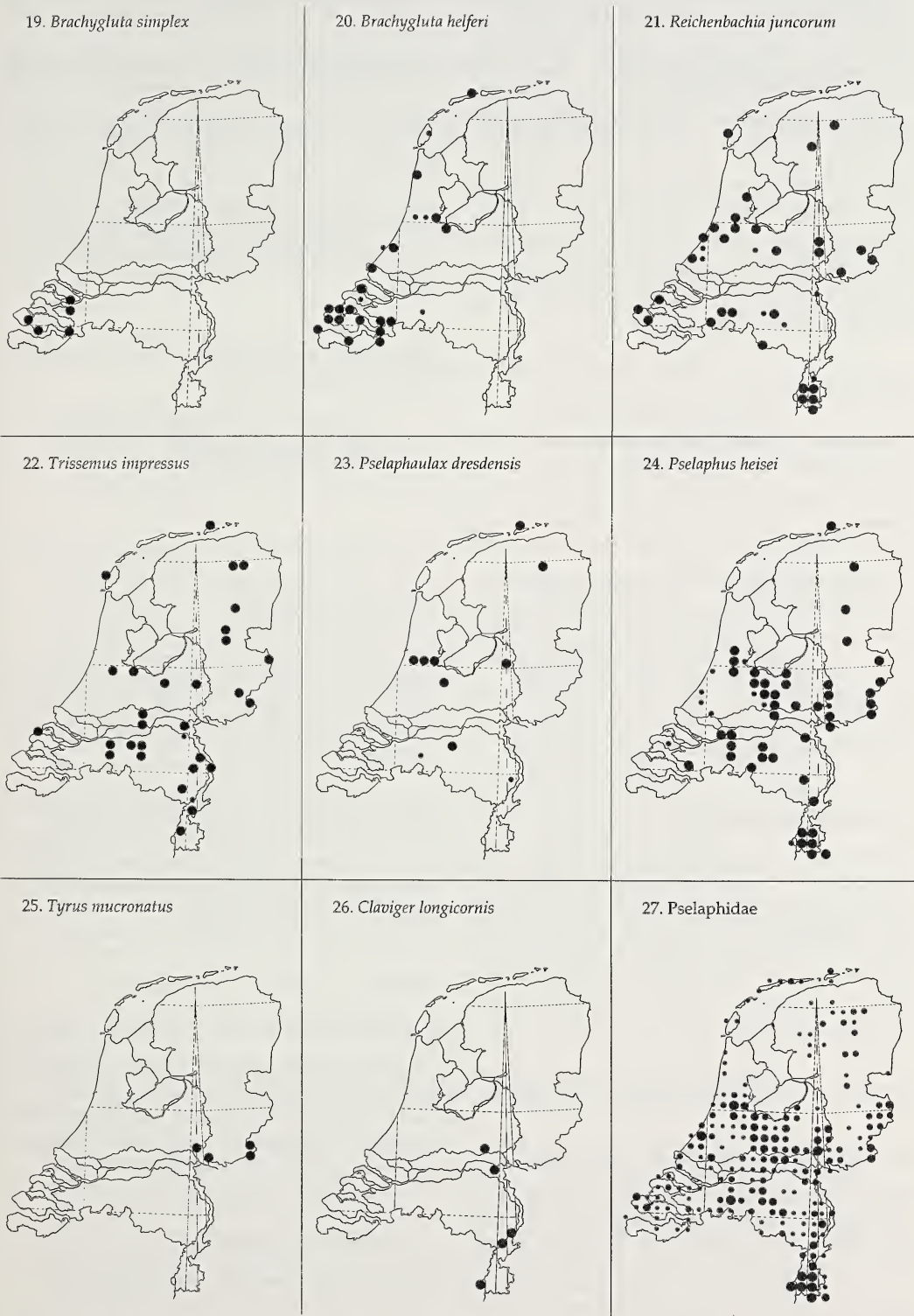
23. *Batrisodes delaporti*

Material: 14 specimens, 8 records, 4 squares - Li: Aalbeek, 17.vi.1910, Schmitz (NNM); Bemelen, viii.1946, Poot; Ibid., 7.viii.1946, van der Wiel (Van der Wiel, 1956); Epen, 12.vi.1971, Blokland; Rimburch, 5.vi.1956, Brakman, van der Wiel; Voerendaal, 10.vii.1952, 24.vi.1955, 25.vi.1955, Brakman, van der Wiel (Van der Wiel, 1956).

Notes: Rare in the southern part of Limburg. Everts (1922) records Maastricht, .vi., .vii., in addition.

24. *Batrisodes venustus*

Material: 21 specimens, 12 records, 5 squares - Ge: Winterswijk, 11.iv.1982, 1 ♀, Heijerman - Li: Bemelen, 7.viii.1946, 1 ♀, van der Wiel (Van der Wiel, 1956); Cadier en Keer, vi.1956, 1 ♀, Berger (NNM); Epen, vi.1956, 1 ♀, vi.1966, 1 ♂, Berger (PO); Ibid., vi.1959,



Figs 19-27. Distribution of Pselaphidae in The Netherlands. 27, The number of pselaphid species recorded from each square is indicated by the size of the dot. From small to large they represent 1-2, 3-6, 7-14 and 15-25 taxa, respectively.

1 ♀ (NNM); Ibid., 28.viii.1959, 3 ♀♀, van der Wiel; Slenaken, 13.v.1947, 1 ♀, van der Wiel; Vaals, vi.1956, 1 ♀, Berger (NNM); Ibid., 6.vi.1956, 1 ♂, Brakman; Voerendaal, 11.vii.1952, 1 ♂, 1.vi.1953, 2 ♂♂, 1 ♀, vi.1955, 2 ♀♀, Berger (NNM, PO); Ibid., 25.vi.1955, 1 ♂, 2 ♀♀, Brakman, van der Wiel (Van der Wiel, 1956).

Notes: Rare in the southern part of Limburg; one recent record outside this region (Winterswijk). Specimens from Tiel (Everts, 1898) belong to *B. oculatus* (Everts, 1922). Those recorded from Aalbeek and Valkenburg (Everts, 1922) are *B. buqueti*.

Batrisesodes adnexus

Notes: Six ♀♀ were designated as possibly belonging to this species by Dr C. Besuchet. One of these, from Oldenzaal (De Vries van Doesburg; NNM) was also identified by Everts as such (Everts, 1898), but later it was considered to belong to *B. venustus* (Brakman, 1963) and *B. adnexus* was subsequently removed from the Dutch list (Brakman, 1966). The other specimens are labelled as follows: Vaals, 6.vi.1956, 3 ♀♀, Brakman, van der Wiel; Ibid., 15.vi.1958, 1 ♀, van der Wiel; Voerendaal, 25.vi.1955, 1 ♀, van der Wiel.

25. *Batrisesodes buqueti* f. nov. spec.

Material: 12 specimens, 7 records, 4 squares - Li: Aalbeek, 4.ix.1912, 1 ♀, Rüschkamp (Everts, 1922, as *B. venustus*); Bemelen, 9.viii.1946, 2 ♀♀, van der Wiel; Epen, vi.1959, 1 ♀ (NNM); Vaals, 16.vi.1958, 1 ♀, Brakman; Valkenburg, .iv., 1 ♀, Heselhaus (Everts, 1922, as *B. venustus*; NNM); Voerendaal, 11.vii.1952, 1 ♂, 3 ♀♀, vi.1955, 2 ♀♀, Berger, van der Wiel (NNM, ZMA).

Notes: Rare in the southern part of Limburg.

26. *Batrisesodes unisexualis* f. nov. spec.

Material: 3 specimens, 3 records, 3 squares - Li: Valkenburg, 11.vi.1970, 1 ♀, Sanders (VE); Vijlen, 23.iv.1967, 1 ♀, Brakman (PO); Voerendaal, 11.vii.1952, 1 ♀, van der Wiel.

Notes: This only recently described species (Besuchet, 1988) is very rare in the southern part of Limburg.

27. *Batrisesodes oculatus*

Material: 27 specimens, 16 records, 8 squares - Ge: Tiel, vi.1896, viii.1896, viii.1898, Uyttenboogaart (Everts, 1922; LUW, NNM, ZMA) - Ut: Breukelen, 21.xi.1934, Kruseman (ZMA) - Li: Aalbeek, 24.v.1917, Wasmann (Everts, 1922; NNM); Elsloo, 9.ii.1969, Blokland; Maastricht, 12.i.1962, 6.xii.1962, 6.iii.1965, Poot; 't Rooth, 23.vi.1962, Poot; Sittard, .ii., Heselhaus (Everts, 1922; NNM); Valkenburg, 10.v.1911, 3.vii.1913, Rüschkamp (Everts, 1922); Ibid., Heselhaus (ZMA); Voerendaal, Heselhaus (Everts, 1922; NNM); Wijlre, 21.v.1951, 25.v.1951, Berger, van der Wiel (NNM, ZMA).

Notes: Rare in the southern part of Limburg; elsewhere extremely rare.

28. *Bythinus macropalpus*

Material: 138 specimens, 75 records, 34 squares.

Notes: Rather common, widespread (fig. 9).

29. *Bythinus burrelli*

Material: 48 specimens, 27 records, 9 squares - Ov: Denekamp, .vi., Everts - Ge: Arnhem, 25.vii.1960, de Gunst (NNM); Eerbeek, xii.1920, Weber (ZMA); Winterswijk, 24.iv.1965, Poot - Li: Many records, especially in the southern part.

Notes: Rather rare, confined to the southern part of Limburg and some parts of Gelderland and Overijssel (fig. 10). The specimen mentioned by Everts (1922) from Oisterwijk, .ix., belongs to *Bryaxis bulbifer*.

[*Bythinus securiger* (Reichenbach)]

Notes: *Bythinus securiger* does not belong to the Dutch fauna. All specimens identified as such were, often teneral, *B. macropalpus*. The nearest sites supporting this species are found in eastern Germany (Lucht, 1987) and northern France (Jeannel, 1950).

30. *Bryaxis puncticollis*

Material: 52 specimens, 23 records, 14 squares.

Notes: Rather rare and scattered throughout the south and east; apart from some old rec-

ords not known from the coastal provinces (fig. 11). Everts mentioned Vorden (Everts, 1898) and Utrecht (Everts, 1922) in addition.

31. *Bryaxis curtisi*

Material: 103 specimens, 45 records, 10 squares - Dr: Assen, .vi., Everts; Ibid., 28.vi.1930, Kempers (ZMA) - Ge: Nijkerk, .v., Everts (Everts, 1922) - Li: Many sites, especially in the southern part.

Notes: Common in the southern part of Limburg; outside this region rare in the east (fig. 12). The specimen recorded from Velp (Everts, 1922) is *B. clavicornis*.

32. *Bryaxis bulbifer*

Material: 681 specimens, 148 records, 70 squares.

Notes: Rather common and widely distributed, but absent from the West Frisian Islands (fig. 13).

33. *Bryaxis clavicornis*

Material: 8 specimens, 8 records, 5 squares - Ov: Lutterzand, 1.iv.1988, 1 ♂, 23.ii.1990, 1 ♂, Sterrenburg - Ge: Renkum, xi.1923, 1 ♂, Uyttenboogaart (NNM); Velp, viii.1915, 1 ♀, van der Hoop (Everts, 1922, as *B. curtisi*; NNM); Wageningen, .ix., 1 ♂, Reclaire (Everts, 1922; NNM) - ZH: Dordrecht, 29.v.1992, 1 ♂, Vorst - NB: Biesbosch, 11.ix.1993, 2 ♂♂, Vorst.

Notes: Rare and mainly confined to the valley of the Rhine and its side rivers. Locally (Biesbosch) not uncommon (fig. 14).

34. *Tychus niger*

Material: 316 specimens, 147 records, 64 squares.

Notes: Rather common, but remarkably scarce in the north (fig. 15).

35. *Tychus monilicornis* f. nov. spec.

Material: 2 specimens, 1 record, 1 square - NB: Breda, .x., 2 ♀♀, Smits van Burgst.

Notes: Presumably extremely rare, last record dating before 1930. Not recognized until now and hence probably less rare than suggested by this single record.

36. *Rybaxis longicornis* (= *Bryaxis sanguinea* Reichenbach)

Material: 367 specimens, 126 records, 63 squares.

Notes: Rather common, also on the West Frisian Islands (fig. 16). Forma *laminata* occurs throughout the country, mostly together with the nominal form, but is in most cases the least abundant.

[*Rybaxis laminata* (Motschulsky)]

Notes: This is considered a male form of *R. longicornis* now (Besuchet, 1989).

37. *Brachygluta fossulata*

Material: 706 specimens, 289 records, 99 squares.

Notes: Common and widespread, also recorded from the West Frisian Islands (fig. 17).

38. *Brachygluta haematica*

Notes: The following records are based on male specimens only.

a. ssp. *haematica*

Material: 4 specimens, 4 records, 3 squares - Ge: Velp, 29.iii.1908, de Vos (NNM) - NH: Amsterdam, .x., Kinker (NNM) - Li: Meerssen, viii.1902, v.1903, Kempers (ZMA).

Notes: Rare, last recorded in 1908.

b. ssp. *simplicior*

Material: 51 specimens, 14 records, 8 squares - NH: Amsterdam, Mac Gillavry; Ibid., Veth; Ibid., .vii., Bolten (NNM); Ibid., v.1870, Kinker (ZMA); Ibid., 9.vii.1892, de Vos (NNM); Diemen, 29.iii.1937, C.A. van Ee (ZMA); Haarlem, Spaarne, .viii., Groll (NNM); Zeeburg, .iv., Versluys (NNM); Ibid., v.1892, Drescher (ZMA); Ibid., ii.1908, 14.iv.1915, Mac Gillavry, Uyttenboogaart (NNM, ZMA) - ZH: Oostvoorne, 24.vi.1969, van Heijnsbergen (ZMA); Ibid., 23.iii.1974, Heijerman - Ze: Kattendijke, 23.iv.1978, van der Krift; Middelburg, 7.iv.1945, Batten (NNM) - NB: Breda, 3.iv.1874, Heylaerts (NNM); Willemstad, 23.xii.1980, van der Krift.

Notes: Rather rare and local, only recorded from the southwestern part of the country and the surroundings of Amsterdam (fig. 18).

c. ssp. *sinuata*

Material: 15 specimens, 12 records, 9 squares - Ov: Losser, 21.ii.1982, Veldkamp - Ge: Arnhem, Bolten (ZMA); Doetinchem, 23.vii.1899, Veth; Nunspeet, 5.viii.1927, Mac Gillavry - NH: Zeeburg (LUW) - Li: Bunde, 29.iv.1990, Vorst; Colmont, 12.v.1956, Poot; Ibid., 3.v.1970, Blokland (Berger & Poot, 1972); Maastricht, .viii., Maurissen (Everts, 1922; NNM); Spaubeek, 26.ix.1929, Scholte (ZMA); St. Pieter, Zürcher (NNM); Valkenburg, .vi., de Vos (NNM).

Notes: Rather rare in the southern part of Limburg; outside this area rare.

[*Brachygluta perforata* (Aubé)]

Notes: To be removed from the Dutch list. The specimen from Amsterdam (.x., Kinker; Everts, 1922, as *B. haematica* var. *perforata*; NNM), probably referred to by Brakman (1963), belongs to *B. haematica haematica*. Brakman (1963) also mentions a second record from Colmont (iv.1962, Berger) that could not be checked.

39. *Brachygluta simplex* (= *B. depressa* (Aubé))

Material: 23 specimens, 11 records, 5 squares - Ze: Borssele, iv.1940, Brakman; Noord Sloe, vii.1945, 14.vii.1945, 5.x.1945, Brakman, Batten (NNM, PO); Nieuw en St. Joosland, vi.1940, Brakman (Brakman, 1943; PO); Ibid., Zuid Sloe, vii.1942, Brakman (Brakman, 1943); Ibid., Zuid Sloe, 30.iii.1945, Brakman; Rilland Bath, 4.ix.1969, van der Krift (PO); St. Philipsland, 13.v.1979, van der Krift; Ibid., Slikken van de Heen, 16.vii.1984, 23.vii.1984, van der Sande.

Notes: Rare, limited in its distribution to Zeeland (fig. 19).

[*Brachygluta haemoptera* (Aubé)]

Notes: Not indigenous. The specimen under this name in the collection Everts (Zeeburg, 1.iv.1918, van der Vaart; Everts, 1922) belongs to *B. helferi*. The only other specimen, collected at the same site (Zeeburg, ii.1908, Uyttenboogaart, NNM), is *B. haematica simplicior*.

40. *Brachygluta helferi*

Material: 228 specimens, 76 records, 25 squares.

Notes: Not uncommon along the coast, especially in Zeeland (fig. 20). A single specimen labelled Gronsveld (26.v.1938, van Nidek, ZMA) is not presented on the distribution map, the occurrence of this halophilic species here being very unlikely. However, similar captures at considerable distance from salt-marshes are reported from Great-Britain (Allen, 1960).

41. *Reichenbachia juncorum*

Material: 126 specimens, 57 records, 37 squares.

Notes: Rather common (fig. 21).

42. *Trissemus impressus*

Material: 117 specimens, 61 records, 31 squares.

Notes: Not uncommon, scattered throughout the country (fig. 22).

43. *Pselaphaulax dresdensis*

Material: 28 specimens, 19 records, 10 squares - Fr: Schiermonnikoog, 19.viii.1985, Vorst - Dr: Haren, Friesche Veen, 2.viii.1942, 10.ii.1943, van Nidek (ZMA, PO) - Ge: Heerde, 27.iv.1917, van Doesburg (ZMA) - NH: Amsterdam, 1.iv.1910 (LUW); Ibid., 27.ii.1917, van der Wiel; Ibid., Koornneef (NNM); Ibid., 7.iii.1915, van Luyk (ZMA); Diemen, iv.1870, iii.1871, Kinker (ZMA); Ibid., 15.iii.1919, van Doesburg (ZMA); Hilversum, 4.v.1919, van der Wiel; Spaarnwoude, 7.iii.1920, van der Wiel; Zeeburg, .iv., v.1893, Versluys (Everts, 1898; NNM) - NB: Breda, 3.iii.1877, Heylaerts (Everts, 1922; NNM); Den Bosch, .ii., 18.iii.1906, Kempers (Everts, 1922; NNM, ZMA) - Li: Steijl, .xii., Berchmans (Everts, 1922; NNM).

Notes: Recorded only once since 1950 (fig. 23). In addition recorded from Roermond (Everts, 1898) and Utrecht (Everts, 1922). The specimen mentioned by Sterrenburg (1989) from Delden (29.ix.1986) belongs to *Bryaxis bulbifer*.

44. *Pselaphus heisei*

Material: 276 specimens, 130 records, 55 squares.

Notes: Rather common, less common in the coastal area (fig. 24).

45. *Chennium bituberculatum*

Material: 3 specimens, 2 records, 2 squares - Li: Exaeten, 4.vi.1898, Wasmann (Everts, 1898, 1922; NNM); Schinveld, 19.iv.1949, Poot.

Notes: Extremely rare, only in Limburg. Furthermore recorded from Nunhem (Li), 7.ix.1942 (Van Boven, 1943).

46. *Tyrus mucronatus* (= *T. sanguineus* auct.)

Material: 9 specimens, 6 records, 4 squares - Ge: Montferland, 10.vii.1955, van der Wiel (Van der Wiel, 1962); Park Veluwezoom, 24.x.1987, Sterrenburg (Sterrenburg, 1989); Winterswijk, 22.vi.1963, Poot; Ibid., 19.vi.1965, Brakman; Woold, 12.vi.1993, Vorst; Zijpenberg, 6.viii.1982, Sterrenburg (Sterrenburg, 1989).

Notes: Rare, confined to Gelderland (fig. 25).

47. *Claviger testaceus*

Material: 148 specimens, 28 records, 3 squares - Li: Colmont, 19.iv.1953 (VE); Ibid., 10.ix.1956, 19.v.1957, van der Wiel; Ibid., 31.iii.1959, 6.iv.1965, Poot (NNM, PO); Ibid., 1.iv.1967, 9.iv.1967, Brakman; Ibid., 3.v.1970, 12.vi.1970, Blokland, Teunissen (NNM); Maastricht, de Vos (NNM); Ibid., .vi., iv-v.1907, iv.1908, Mac Gillavry, Schmitz, Veth, de Vos (Everts, 1922; NNM, ZMA); Ibid., 18.iv.1965, 22.iv.1966, 22.vi.1966, Poot (NNM, PO); Strucht, 29.iv.1935, Scholte (ZMA); Ubachsberg, 8.iv.1966, Blokland; Valkenburg, .v., Leesberg (Everts, 1898; NNM); Ibid., .v., Schmitz (NNM); Ibid., vi.1895, v.1897, Wasmann, Veth (NNM); Ibid., v.1899, Leesberg (ZMA); Wijlre, .iv.1901, Everts (Everts, 1922); Ibid., 7.vi.1930, Batten (NNM); Ibid., 9.v.1949, 12.iv.1953, Batten, van Nidek, van der Wiel (NNM, ZMA); Ibid., 9.vi.1967, Sanders (VE).

Notes: Rare and local (southern part of Limburg). Everts (1922) records Sittard in addition.

48. *Claviger longicornis*

Material: 23 specimens, 6 records, 5 squares - Ge: Ede, viii.1947, Sterrenburg; Nijmegen, 23.iv.1982, van de Sande - Li: Belfeld, 10.iv.1968, Sanders (VE); Maastricht, .iv., .v., iv.1908, iv-v.1909, Schmitz (Everts, 1922; NNM, ZMA); Roermond, 13.viii.1942, Sanders (Van Boven, 1942; PO).

Notes: Rare, only in the south-eastern part of the country (fig. 26). Furthermore recorded from Waubach and Sittard (Everts, 1922).

Discussion

The number of species recorded from each 10 × 10 km UTM square is presented in figure 27. From a large number of squares (~55%) no pselaphids are recorded, although some of the more common species will occur almost everywhere. This indicates that the present data are far from complete and can only give a limited picture of the actual distribution in space and time of most species; especially the northern part of the country seems undersampled (fig. 27). Apart from the small number of records the interpretation of the data is also hampered by the fact that many pselaphids are stenotopic and ask for aimed collecting in special habitats. However, not all habitats and collecting techniques were always equally fashionable and, as a result, some species might be undercollected in a particular period. This may especially be true for species that live in rotten wood (e.g. *Tyrus mucronatus* and *Bibloporus* spp.) or associated with certain ants (e.g. *Batrisodes* spp. and *Claviger* spp.); many *Batrisodes*-species for instance are collected by only a few collectors. Furthermore, semi-aquatic habitats seem to have been neglected by most coleopterists in the past. Nevertheless, an attempt is made to analyse the available information in a meaningful way.

Patterns in distribution

When the distributional data are considered at the level of provinces, as presented in table 1, it appears that not all parts of the country are equally rich in species; the province of Limburg and especially the hilly southern part of it, possesses by far the most extended pselaphid fauna. Forty-four (sub)species are known from this region of which four are recorded before 1900 only. The maximum number of species recorded from a single square is 25, for square FS93, near Valkenburg (Limburg).

Examples of species that are confined to southern Limburg, or have their main distribution in this region, are *Euplectus nanus*, *Trimium brevicorne*, *Batrisus formicarius*,

Table 2. Trends in time. Number of 10×10 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 analyzed.

	...-1899	1900-1949	1950-...
Strong increase			
<i>Bibloporus minutus</i>	1 (1.5)	6 (7.0)	13 (8.4)
<i>Biblopectus tenebrosus</i>	1 (1.5)	3 (3.5)	10 (6.5)
<i>Trissemus impressus</i>	2 (3.1)	8 (9.3)	22 (14)
Increase			
<i>Bryaxis puncticollis</i>	2 (3.1)	4 (4.7)	9 (5.8)
<i>Bryaxis bulbifer</i>	11 (17)	19 (22)	48 (31)
<i>Brachygluta fossulata</i>	18 (28)	33 (38)	72 (46)
Decrease			
<i>Tychus niger</i>	23 (35)	24 (28)	34 (22)
<i>Brachygluta helferi</i>	9 (14)	9 (10)	14 (9.0)
<i>Reichenbachia juncorum</i>	11 (17)	14 (16)	18 (12)
Strong decrease			
<i>Biblopectus ambiguus</i>	9 (13.8)	8 (9.3)	10 (6.5)
<i>Biblopectus pusillus</i>	5 (7.7)	2 (2.3)	0 (0)
<i>Euplectus signatus</i>	6 (9.2)	5 (5.8)	1 (0.6)
<i>Amauronyx maerkeli</i>	3 (4.6)	3 (3.5)	2 (1.3)
<i>Batrisodes oculatus</i>	4 (6.2)	3 (3.5)	4 (2.6)
<i>Bythinus macropalpus</i>	14 (22)	15 (17)	13 (8.4)
<i>Brachygluta h. simplicior</i>	4 (6.2)	2 (2.3)	3 (1.9)
<i>Brachygluta h. sinuata</i>	5 (7.7)	2 (2.3)	2 (1.3)
<i>Claviger testaceus</i>	3 (4.6)	2 (2.3)	2 (1.3)
Pselaphidae	65 (100)	86 (100)	155 (100)

Batrisodes delaporti, *B. buqueti*, *B. unisexualis* and *Claviger testaceus*. This area occupies within The Netherlands a special position; not only these Pselaphidae but also many other, often southern, plant and animal species reach their distributional limits here. This can be explained by the rather deviant geological and climatological properties of this region that, unlike the rest of The Netherlands, resemble those of the central European hills. Remarkably enough, many of the species associated with the ant *Lasius brunneus* (Latreille) are also confined to southern Limburg, whereas this ant inhabits a large part of the country (Van Boven, 1986).

The pleistocene central, eastern and southern part of the country hardly harbours characteristic species. Only *Euplectus punctatus* and *Tyrus mucronatus*, both dependent on rotten wood (Horion, 1949; Koch, 1989), are limited to this region. A larger group of species is

common to both the pleistocene part and southern Limburg; to this group *Bythinus burrelli* and *Bryaxis puncticollis* belong. A total of 33 species (post-1900) inhabits the pleistocene area.

With twenty-four species the holocene coastal region possesses the poorest pselaphid fauna of the country; three of these species are confined to this area: *Brachygluta haematica simplicior*, *B. helferi* and *B. simplex*. The latter two are exclusively halophilic species (Horion, 1949; Pearce, 1957). This might also be true for *B. haematica simplicior*, as is suggested by its strictly coastal distribution (fig. 18). Outside The Netherlands, however, the species is not recognized as halophilic (Koch, 1989). The distribution of this southern species in The Netherlands coincides with the area possessing the mildest winters and thus might as well have a climatological explanation. Apart from these characteristic species,

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 record is given in the last column.

Extinct		
<i>Bibloplectus pusillus</i>		1919
<i>Euplectus infirmus</i>		1915
<i>Euplectus bescidicus</i>		1924
<i>Euplectus duponti</i>		1928
<i>Plectophloeus erichsoni</i>		1920
<i>Tychus monilicornis</i>		< 1930
<i>Brachygluta h. haematica</i>		1908
<i>Chennium bituberculatum</i>		1949
Endangered		
<i>Euplectus signatus</i>	0.07	1983
<i>Euplectus punctatus</i>	0.13	1992
<i>Amauronyx maerkeli</i>	0.28	1962
<i>Brachygluta h. simplicior</i>	0.31	1980
<i>Brachygluta h. sinuata</i>	0.25	1990
<i>Pselaphaulax dresdensis</i>	0.08	1985

the coastal district differs from the pleistocene region only by the absence of species, such as *Bibloporus bicolor*, *B. minutus* and *Euplectus piceus*. For some wood-dwelling species (e.g. *Euplectus piceus*) this seems due to the lack of extensive forests in this area. From the West Frisian Islands, although relatively well examined during this century, only nine species are recorded.

Trends in time

To analyse any changes in abundance, three periods are discerned: pre-1900, 1900-1949 and from 1950 onward. The relative abundance (*a*, *b* or *c*, respectively) was calculated for each of these periods as the number of 10 × 10 km UTM-squares a species is recorded from, divided by the total number of squares from which Pselaphidae are recorded during that period. By using squares instead of records, the abundance is not affected by the repeated collecting, sometimes year after year, at well known sites. This approach is allowable because the total number of sampled squares is in all periods far from maximum and thus an indicator for the collecting intensity. Species not

reaching a relative abundance of 4% in any of the three periods are excluded from analysis (thus: $a > 0.04$ or $b > 0.04$ or $c > 0.04$).

Species showing a consistent trend in time, either decreasing ($a > b > c$) or increasing ($a < b < c$), are presented in table 2. Three species showed a strong consistent increase ($c > 2a$): *Bibloporus minutus*, *Bibloplectus tenebrosus* and *Trissemus impressus*. The latter one is recorded in twenty-two squares for the period from 1950 onward, and before 1900 in only two.

Nine species showed a strong decreasing trend ($c < a/2$; table 2). Only one of these, *Bythinus macropalpus*, is widespread and still rather common, but shows nevertheless a marked decrease in relative abundance: from 22% to 8.4%. From an ecological point of view these decreasing species form a diverse assembly, thereby suggesting multiple factors to be responsible for the trend.

Of particular interest is the genus *Bibloplectus*. Until now the three species that occur in The Netherlands were not recognised as such, allowing an analysis of their relative abundance not biased by differences in collecting intensity. Remarkably enough all three show a clear and partly opposite trend in time. *Bibloplectus ambiguus* and especially *B. pusillus* show a marked decrease, while the number of squares supporting *B. tenebrosus* strongly increased during the last century (table 2).

Taxa in danger

Finally, the available data were applied to identify taxa that are threatened with extinction or no longer occur in The Netherlands. Species that are not recorded since 1950 are considered to be extinct. The eight species which have vanished since the middle of the century according to this criterion are enumerated in table 3. Of these, three (*Bibloplectus pusillus*, *Tychus monilicornis* and *Brachygluta haematica haematica*) are soil-dwelling species, *Chennium bituberculatum* lives with ants, while the other four are found in decaying wood or vegetable matter (Koch, 1989; Pearce, 1957).

For the remaining species, rareness by itself is not a sufficient character to select threatened taxa. A taxon may have only a few very localised but stable populations and be not in danger at all. A strong decrease in abundance during the last decades however, probably is a more reliable indicator. Extrapolation of such a trend will inevitably result in extinction. In this study a species is considered endangered when its relative abundance since 1950 is three or more times less than in one or both of the previous periods ($c/a < 1/3$ or $c/b < 1/3$). Again, species not reaching the 4%-limit in any of the periods are excluded from this analysis.

Species in danger of extinction according to these arbitrary criteria are listed in table 3. All six (sub)species never had a wide distribution in The Netherlands and greatly differ in their habitat preference. *Euplectus signatus* for instance occurs in hot-beds, manure heaps and with ants; *E. punctatus* is clearly associated with rotten wood, while *Pselaphaulax dresdensis* inhabits very wet moss (Koch, 1989; Pearce, 1957).

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