

Review of the European species of the genus *Chionea* DALMAN, 1816 (Diptera, Limoniidae)

Revision der europäischen Arten der Gattung *Chionea* DALMAN, 1816 (Diptera, Limoniidae)

PJOTR OOSTERBROEK and HERBERT REUSCH

Summary

This review of the European species of the genus *Chionea* (Diptera, Limoniidae), in 2 subgenera, *Chionea* (2 species) and *Sphaeconophilus* (7 species) includes an illustrated key to the species and for each species a diagnosis, type material, synonymy, discussion and details about the countries from which the species is known or has been reported. *C. (S.) bezzii* from Northwest Spain is new to science. 7 new synonyms are proposed and lectotypes are designated for *C. (S.) lutescens* LUNDSTRÖM, 1907, *C. (S.) belgica* (BECKER, 1912) and *C. (S.) italica* VENTURI in FRANCISCOLO, 1955. An extensive list of references on European *Chionea* species is presented and the paper concludes with a list of the material examined.

1. Introduction

Members of the genus *Chionea* are small (3-8 mm), spider-like, nematocerous Diptera with the wings so extremely short that they are frequently referred to as being wingless (fig. 1, 2, 25). The body colour ranges from yellowish to very dark brown, this variation being found even within one species. They are mainly active around and during the winter period¹ and are frequently found on snow, in caves and in animal

¹ Adults are most frequently collected between September and April with most records referring to the period from mid November to the end of February. MENDEL et al. (1977) pointed out that in North Sweden the period of adult activity of both *araneoides* and *crassipes* lasts until far in June. From other parts of Europe there are records from May for *lutescens* (Germany: REUSCH 1997, ME; Czech Rep.: STARÝ et al. 2005), from May and June for *austriaca* (Austria: CHRISTIAN 1980, ME (June); Italy: VANIN & MASUTTI 2008 (as *lutescens*); Slovenia: ME (May) and several records from May to August for *alpina*, indicating that especially this species can in fact be collected throughout the year (France: FOCARILE 1975 (August); Spain: ESCOLÀ & BELLÉS 1977, BOURNE 1979a, ME (July, August); Germany: ME (May); Switzerland: ME (June-July); Austria: FRANZ 1989, CHRISTIAN 2009, ME (May, July, August); Italy: BURGHELE-BĂLĂCESCO 1969, FOCARILE 1975, VANIN & MASUTTI 2008, ME (May, June, July, August); Montenegro: SIMOVA-TOSIC 1992, ME (June, July).

burrows². In Europe altitudes range from sea level to over 3000 m, with a corresponding wide choice of habitats, from pastures, gardens, heath, bogs, deciduous as well coniferous forests to alpine meadows and high altitude marshlands³. Many samples from a wide variety of these habitats contain 2 species and in several cases even 3⁴.

The genus *Chionea* was erected by DALMAN in 1816 for the new species *araneoides*. By a century later, another 4 European species were described (*crassipes* BOHEMAN, 1846; *lutescens* LUNDSTRÖM, 1907; *alpina* BEZZI, 1908; *belgica* BECKER, 1912), followed by another 16 between 1932 and 1986. 6 of these 21 names have been synonymized in the past. In the present study another 7 names are synonymized. Together with the description of the new species *bezzii* from Spain, this results in a total of 9 *Chionea* species recognized by us for Europe.

The genus is strictly Holarctic, with 18 recognized species group taxa in the Nearctic and now 14 in the Palaearctic. The 9 European members have been divided into 2 subgenera, *Chionea* s.str. (2 species) and *Sphaeconophilus* BECKER, 1912 (7 species). The 5 East Palaearctic members are assigned to the subgenus *Chionea*. This currently is also the case for the Nearctic species but here further research is necessary. The Nearctic species *macnabeana* ALEXANDER, 1946 and *jenniferae* BYERS, 1995 almost certainly belong to the subgenus *Sphaeconophilus*, whereas others show at least some ♂ genital characters as found in *Sphaeconophilus* (BYERS 1983, 1995).

The division of *Chionea* into 2 subgenera goes back to ENDERLEIN (1936) and KRATOCHVÍL (1936a, 1938). ENDERLEIN erected the new genus *Niphadobata* [= *Sphaeconophilus*] to include *lutescens* and 2 unspecified species, maintaining *araneoides* in *Chionea*. The separation of the 2 genera was based on the number of antennal segments

² Of the records that provide information on where the material has been collected, about 40 % is from soil or Barber traps, about 40 % from snow and about 10 % from caves or animal burrows.

³ The following papers provide information about the biology of (species of) *Chionea*: BARNDT (2004), BOURNE (1981b), BYERS (1961, 1983), EDWARDS (1936, refers to *belgica*), HÅGVAR (1971, 1976a, 1976b), HEIJERMAN (1987), ITĂMIES & LINDGREN (1985), MARCHAND (1917), MENDEL et al. (1977, 1987), NADIG (1945, 1949), REUSCH (1997), SÖMME & ÖSTBYE (1969), STRÜBING (1958), THALER (2002), TURQUIN (1973), VANIN & MASUTTI (2008), WEBER & WEIDEMANN (1993), WOJTUSIAK (1950).

⁴ Samples containing 2 species are rather frequent and in several cases samples contain 3 species. The habitat preferences of the species are far from understood. However, these 2- and 3-species-samples indicate that there is a certain overlap in the habitat preferences of the species. But even if in the same habitat, there can be differences in activity. For example, 10 days collecting with a time trap in the Messaure region in North Sweden showed that *araneoides* was active from 4.00-16.00 hours whereas *crassipes* was collected only during midnight (MENDEL 1972). Apart from the many *araneoides-crassipes* samples from the Abisko and Messaure regions in north Sweden, we have seen 2-species-samples for the following species: *alpina* 36 (17× *araneoides*, 10× *austriaca*, 3× *belgica*, 3× *botosaneanui*, 3× *lutescens*), *araneoides* 28 (17× *alpina*, 5× *belgica*, 3× *botosaneanui*, 3× *lutescens*), *austriaca* 10 (10× *alpina*), *belgica* 13 (3× *alpina*, 5× *araneoides*, 5× *lutescens*), *botosaneanui* 6 (3× *alpina*, 3× *araneoides*), *lutescens* 11 (3× *alpina*, 3× *araneoides*, 5× *belgica*). 2 samples contain 3 species: France, Haute-Savoie, Flaine, 14.XII.1975, 1700 m (*alpina*, *belgica* and *lutescens*, all det. *lutescens* by J.D. BOURNE); Italy, Lombardia, Sondrio, Valfurva, 20-30.XII.1981, 1300-1400 m (*araneoides*, *alpina* and *botosaneanui*, det. *araneoides* and *lutescens* by L. SÜSS). Of the 48 localities given by NADIG (1943b) for *araneoides* (as *minuta*) and *alpina*, 10 are the same for both species. Many 2-species-samples and several 3-species-samples are also given in CHRISTIAN (2009).

(10 in *Chionea*, 7 in *Niphadobata*) and on the lobe at the base of the gonostyle (present in *Chionea*, present or absent in *Niphadobata*). A similar division between a *longicornes* and a *brevicornes* group was proposed by KRATOCHVÍL (1936a, 1938), based also on antennal and ♂ genital characters. Study of the ♂ genital characters corroborated the division of *Chionea* into 2 separate groups (BURGHELE-BĂLĂCESCO 1969), but this is not the case with the number of antennal segments (SAVCHENKO 1981, KRZEMIŃSKI 1982, BYERS 1983). Other characters used in the older as well as the more recent literature to describe and/or separate species (e.g., body colouration, numbers and length of the verticils on the antennal segments, arrangement and strength of the hair-like bristles on the legs, shape and build of the femora) turned out to be rather variable within the species as recognized by us.

Niphadobata was proposed as a genus separate of *Chionea*, but as pointed out by BYERS (1983), a division into 2 genera ignores the great number of structural specializations of the thorax, legs, wings, halteres and abdomen that *Chionea* species have in common. This view was also taken by MENDL (1979) although most European workers maintained considering *Niphadobata* as a genus (CHRISTIAN 1980, BOURNE 1979a, SAVCHENKO 1982, GROOTAERT 1984, BRUNHES 1986, HEIJERMAN 1987, REUSCH 1988). Presently, almost all authors follow SAVCHENKO et al. (1992) who recognized 1 genus with 2 subgenera, *Chionea* s.str. and *Sphaeconophilus* BECKER, 1912, the latter as senior synonym of *Niphadobata* ENDERLEIN, 1936. BECKER (1912a) described *Sphaeconophilus belgicus* as a new genus and species without reference to a family. In the same year, BECKER withdrew the name *Sphaeconophilus* because of the great similarity with *Chionea*, and considered the possible synonymy of *belgicus* with *crassipes* BOHEMAN, 1846 (BECKER 1912b). Thereupon, *Sphaeconophilus belgicus* became forgotten until the species was redescribed, in *Niphadobata*, by GROOTAERT (1984).

Keys to the European species of *Chionea* are presented between 1982 and 1986 by several authors, but none of them with inclusion of all species group taxa or synonyms known at the time of their publication. KRZEMIŃSKI (1982) does not include *belgica* (BECKER, 1912) and *austriaca* CHRISTIAN, 1980, apparently because he is not aware of their descriptions. GROOTAERT (1984) does not yet take into account the synonyms proposed by KRZEMIŃSKI (1982). Finally, BRUNHES (1986) does not cite CHRISTIAN (1980), KRZEMIŃSKI (1982), or GROOTAERT (1984).

It has been our goal to overcome the above deficiencies by presenting a key which includes all European species. In order to do so, we have tried to study as much original type material as possible. An unexpected outcome of this are the various new synonyms proposed here and the discovery of the new species *bezzii* from Northwest Spain.

This *Chionea* project has been underway for about 10 years. During all this time we have received great help from many friends and colleagues who helped us out with tracing collections, localities, the loan of type material, etc. It was of great importance that we were able to study the large collections of various *Chionea* authors, such as BOURNE, KRZEMIŃSKI, MENDL, NADIG and VANIN. Apart from this it was of much interest to study smaller collections, on loan or as a gift, from the distributional limits of *Chionea* in the Westpalaeartic such as the Kola Peninsula, Spain, Portugal and Romania. It is therefore with great pleasure to thank the following persons:

LAZARE BOTOSANEANU (Amsterdam, Netherlands), GEORGE W. BYERS (Lawrence, USA), MIGUEL CARLES-TOLRÀ (Barcelona, Spain), ERHARD CHRISTIAN (Vienna, Austria), NETTA DORCHIN (Bonn, Germany), EULALIA EIROA (Santiago de Compostela, Spain), OLEGUER ESCOLÀ (Barcelona, Spain), PATRICK GROOTAERT (Brussels, Belgium), JEAN-PAUL HAENNI (Neuchâtel, Switzerland), THEODOOR HEIJERMAN (Wageningen, Netherlands), HEIKKI HIPPA (Stockholm, Sweden), HERMAN DE JONG (Amsterdam, Netherlands), WIESLAW KRZEMIŃSKI (Krakow, Poland), OLAVI KURINA (Tartu, Estonia), JUHA LAIHO (Helsinki, Finland), GUNVI LINDBERG (Stockholm, Sweden), COSMIN O. MANCI (Retezat, Romania), GLÒRIA MASÓ I ROS (Barcelona, Spain), FRANCO MASON (Verona, Italy), LOÏC MATILE (Paris, France), BERNARD MERZ (Geneva, Switzerland), JORGE MEDEROS (Barcelona, Spain), GIANLUCA NARDI (Verona, Italy), TONE NOVAK (Marobor, Slovenia), THOMAS PAPE (Copenhagen, Denmark), FABIO PENATI (Genova, Italy), SLAVKO POLAK (Postojna, Slovenia), ALFIO RASPI (Pisa, Italy), JUKKA SALMELA (Jyväskylä, Finland), ULRICH SCHNEPPAT (Bern, Switzerland), PETER SEHNAL (Vienna, Austria), HANS SILFVERBERG (Helsinki, Finland), BRADLEY SINCLAIR (Bonn, Germany), IGNAC SIVEC (Ljubljana, Slovenia), JAROSLAV STARÝ (Olomouc, Czech Republic), HANS ULRICH (Bonn, Germany), LUIZA UJVAROSI (Cluj, Romania), STEFANO VANIN (Padova, Italy), PEKKA VILKAMAA (Helsinki, Finland) and JAN-WILLEM VAN ZUIJLEN (Waalwijk, Netherlands).

2. Material and methods

List of names

- alpina* BEZZI, 1908 (as *Chionea*), valid species, in *Chionea (Sphaeconophilus)*.
- ancae* MENIER et MATILE, 1976 (as *Niphadobata*), tentatively considered here a synonym of *belgica*, **syn. nov.**
- araneoides* DALMAN, 1816 (as *Chionea*), valid species, type species of *Chionea*.
- arverna* BRUNHES, 1986 (as *Niphadobata*), synonym of *lutescens*, **syn. nov.**
- austriaca* CHRISTIAN, 1980 (as *Niphadobata*), valid species, in *Chionea (Sphaeconophilus)*.
- belgica* BECKER, 1912 (as *Sphaeconophilus*), valid species, type species of *Chionea (Sphaeconophilus)*.
- buschetti* BOURNE, 1979 (as *Niphadobata*), synonym of *lutescens*, **syn. nov.**
- bezzii* OOSTERBROEK et REUSCH, 2008 (as *Chionea*), valid species, in *Chionea (Sphaeconophilus)*, **spec. nov.**
- bohemica* KRATOCHVÍL, 1936 (as *Chionea*), synonym of *lutescens* (KRATOCHVÍL 1938).
- botosaneanui* BURGHELE-BĂLĂCESCO, 1969 (as *Niphadobata*), valid species, in *Chionea (Sphaeconophilus)*.
- brevirostris* TAHVONEN, 1932 (as *Chionea*), synonym of *lutescens* (as already suggested in BOURNE (1979a), contra SVENSSON (1969: synonym of *araneoides*).
- breviventris* TAHVONEN in FREY & STORÅ (1941), lapsus for *brevirostris*.
- catalonica* BOURNE, 1979 (as *Niphadobata*), synonym of *alpina*, **syn. nov.**
- crassipes* BOHEMAN, 1846 (as *Chionea*), valid species in *Chionea (Chionea)*, represented in the Westpalaeartic by the nominotypical subspecies.
- dalmani* LOEW, 1871 (as *Chionea*), as unnecessary new name for *araneoides*.
- hrabei* KRATOCHVÍL, 1936 (as *Chionea*), synonym of *araneoides* (NADIG 1943b: synonym of *minuta* [= *araneoides*]).
- italica* VENTURI in FRANCISCOLO, 1955 (as *Chionea*), tentatively considered here a synonym of *alpina* Bezzi, 1908.
- jurassica* BOURNE, 1979 (as *Niphadobata*), synonym of *lutescens*, **syn. nov.**
- kratochvili* BURGHELE-BĂLĂCESCO, 1969 (as *Niphadobata*), synonym of *botosaneanui* (KRZEMIŃSKI 1982).

lutescens LUNDSTRÖM, 1907 (as *Chionea*), valid species, in *Chionea (Sphaeconophilus)*, type species of *Niphadobata*.

major STROBL, 1900 (as *Chionea*), nomen dubium (Bosnia-Herzegovina; most probably referring to *lutescens* or *alpina*, cf BEZZI 1919, KRATOCHVÍL 1938, BITSCH 1955, OOSTERBROEK & SIMOVA-TOSIC 2004). Apart from STROBL (1900) the name *major* has been used only once, by BEZZI (1914) for records also from Bosnia-Herzegovina.

minuta TAHVONEN, 1932 (as *Chionea*), synonym of *araneoides* (SVENSSON 1966, 1969).

pyrenaea BOURNE, 1981 (as *Niphadobata*), valid species, in *Chionea (Sphaeconophilus)*.

racovitzai BURGHELE-BĂLĂCESCO, 1969 (as *Chionea*), synonym of *araneoides*, **syn. nov.**

simplicitarsis TAHVONEN, 1942 (as *Chionea*), nomen nudum (most probably a lapsus for *brevirostris*).

stelviana SÜSS, 1982 (as *Niphadobata*), tentatively considered here a synonym of *botosaneanui*, **syn. nov.**

Material examined

Thanks to the kind co-operation of a large number of people we were able to study practically all the type material that is still preserved as well as material from all the available major *Chionea* collections in Europe. Type material was studied of the following species and synonyms: *arverna*, *austriaca*, *belgica*, *besucheti*, *bezzii*, *brevirostris*, *catalonica*, *italica*, *jurassica*, *lutescens*, *minuta* and *pyrenaea*. Collections that we have seen are those of JOHN D. BOURNE (MHNG), ERHARD CHRISTIAN (NMWA, and as donated to ZMAN), WIESLAW & EWA KRZEMIŃSKI (WKKP), HANS MENDEL (ZFMK), ADOLF NADIG (BNMC), JAROSLAV STARÝ (JSOC, and as donated to ZMAN), LUCIANO SÜSS (CSFI) and STEFANO VANIN (CSFI). Together with smaller collections that we received on loan or as a gift from various colleagues, the material we have seen covers the entire distribution of *Chionea* in the Westpalaeartic except for most of European Russia. Not available because apparently no longer preserved are the collections of MARIO BEZZI and ANCA BURGHELE-BĂLĂCESCO. The type material is discussed with the species and their synonyms, all other material examined is given in the Appendix.

Abbreviations

- alc. = preserved in "alcohol", which is usually ethanol of 70 % or higher.
BNMC = Bündner Naturmuseum, Chur, Switzerland (collection NADIG).
CGBD = Collection G. BÄCHLI, Dietikon, Switzerland (on loan at MHNN).
COMR = Collection COSMIN O. MANCI, Retezat National Park, Romania.
CSVI = Collection STEFANO VANIN, Padova, Italy.
FMNH = Finnish Museum of Natural History, Helsinki, Finland.
ISER = Institutul de Spéologie "Emile Racovitsa", Bucarest, Romania.
JSOC = Collection JAROSLAV STARÝ, Olomouc, Czech Republic.
KBIN = Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium.
MCTB = Collection MIGUEL CARLES-TOLRA, Barcelona, Spain.
ME = Material examined.
MHNG = Muséum d'Histoire naturelle de la Ville de Genève, Switzerland (collection BOURNE).
MHNN = Muséum d'Histoire naturelle de la Ville de Neuchâtel, Switzerland.
MNHN = Muséum national d'Histoire naturelle, Paris, France.
MZBS = Museo de Zoologie, Barcelona, Spain.
NMPS = Notranjski Muzei, Postojna, Slovenia.
NMWA = Naturhistorisches Museum Wien, Austria.

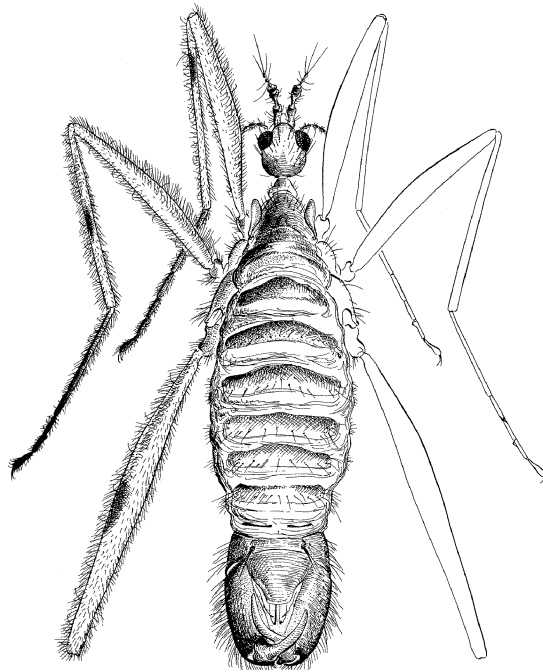
- PMLS = Prirodoslovni Muzei, Ljubljana, Slovenia.
 SEAP = Sezione di Entomologia Agraria, Università di Pisa, Italy.
 TL = Type locality or Type localities.
 USCS = Universidad de Santiago de Compostela, Spain.
 UZMK = Universitetets Zoologiske Museum, København, Denmark.
 WKKP = Collection WIESLAW & EWA KRZEMIŃSKI, Krakow, Poland.
 ZFMK = Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany (collection MENDL).
 ZMAN = Zoologisch Museum, Universiteit van Amsterdam, Netherlands.
 ZMHF = Zoological Museum Helsinki, Finland.

3. Key to the European species of *Chionea*

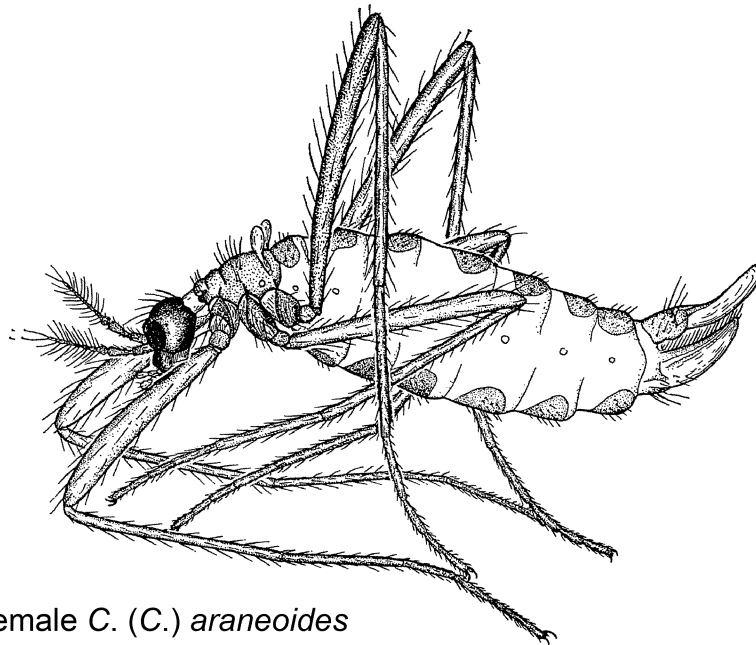
♂♂ and ♀♀ can be easily assigned to 1 of the 2 subgenera. However, at the species level we were unable to find reliable characters to separate between ♀♀ of *Sphaeconophilus*, except for *C. (S.) alpina*. Therefore, the *Sphaeconophilus* part of the key is for ♂♂ only, *alpina* excepted.

- 1 ♂♂: Sclerotized lobe present at base of gonostyle; aedeagus short; parameres short, triangular (fig. 3). ♀♀: cerci broadly rounded at apex (fig. 2, 8). Antenna with 5-7 or 9-10 segments (fig. 5, 6). (Subgenus *Chionea*) **2**
 - ♂♂: No lobe at base of gonostyle (fig. 4); aedeagus long, thin and looping; parameres long, not triangular (fig. 4, 17-23). ♀♀: cerci with a more acute apex (fig. 9). Antenna with 5-7 segments (fig. 7). (Subgenus *Sphaeconophilus*) **3**
 - 2 Antenna with 9-10 segments (fig. 5: scape, pedicel, and 7-8 flagellar segments). *C. (C.) araneoides*
 - Antenna with 5-7 segments (fig. 6: scape, pedicel, and 3-5 flagellar segments). *C. (C.) crassipes crassipes*
 - 3 Bristles on legs strong, widely spaced and coloured dark brown to black (fig. 10). ♂♂ without a medial comb on sternite 9 (cf. fig. 14) and with very long, coiled tubular prolongations of aedeagus (fig. 20). *C. (S.) alpina*
 - Bristles on legs thin, closely set and yellowish to brown (fig. 11). If this character is not decisive, continue with 4 (♂♂ only). **4**
 - 4 Sternite 9 medially with a comb of fine bristles, at least on one third of the posterior half (fig. 4B, 12), in Italian representatives of *C. (S.) botosaneanui* comb shorter and more like a bundle of bristles (fig. 13). **5**
 - Sternite 9 without a medial comb, at most with a row of fine bristles along the hind margin (fig. 14). **8**

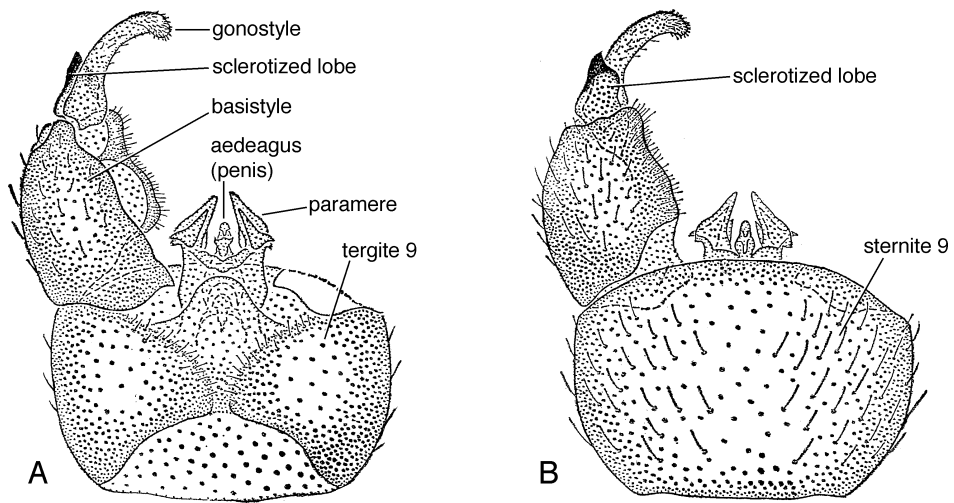
- 5 Tergite 9 mid-dorsally not emarginate but with small elevations (fig. 15).
C. (S.) bezzii
- Tergite 9 mid-dorsally broadly emarginate (fig. 4A, 16) and usually provided with small bristly elevations at the lateral corners (fig. 16). **6**
- 6 Tip of aedeagus without prolongations and lower corner of paramere very weakly developed (fig. 17).
C. (S.) botosaneanui
- Aedeagus with 2 narrow tubular prolongations and lower corner of paramere well developed (fig. 18, 19). **7**
- 7 The 2 prolongations of aedeagus short, at most as long as the bristles forming the ventral comb but usually about half as long, prolongations always facing downward and slightly recurrent, never curled (fig. 18). *C. (S.) lutescens*
- The 2 prolongations of aedeagus much longer than the bristles forming the ventral comb and curled (fig. 19). *C. (S.) pyrenaea*
- 8 Aedeagus with 2 narrow tubular prolongations that are strongly coiled and very long; lower corner of paramere almost as strong as upper corner which has a small apical hook (fig. 20). *C. (S.) alpina*
- Aedeagus without tubular prolongations (fig. 21-24). Lower corner of paramere clearly not as strong as upper corner which has a larger apical hook (fig. 21, 23). **9**
- 9 Aedeagus thicker than in other species of *Sphaeconophilus*, diameter opposite semen pump (D in fig. 21) about the same diameter as the small sclerite at the base of the haltere (fig. 25). Apical hook of paramere not closely adpressed to the paramere (fig. 21). Tip of aedeagus more or less rectangular without relatively long triangular filaments (fig. 22). *C. (S.) belgica*
- Diameter of aedeagus the same as in other species of *Sphaeconophilus*, about half the diameter of the small sclerite at the base of the haltere. Parameres variable, sometimes as in *belgica* (fig. 21) but usually apical hook adpressed to the paramere (fig. 23). Tip of aedeagus provided with two triangular filaments that are about 2 times the diameter of the aedeagus (fig. 24). *C. (S.) austriaca*



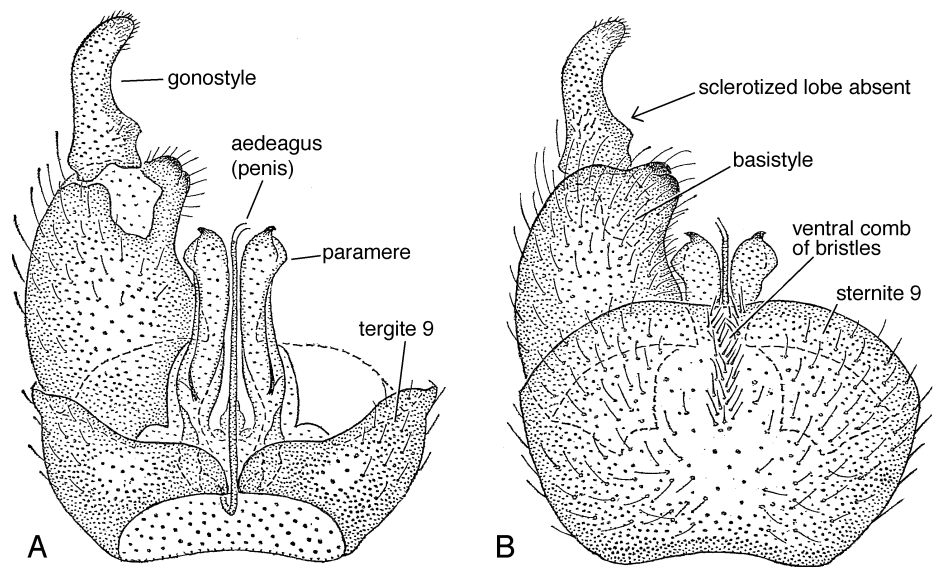
1. male *C. (S.) belgica*



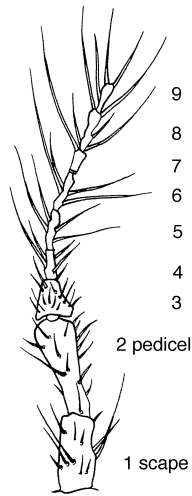
2. female *C. (C.) araneoides*



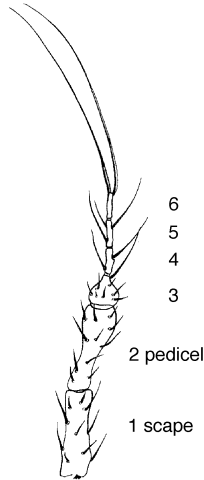
3. hypopygium *C. (C.) araneoides*; A dorsal view, B ventral view



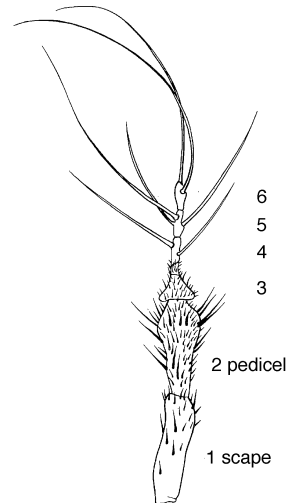
4. hypopygium *C. (S.) lutescens*; A dorsal view, B ventral view



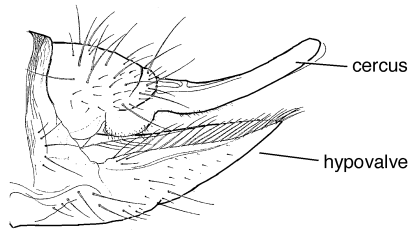
5. antenna *C. (C.) araneoides*



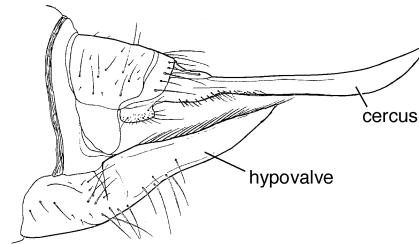
6. antenna *C. (C.) crassipes*



7. antenna *C. (S.) botosaneanui*



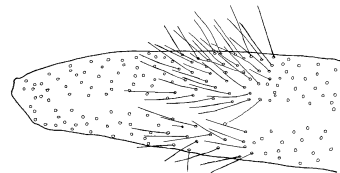
8. ovipositor *C. (C.) araneoides*



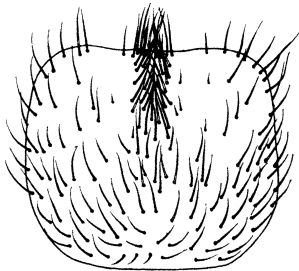
9. ovipositor *C. (S.) lutescens*



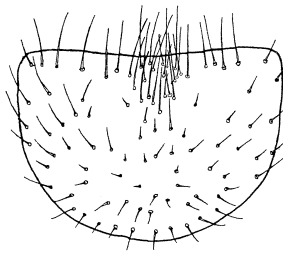
10. femur hind leg *C. (C.) alpina*



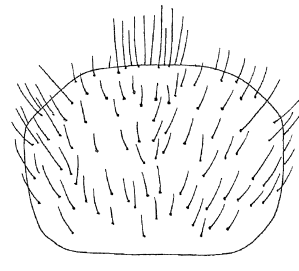
11. femur hind leg *C. (S.) lutescens*



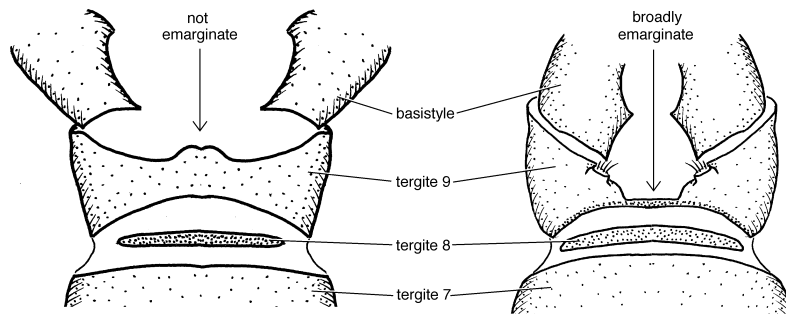
12. sternite 9
C. (S.) botosaneanui
Carpathians



13. sternite 9
C. (S.) botosaneanui
Italy

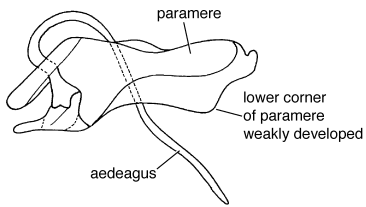


14. sternite 9
C. (S.) belgica
Belgium

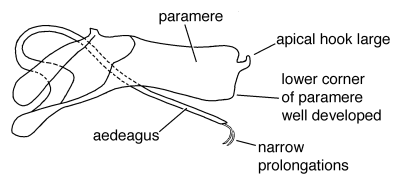


15. end of abdomen *C. (S.) bezzii*
male, dorsal view

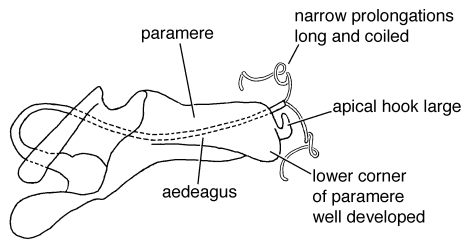
16. end of abdomen *C. (S.) lutescens*
male, dorsal view



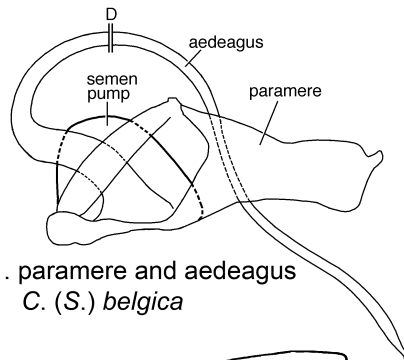
17. paramere and aedeagus
C. (S.) botosaneanui



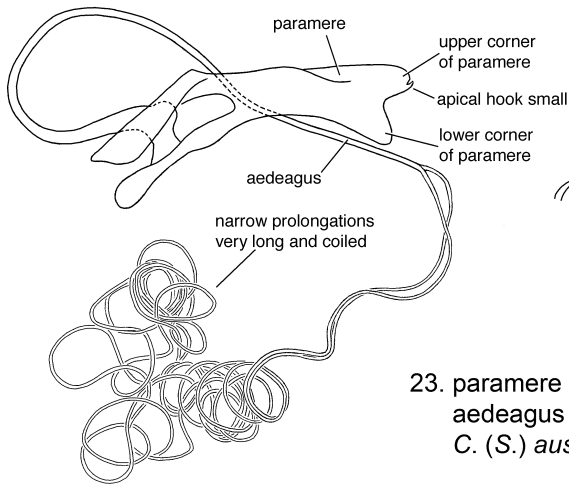
18. paramere and aedeagus
C. (S.) lutescens



19. paramere and aedeagus
C. (S.) pyrenaea

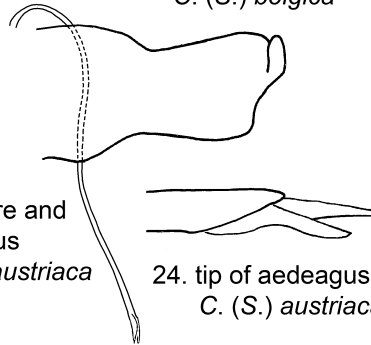


21. paramere and aedeagus
C. (S.) belgica



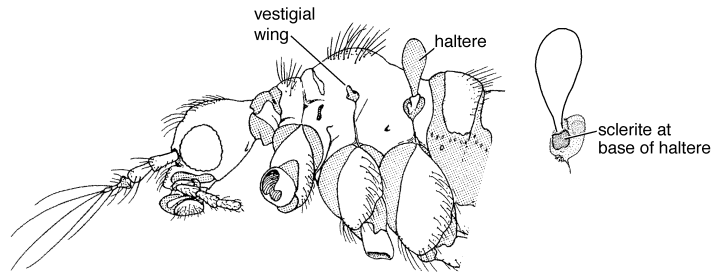
20. paramere and aedeagus
C. (S.) alpina

22. tip of aedeagus
C. (S.) belgica



23. paramere and aedeagus
C. (S.) austriaca

24. tip of aedeagus
C. (S.) austriaca



25. head, thorax and haltere *C. (C.) alexandriana*
(North American species)

4. Species

Chionea (Chionea) araneoides DALMAN, 1816

Chionea (Chionea) dalmani LOEW, 1871

Chionea (Chionea) minuta TAHVONEN, 1932

Chionea (Chionea) hrabei KRATOCHVÍL, 1936

Chionea (Chionea) racovitzai BURGHELE-BĂLĂCESCO, 1969, **syn. nov.**

Diagnosis

Antenna with 9-10 segments (fig. 5). ♂ with a sclerotized lobe at base of gonostyle; aedeagus short, thick and close to semen pump; parameres short, triangular (fig. 3). ♀ cerci broadly rounded at apex (fig. 2, 8).

Type material

Chionea araneoides DALMAN, 1816: Specimens are not mentioned but both sexes are illustrated, originating from Westergöthland [= Sweden, Västra Götaland]. The description is repeated in DALMAN (1823) and (1824); the 1823 version also mentions the island Laxön [= Sweden, Norrbotten, 65°48'N 22°24'E]. Type material apparently is no longer preserved (G. LINDBERG pers. comm. 2008).

Chionea dalmani LOEW, 1871: The name *dalmani* is proposed as [unnecessary] new name for *araneoides*. Therefore, type material is irrelevant and the remark in SAVCHENKO et al. (1992) about the uncertainty of the synonymy incorrect.

Chionea minuta TAHVONEN, 1932: Described after the following syntypes, all from Finland, province Länsi Suomen [= Western Finland] and deposited as "Typus N:o 4811 in Museum Zool. Helsinki": 1♂, Toivakka, Särkimäen Hepoharju, 1920; 5♂♂, 9♀♀, Jyväskylä, Tuohivuori, I.1931 (1♂, 1♀), I.1932 (4♂♂, 8♀♀). Sämtlich in Januar auf frisch gefallenen Schnee [all in January on fresh snow], temperature -2° to -4,5° C. Apart from the type series, TAHVONEN (1932: 41) also mentions a ♂ of *minuta* in the Helsinki Museum from Karislojo, FORSIUS leg., 9.I.1909. We examined 6 glass slides, all labelled Mus. Zool. H:fors Spec. typ. No 4811 *Chionea minuta* Tahv.

Additional data for the slides are: 1 slide containing a head of *C. (C.) araneoides*, labelled Ch. minuta ♂ n. sp. Toivakka 12.I.1930. 1 slide containing a leg labelled Ch. minuta n. sp. unreadable word [Taksj?], E.V.T. 1930. 1 slide containing a leg labelled Ch. minuta n. sp. unreadable word [Kerkj?], Eino TAHVONEN. 1 slide containing a leg labelled Ch. minuta ♂ n. sp. unreadable word [Kerkijulka?]. 1 slide containing a leg labelled Ch. minuta ♂ n. sp. unreadable word [Eterj?], E.V.T. 1930. 1 slide containing a leg labelled Ch. minuta n. sp. unreadable word [Elujilks?], E.V.T.

The first slide most likely represents the ♂ from Toivakka mentioned in the original description although that is stated to be collected in 1920. The 5 last-mentioned slides most probably do not belong to the type series; the localities, as

far as something can be said about them, do not match the original type localities and 2 of them are from 1930 instead of 1931 or 1932.

Chionea hrabei KRATOCHVÍL, 1936: Described after 74 syntypes collected by S. HRABĚ during the years 1933-35 at 4 localities between 900-1600 m in the High Tatra of Slovakia. We do not know if type material still exists.

Chionea racovitzai BURGHELE-BĂLĂCESCO, 1969: The description of *racovitzai* is based on 1 ♂ holotype and 2 ♀ ♀ paratypes from Romania, on snow at the beginning of the Scarisoara glacier, 19.III.1967, 1200 m, A. BĂLĂCESCO and G. RACOVITZA leg. (ISER). Types are lacking and apparently no longer preserved (KRZEMIŃSKI 1982; L. BOTOSANEANU pers. comm. 2003).

Discussion

Although types are apparently no longer available, there is general agreement about the identity of *araneoides*, the only European species of *Chionea* with 9-10 antennal segments. The original figures accompanying the description clearly illustrate this character. In the ♂, they also show the distinct sclerotized lobe at the base of the gonostyle and in the ♀ the shape of the cerci, 2 characters that discriminate between the subgenera *Chionea* and *Sphaeconophilus*.

The name *dalmani* was proposed by LOEW (1871) as [unnecessary] new name. The one slide out of the supposed type series of *minuta* containing a head confirms the synonymy with *araneoides* as proposed by SVENSSON (1966, 1969). For the synonymy of *hrabei* we have followed NADIG (1943b) and KRZEMIŃSKI (1982). In describing *racovitzai*, BURGHELE-BĂLĂCESCO (1969) mentions that it is very difficult to separate the ♀ ♀ from those of *minuta* [= *araneoides*]. The description is furthermore based on a single ♂ only. Its discriminating characters fall within the variability of what we have seen in the many *araneoides* specimens studied. This also applies to the shape of the lobe at the base of the gonostyle, used by KRZEMIŃSKI (1982) in his key to separate *racovitzai* from *araneoides*.

The synonymy of *brevirostris* with *araneoides*, based on study of the types by SVENSSON (1969) and largely followed since, cannot be maintained (see below under *lutescens*).

Distribution

C. (C.) araneoides is distributed in northern Europe and in the mountains of Central Europe and Romania; the species apparently does not occur in the intermediate lowlands of France, Belgium, Netherlands, Germany, Denmark, the Baltic States, Poland and Hungary. Countries from which the species is known are:

Austria: All older records up to BAU (1910) have been assigned by BEZZI (1919) to *lutescens*, but *araneoides* is known from 5 of the 9 federal states of Austria (CHRISTIAN 2009; ME), specified altitudes ranging from 700-3035 m.

Czech Republic: Known from Bohemia and Moravia (KRZEMIŃSKI 1982, STARÝ 1997; ME), whereas various older records have been assigned by KRATOCHVÍL (1936a), STARÝ & ROZKOŠNÝ (1970) or STARÝ (1971) to *lutescens*.

Finland: Widespread (SAHLBERG 1876, LUNDSTRÖM 1907, 1912, FREY 1913, TAHVONEN 1932, 1942, TJEDER 1955, MENDEL et al. 1977, HACKMAN 1980, KRZEMIŃSKI 1982, ITÄMIES & LINDGREN 1985; TL *minuta*; ME).

Italy: Older records from the North Apennines have been assigned to *lutescens* (BEZZI 1919, VANIN & MASUTTI 2008). Presently known from the provinces Aosta (1 locality; FOCARILE 1975), Sondrio (3 localities; SÜSS 1982, 1986; ME) and Trento (1 locality; ME), specified altitudes ranging from 1300-1950 m.

Norway: Widespread but not recorded further south than Oslo (TJEDER 1965, SÖMME & ÖSTBYE 1969, HÅGVAR 1971, 1976a, 1976b, MENDEL et al. 1987).

Poland: One older record (DEMEL 1924) is referred to *lutescens* (KRZEMIŃSKI 1984). All other records are from mountainous South Poland (KRZEMIŃSKI 1978, 1982, 1984; ME) with specified altitudes ranging from 600-1600 m.

Romania: Known from the Carpatii Meridionalis (Transylvanian Alps) (TL *racovitzai*: Apuseni Mountains, 1200 m; ME: Retezat National Park, 1100-1200 m).

Russia: With certainty known from the Leningradskaya oblast (BOLDYREV 1913, SAVCHENKO 1989b), Karelia (MENDEL et al. 1977) and the Kola Peninsula (ME). Detailed records from the Moscow region (BOLDYREV 1913) are not confirmed by SAVCHENKO (1989b). Records from further east (SAVCHENKO 1982, 1989b, NARCHUK 1998) apparently refer to the unconfirmed records by ERICHSON (1851: Turuchansk [= Krasnoyarskiy kray]) and BOLDYREV (1911, 1913: Yamburg [= Tazov Peninsula] and Ussuri).

Slovakia: Tatra mountains (STARÝ & ROZKOŠNÝ 1970 (as *minuta*); TL *hrabei*, ME) between 900-1600 m.

Slovenia: Recorded from the Triglav region only (FRANZ 1989, NOVAK et al. 2007).

Sweden: Widespread but not recorded further south than Västra Götaland (TJEDER 1955, MENDEL 1972, MENDEL et al. 1977; TL; ME).

Switzerland: Known with certainty from canton Graubünden only (NADIG 1943a-1949, MENDEL et al. 1977; ME) with specified altitudes ranging from 1200-2300 m. The mapped record from Valais by PODENAS et al. (2006) could not be confirmed; from this canton we have seen *alpina* and *belgica* only. According to BEZZI (1919), BANGERTER (1932) and NADIG (1943a) older Swiss records belong to *alpina* or *lutescens*.

The following country records refer to other species or are in need of confirmation:

Belgium: In SAVCHENKO (1982, 1989b) based on *belgica* perhaps being a synonym of *araneoides*.

Bosnia-Herzegovina: As *araneoides* (STROBL 1898) and *araneoides* var. *major* (STROBL 1900), nomen dubium (see list of names above).

Denmark: See below under *belgica*.

France: Older records from the Elzas have been assigned to *lutescens* by LESNE (1911) and BEZZI (1919) but they might as well refer to *belgica*. The transfer of the record from near Digne (PEYERIMHOFF 1906) to *alpina* by PEYERIMHOFF (1911) is most probably correct; *alpina* material from the same province as Digne (Alpes-de-Haute-Provence) was studied and no other *Chionea* species is known from this part of France.

Germany: Older records only, all assigned to *lutescens* by BEZZI (1919) but they might as well at least in part refer to *belgica*.

Hungary: According to STARÝ & ROZKOŠNÝ (1970) the record by BIRÒ (1885) refers to *lutescens* and to a locality in the Czech Republic.

Netherlands: It is most likely that all Dutch *Chionea* records refer to *belgica* (see that species).

Chionea (Chionea) crassipes crassipes BOHEMAN, 1846

Diagnosis

Antenna with 5-7 segments (fig. 6). ♂ with a sclerotized lobe at base of gonostyle; aedeagus short, thick and close to semen pump; parameres short, triangular (cf. fig. 3). ♀ cerci broadly rounded at apex as in *araneoides* (fig. 2, 8) but somewhat longer.

Type material

Chionea crassipes BOHEMAN, 1846: Described after a ♂ from Lapponia Tornensi [= in Norrbotten, Sweden]. Type material apparently is no longer preserved (G. LINDBERG pers. comm. 2008).

Discussion

On the basis of the number of antennal segments, *crassipes* has been assigned first to the subgenus *Sphaeconophilus*. However, SAVCHENKO (1981) and KRZEMIŃSKI (1982) have pointed out that the species should be included in the subgenus *Chionea* because the genital characters do not correspond to what is found in *Sphaeconophilus* but are of the same general build as in *araneoides*, type species of the genus, and likewise the subgenus, *Chionea*.

Distribution

Of *crassipes* 3 subspecies are known (NARCHUK 1998). The nominotypical subspecies is distributed in Fennoscandia and Northwest Russia only. The 2 other subspecies are

gracilistyla ALEXANDER, 1936 (listed as a synonym of *crassipes* in SAVCHENKO et al. 1992), distributed in Far East Russia, North Korea, Japan, and *magadanensis* NARCHUK, 1998, distributed in Magadan. Countries from which *crassipes crassipes* is known are:

Finland: Only known from a few localities in the province Oulu (ME) and one literature record, Muonio in Lapland on the border with Sweden, about 250 km north of Haparanda (LUNDSTRÖM 1907).

Norway: Known after 2 records only, Finmarkia in the north (SIEBKE 1877) and Norefjell in Buskerud, some 150 km northwest of Oslo (TJEDER 1965).

Russia: Kola Peninsula (SAVCHENKO 1989b).

Sweden: Widespread but not further south than Dalarna (TJEDER 1955, MENDEL et al. 1977; ME).

The following country records refer to other species:

Austria: Older records are assigned to *lutescens* by BEZZI (1919), but they might as well include other species of the subgenus *Sphaeconophilus* known from Austria.

Belgium: In BECKER (1912b) refers to *belgica* BECKER, 1912.

Italy: In BEZZI (1900) refers to *alpina* (BEZZI 1919).

Poland: Older records are referred to *botosaneanui* by KRZEMIŃSKI (1984).

Russia: Recorded from the Kola Peninsula by SAVCHENKO (1989b). All other records from BOLDYREV (1913) and later apparently refer to one of the East Palaearctic subspecies mentioned above.

***Chionea (Sphaeconophilus) alpina* BEZZI, 1908**

Chionea (Sphaeconophilus) italica VENTURI IN FRANCISCOLO, 1955

Chionea (Sphaeconophilus) catalonica (BOURNE, 1979), **syn. nov.**

Diagnosis

Bristles on legs strong, widely spaced and dark brown to black (fig. 10). ♂ sternite 9 without a medial comb of fine bristles, at most with a row of fine bristles along the hind margin (cf. fig. 14). Aedeagus with narrow tubular prolongations that are strongly coiled and very long, at least 10 times longer than aedeagus itself (fig. 20; see discussion). Shape of parameres characteristic, lower corner almost as strong as upper corner which has a small apical hook (fig. 20).

Type material

Chionea alpina BEZZI, 1908: Described after 4 syntypes of both sexes (apparently 2♂♂, 2♀♀) from Italy, Sondrio, Valmalenco, near Chiareggio, 8.XII.1899,

1400-1600 m, M. BEZZI leg. Type material apparently destroyed in World War II (SÜSS 1982).

Chionea italica VENTURI in FRANCISCOLO, 1955: The first rather short description (VENTURI in FRANCISCOLO 1955) is based on 2 syntypes, a ♂ from Liguria, Savona, Buranco Rampion, 11.V.1952, SANFILIPPO leg., and a ♀ from Liguria, Genova, Monte Aiona, Lago Grande delle Agoraie, 9.XII.1952, 1328 m, FRANCESCHI leg. A full description and comparison with other species is presented in VENTURI (1956), mentioning the same 2 specimens as in 1955, but describing the ♀ only. We examined the ♂ lectotype (SEAP; present designation, see discussion), all legs present, parameres and aedeagus lacking, one 6-joined antenna and one basistyle on separate glassmount. The alcohol tube from Buranco Rampion, 11.V.1952, SANFILIPPO leg. containing the lectotype also contains a ♀. We assume that this is the ♀ syntype from Monte Aiona but of course we cannot be sure about this. Of the ♀ syntype (paralectotype) we saw 1 glassmount (SEAP), containing one 6-joined antenna, and labelled: *Ch. italica* Vent./*Chionea* sp. leg. Franceschi ♀ 9.XII.52, M. Aiona, Lago Grande.

Niphadobata catalonica BRUNHES, 1979: Described after the holotype ♂ and 3 paratypes (sex not specified) from Spain, Catalunya, Gerona, Serra del Cadí, Grallera Gran de Cornellana, 23.VIII.1970, O. ESCOLÀ leg. (MZBS: holotype, 1 paratype; MHNG: 2 paratypes). We examined 2 ♂ paratypes preserved at MHNG (alc.) and 1 ♀ paratype preserved at MZBS (alc.). The holotype is also preserved at MZBS; this museum does not send out holotypes on loan.

Discussion

Types of *C. (S.) alpina* are no longer available. In the literature there is general agreement about the interpretation of the species. This interpretation, which is followed here, is based mainly on BURGHELE-BĂLĂCESCO (1969), the first author to mention and figure the typical, very long and coiled tubular prolongations of the aedeagus (fig. 20).

The original 2 syntypes of *italica* were studied by BURGHELE-BĂLĂCESCO (1969), who synonymized the ♀ with *lutescens* and the ♂ with *alpina*. We are unable to identify *Sphaeconophilus* ♀♀ at the species level except for *alpina*. Furthermore, the presence of *lutescens* in Italy is not yet proven. Therefore, in spite of the fact that VENTURI (1956) gives a detailed description of the ♀ and hardly mentions the syntype ♂ from Buranco Rampion, we designate this ♂ as lectotype in order to maintain the synonymy with *alpina* as given in SAVCHENKO et al. (1992). The parameres and aedeagus of the lectotype are missing but all legs are preserved and they clearly show that it belongs to *alpina*.

The examined type material of *C. (S.) catalonica* showed all taxonomically relevant characters as in *alpina*. Therefore, *catalonica* is treated here as a junior synonym of *alpina*. In the original description, BOURNE (1979a) on several occasions mentions similarities between *catalonica* and *alpina*, instead of presenting specific characters in which they differ. Given the final chapter of his paper where he discusses the

distribution of the species, it is our impression that the “endemic” Pyrenean occurrence of *catalonica* might have played a role in describing it as a new species.

A very special character of *alpina* are the very long prolongations of the aedeagus (fig. 20). Among the material in the NADIG collection there were 2 intact copulas of *alpina*. In one of them the 2 endings of the prolongations were inside the copulatory organs of the ♀. In the other the prolongations were completely inside the ♀. How this is brought about is completely unknown, as is the function of these prolongations.

Distribution

C. (S.) alpina is found in the mountains of South and Central Europe, from Northwest Spain via the Alps and northern Italy to Romania and Montenegro. Countries from which the species is known are:

Andorra: ESCOLÀ & BELLES (1977; ME) at altitudes from 2145-2548 m.

Austria: Widespread except for Wien and Borderland (CHRISTIAN 2009; ME) with specified altitudes ranging from 540-3035 m.

France: Known with certainty from the following departments in the southeast of France: Ain (TURQUIN 1973, BOURNE 1977b), Haute-Savoie (ME), Isère (FOCARILE 1975), Hautes-Alpes (ME), Drôme (ME), Alpes-de-Haute-Provence (PEYERIMHOFF 1911, BOURNE, 1979a; ME) and Alpes-Maritimes (FOCARILE 1975) from 345-1900 m. The single record from west of the river Rhône (MANEVAL 1936: Haute-Loire, *alpina* det. SÉGUY) could not be confirmed.

Germany: Only known from Oybachthal near Oberstdorf in Bayern (SCHACHT 1999, REUSCH & OOSTERBROEK 2000; ME).

Italy: Distributed throughout the Alps, mountainous Liguria into Emilia Romagna (VANIN & MASUTTI 2008; TL; ME) with specified altitudes ranging from 1100-2500 m.

Montenegro: Durmitor (OOSTERBROEK & SIMOVA-TOSIC 2004; ME; as *lutescens* in SIMOVA 1992) at 2000 m.

Romania: New, but unfortunately without any locality information (ME).

Spain: The species is known from the provinces Gerona and Lleida (ESCOLÀ & BELLÉS 1977; TL *catalonica*; ME) at altitudes between 1690-2460 m. Records from central Spain (BOLIVAR 1916, ESPAÑOL 1955: Sierra Guadarrama, Puerto de Navacerrada, 1600-1800 m) could not be confirmed.

Switzerland: With certainty known from the cantons Valais (FOCARILE 1975, BOURNE 1981b, BARNDT 2004; ME), Ticino (BOURNE 1977b, 1981b; ME) and Graubünden (BÄBLER 1910, MARCHAND 1917, LACKSCHEWITZ 1940, BANGERTER 1943, NADIG 1943a-1949, STRINATI & AELLEN 1964, 1967, STRINATI 1966, BURGHELE-BĂLĂCESCO 1969, BOURNE 1981b; ME) from 800-2700 m. The single dot west of the Lac de Neuchâtel on the map in PODENAS et al. (2006) most probably does not refer to *alpina*.

The species is furthermore recorded from Slovenia (SIMOVA-TOSIC & SIVEC 1977, NOVAK & KUSTOR 1983, NOVAK 2005, NOVAK et al. 2007) but these records could not be confirmed; some of the material mentioned in these papers and examined by us belongs to *austriaca*.

***Chionea (Sphaeconophilus) austriaca* (CHRISTIAN, 1980)**

Diagnosis

♂ sternite 9 without a comb of fine bristles, at most with a row of fine bristles along the hind margin (cf. fig. 14). Aedeagus without tubular prolongations, tip of aedeagus provided with 2 triangular filaments that are about 2 times the diameter of the aedeagus (fig. 24). Parameres variable: apical hook usually closely adpressed to the paramere (fig. 23) but sometimes separated as in *belgica* (fig. 21), lower corner of parameres usually as in *belgica* (fig. 21, 23), sometimes less developed but not to the degree of being almost absent as in *botosaneanui* (fig. 17).

Type material

Niphadobata austriaca CHRISTIAN, 1980: Described after the holotype ♂ and 1♂, 4♀♀ paratypes from Austria, Niederösterreich, Schagerlhöhle im Mitterkeil, Schwarzenbach / Pielach, 23.VI.1979, 1000 m, Barberfalle, H. SCHÖNMANN and E. CHRISTIAN leg. (NMWA, alc.). All 6 types have been examined.

Discussion

The species *austriaca* and *belgica* are very similar and at the start of our investigations considered by us as synonyms. However, there are small but constant differences between the 2 species. These became obvious as more material came to our disposal, especially through the kind cooperation of E. CHRISTIAN, T. NOVAK and I. SIVEC. *C. (S.) belgica* is a more western species with a strong aedeagus, with the tip of the aedeagus rectangular (fig. 21, 22) and the apical hook of the paramere lying free from the paramere. *C. (S.) austriaca* is a Central European species with the aedeagus about half the diameter of what is found in *belgica* and the tip of the aedeagus possesses short triangular prolongations (fig. 24). In *austriaca* the shape of the parameres is rather variable. Usually the lower corner is distinctly developed and the apical hook adpressed to the upper corner (fig. 23), but sometimes the lower corner is less distinct and/or the apical hook is more free, as in *belgica* (fig. 21).

Distribution

Described from Austria and also known from Hungary, Italy, and Slovenia. Individual country records are:

Austria: Known from all federal states except Vorarlberg (CHRISTIAN 2009; ME), the specified altitudes ranging from 300-2500 m. The *belgica* record for Carinthia in SCHULTZ et al. (2006) also refers to *austriaca*.

Hungary: Western Hungary (CHRISTIAN unpubl., in NOVAK et al. 2007; ME: we examined material from 1 of the 2 localities in western Hungary from which STARÝ (2001) recorded *belgica*; this material belongs to *austriaca* and we assume that the material from the second locality also belongs to this species).

Italy: New. Material was examined from the provinces Cuneo, Trento, Belluno, Vicenze, Treviso and Pordenone, the specified altitudes ranging from 1100-2000 m (see also Italy under *lutescens*).

Slovenia: Widespread (NOVAK et al. 2007; ME) from 270-1840 m.

***Chionea (Sphaeconophilus) belgica* (BECKER, 1912)**

Chionea (Sphaeconophilus) ancae (MENIER et MATILE, 1976), **syn. nov.**

Diagnosis

♂ sternite 9 without a comb of fine bristles, at most with a bundle of fine bristles along the hind margin (fig. 14). Aedeagus without tubular prolongations, tip of aedeagus almost rectangular (fig. 22), without relatively long triangular filaments. Apical hook of paramere not closely adpressed to the paramere (fig. 21).

Type material

Sphaeconophilus belgicus BECKER, 1912: Described after an unspecified number of syntypes, but at least 1 ♂ and 1 ♀ from Belgium, Ardennes, Francorchamps and environments, those of final days December 1911 found in nests of *Vespa*, G. SEVERIN leg. We examined a ♂ from Belgium, Liège, Francorchamps, 24.XII.1911-2.I.1912, G. SEVERIN leg. “*belgica*“ det. T. BECKER (KBIN; dry, hypopygium on separate glassmount). This ♂ is designated here as lectotype to maintain the current usage of the name and to set aside its status as holotype sensu GROOTAERT (1984).

Niphadobata ancae MENIER et MATILE, 1976: Described after the holotype ♂ and 1 ♂, 1 ♀ paratypes from France, Doubs, Les Combes, 8-15.XI.1972, 1200 m, sur le sol [on the ground], M. FROISSART leg. (MNHN). BOURNE (1979a) mentions that he has seen the type material. Unfortunately, the types could not be traced in the Paris Museum (L. MATILE pers. comm. 2000) and they are also not present where BOURNE did his *Chionea* work, the Geneva Museum (B. MERZ pers. comm. 2007).

Discussion

C. (S.) belgica was described in 1912 but recognized as a valid species when it was redescribed by GROOTAERT (1984). By then, *ancae* was described by MENIER & MATILE

(1976) and *austriaca* by CHRISTIAN (1980). The differences between *belgica* and *austriaca* are discussed under the last-mentioned species. For *ancae* the situation is more confusing because 2 species might be involved. Type material is not available so we can for the moment rely on the description only. The aedeagal prolongations are certainly not of the *alpina* type. Sternite 9 has no ventral comb, which points to *austriaca* or *belgica*. Because *ancae* is described from France, Doubs, *belgica* is the most likely candidate. However, the large apical hook of the parameres and the prolongations of the aedeagus are more as in *lutescens*, a species with a ventral comb. As mentioned above, according to the description *ancae* does not possess such a comb, but MENIER & MATILE further mention that with the key of BURGHELE-BĂLĂCESCO (1969) *ancae* is placed among the species with such a comb and next to *botosaneanui*. MENIER & MATILE (1976) also mention a few unique characters which in our opinion have no relevance, such as the 6 hairs on the dorsal corners of tergite 9, a variable character found in many specimens of other species as well. Given this situation, there seems to be no reason to treat *ancae* as a separate species and it is tentatively considered here a synonym of *belgica*.

Distribution

After its redescription and being reinstated as a valid species by GROOTAERT (1984), *belgica* has become known from various lowland regions in western Europe, but also from more mountainous habitats in Switzerland for example. Individual country records are:

Belgium: Known from the provinces Vlaams Brabant (BRUGE 2006: Halle), Hainaut (ROUARD 1985: Chimay), Liège, Namur and Luxembourg (GROOTAERT 1984; TL; ME), at altitudes up to 500 m.

Denmark: All material identified and published as *araneoides* and *lutescens*, including KLØCKER (1900) and the material on which EDWARDS (1936) based his description of the pupa of *lutescens*, turned out to belong to *belgica* (REUSCH 1997; ME), the only species of *Chionea* we have seen from Denmark.

France: Not yet recorded from France, but known from 3 Departements near the Swiss localities, namely Doubs (TL *ancae*), Ain and Haute-Savoie (ME), at altitudes up to 1700 m. Most probably several of the older French records of *lutescens* refer (partly) to *belgica*.

Germany: Widespread. In addition to the Bundesländer as mentioned in REUSCH & OOSTERBROEK (2000) recorded here from Schleswig-Holstein (ME). Detailed information on Brandenburg is given in BARNDT (2004).

Netherlands: Most probably all *Chionea* records from The Netherlands refer to *belgica*. DE MEIJERE (1920) mentions and figures for Dutch *lutescens* that the aedeagus is not bifid apically. All Dutch records and material originates from the south of the province Limburg (HEIJERMAN 1987; ME).

Switzerland: Recorded for Switzerland for the first time by REUSCH (1997: Bern, *lutescens* sensu BANGERTER). Now known as well from the cantons Neuchâtel,

Vaud, Valais, Ticino and Graubünden (ME), the specified altitudes ranging from 490-1800 m.

As far as studied by us, material from Hungary identified and published as *belgica* (STARÝ 2001) turned out to belong to *austriaca*.

***Chionea (Sphaeconophilus) bezzii* spec. nov.**

Diagnosis

♂ tergite 9 broad and with small elevations in the middle (fig. 15), not emarginate as found in all other European species of *Sphaeconophilus* (fig. 16). Belongs to the group of species with a ventral comb of fine bristles on the hypopygium (*botosaneanui*, *lutescens* and *pyrenaea*; fig. 12). The eidonomic characters of the holotype of *bezzii* are also as found in this group, including the yellowish brown colouration of the body. Within the above-mentioned group, *bezzii* is closest to *pyrenaea*, sharing parameres and narrow prolongations of aedeagus (fig. 19).

Type material

Holotype: ♂, Spain, Aragon, Huesca, Bonansa, Avencó Closes, 11.X.1981-17.I.1982, piège glicol-bière, O. ESCOLÀ leg. (MZBS, alc.).

Discussion

The broad tergite 9 (fig. 15) is a very unique character, not found in any other species of *Sphaeconophilus*. Therefore, in spite of the fact that only one male is available, we are confident that it represents a new species. Given the large variability in size and colour in species of *Chionea* in general, a more extensive description seems appropriate when more material becomes available.

Distribution

Known after the ♂ holotype only, collected at the southern slopes of the Pyrenees in northwest Huesca near Pont de Suert.

***Chionea (Sphaeconophilus) botosaneanui* (BURGHELE-BĂLĂCESCO, 1969)**

Chionea (Sphaeconophilus) kratochvili (BURGHELE-BĂLĂCESCO, 1969)

Chionea (Sphaeconophilus) lutescens stelviana (SÜSS, 1982), **syn. nov.**

Diagnosis

♂ sternite 9 medially with a comb of fine bristles, in specimens from the Carpathians at least on one third of the posterior half (fig. 12), in material seen from Italy the

comb is distinctly shorter (fig. 13). Tip of aedeagus without prolongations and lower corner of parameres weakly developed (fig. 17).

Type material

Niphadobata botosaneanui BURGHELE-BĂLĂCESCO, 1969: Described from Romania after 5 ♂♂, 2 ♀♀ (ISER), as follows: holotype ♂ and 2 ♂♂, 2 ♀♀ paratypes, Obirsia Ialomitei dans le massif Bucegi, (holotype and 1 paratype ♀ sur la neige [on the snow], 23.XI.1966, L. BOTOSANEANU leg.; paratype ♂, dans le Valea Cetatii-Risnov, sur la neige [on the snow], 4.III.1967, M. GEORGESCU leg.; paratype ♂, Babele dans le massif Bucegi, 9.XI.1968, A. BĂLĂCESCO leg. Types are lacking and apparently no longer preserved (KRZEMIŃSKI 1982; L. BOTOSANEANU pers. comm. 2003).

Niphadobata kratochvili BURGHELE-BĂLĂCESCO, 1969: Described after the holotype ♂ and a paratype ♀ from Romania, Carpatii Meridionalis, près du lac Bilea dans le massif Fagaras, sur la neige [on the snow], 28.X.1962, L. BOTOSANEANU leg. (ISER). Types are lacking and apparently no longer preserved (KRZEMIŃSKI 1982; L. BOTOSANEANU pers. comm. 2003).

N. lutescens ssp. *stelviana* SÜSS, 1982: Described from Italy, Sondrio, S. Antonio Valfurva, 1400-1450 m, end of December 1978 and 1979; types are not specified but include at least a ♂ (illustrated) and more than one specimen (2 dates are given) and therefore to be considered syntypes. The depository of these syntypes is not specified. They are not present among the series of samples from near Valfurva collected by SÜSS and preserved in the VANIN collection (CSV).

Discussion

The synonymy of *kratochvili* was established by KRZEMIŃSKI (1982), on the basis of numerous specimens from the Tatra and Beskid mountains (Polish Carpathians). According to KRZEMIŃSKI (1982) few of these fitted the description of *kratochvili* or *botosaneanui*, while the remaining specimens exhibit the continuous variation between these 2.

SÜSS (1982) described his North Italian *stelviana* as a subspecies of *lutescens*. Examination of the SÜSS material present in the collection VANIN showed that his *lutescens* is what we have identified as *botosaneanui*. The Italian populations of *botosaneanui* are geographically isolated from typical *botosaneanui* as found in the Carpathians. In Italian material the aedeagus and the parameres are as in typical *botosaneanui*, but the mid-ventral comb on sternite 9 forms a bundle of bristles in front of the hind margin (fig. 13) instead of the distinct comb as found in specimens from the Carpathians (fig. 12). On the basis of the geographical isolation and morphological differences, the Italian populations might be considered a different subspecies, possibly with the name *stelviana*. However, the type material of *stelviana* is not among the SÜSS material preserved in the VANIN collection. Moreover, the figures in SÜSS (1982) clearly illustrate the bundle of bristles as found in Italian *botosaneanui* (fig. 13) but also parameres as found in *austriaca* (Süss 1982 fig. 24), another species known from northern Italy. We

were unable to trace the type material of *stelviana*, but it might well be that it still exists. The study of this material, or the designation of a neotype, is necessary before the Italian populations of *botosaneanui* can be properly named.

Distribution

The species is known from the following countries:

Czech Republic: Moravia, especially in the part close to Slovakia (STARÝ 1981; ME).

Italy: New. Material was examined from the provinces Sondrio, Trento, Belluno and Verona, the specified altitudes ranging from 1300-1800 m (see discussion above and also Italy under *lutescens*).

Poland: Carpathians (KRZEMIŃSKI 1984; ME), the specified altitudes ranging from 900-1600 m.

Romania: Known from the Carpatii Meridionalis (Transylvanian Alps) (TL; TL *kratochvili*; ME).

Slovakia: Tatra mountains (STARÝ 1981).

Chionea (Sphaeconophilus) lutescens LUNDSTRÖM, 1907

Chionea (Sphaeconophilus) brevirostris TAHVONEN, 1932

Chionea (Sphaeconophilus) bohémica KRATOCHVÍL, 1936

Chionea (Sphaeconophilus) besucheti (BOURNE, 1979), **syn. nov.**

Chionea (Sphaeconophilus) jurassica (BOURNE, 1979), **syn. nov.**

Chionea (Sphaeconophilus) arverna (BRUNHES, 1986), **syn. nov.**

Diagnosis

♂ sternite 9 medially with a comb of fine bristles, at least on one third of the posterior half (fig. 4, 12). Narrow prolongations of aedeagus short, at most as long as the bristles forming the ventral comb but usually about half as long, prolongations always facing downward and slightly recurrent, never curled; parameres with a large apical hook (fig. 18).

Type material

C. lutescens LUNDSTRÖM, 1907: Described after 3♂♂, 1♀ syntypes from Finland, province Etelä Suomen [= Southern Finland], as follows: 1♂ near Helsingfors [= Helsinki], J. SAHLBERG leg.; 1♂ Sjundeå, 5.I.1906, E. REUTER leg.; 1♂, 1♀, Esbo, B. POPPIUS leg. We examined the ♂ lectotype (designated here to maintain the current usage of the name) and one ♀ paralectotype from Esbo [= Espoo], B. POPPIUS leg. (ZMHF; dry; no 17434, spec. typ. No 4097 (lectotype) and no 17435, spec. typ. No 4098 (paralectotype)).

Chionea brevirostris TAHVONEN, 1932: Described after 1 ♂ from Finland, province Länsi Suomon [= Western Finland], Jyväskylä, Väärämäki, 20.XII.1928, auf dem Schnee bei Tauwetter auf Heide vom *Myrtillus*-Typ [on snow by thaw on heather of the *Myrtillus*-type], deposited as “Typus N:o 4810 in Museum Zool. Helsinki”. We examined 3 glass slides, containing leg fragments only, all 3 slides labelled: Mus. Zool. H:fors Spec. typ No 4810 *Chionea brevirostris* Tahv./Ch. brevirostris n.sp. ♂ Jyväskylä 20.12.28.

Chionea lutescens var. *bohemica* KRATOCHVÍL, 1936: Based on syntypes (9 ♂♂, 17 ♀♀ and “plusieurs exemplaires”) from various localities in the Czech Republic and Slovakia, with 6 antennal segments, specimens with 7 antennal segments representing the typical *C. (S.) lutescens*. 2 years later, because of the variability of the number of antennal segments, considered a synonym of *C. (S.) lutescens* (KRATOCHVÍL 1938).

Niphadobata besucheti BOURNE, 1979: Described after the holotype ♂ and 9 paratypes from Switzerland, Thurgau, Kesswil, Forêt de Kesswil, sous de vieilles souches pourries et microcavités de petits rongeurs [below old tree trunks, porrifed and with micro cavities from small rodents], XII.1977, 400 m, J.B. BOURNE & C. BESUCHET leg. (MHNG, alc.). We examined the holotype and all paratypes (7 ♂♂, 2 ♀♀).

Niphadobata jurassica BOURNE, 1979: Described after the holotype ♂ and 5 paratypes from France, Ain, Torcieu, Grotte du Cormoran, biotope: éboulis humide avec de l'argile et des feuilles mortes [biotope: wet earth with clay and dead leaves], Winter 1975/76, 520 m, J.B. BOURNE leg. (MHNG, alc.). We examined the holotype and 5 paratypes; the paratype (allotype) ♀ complete, the holotype and 3 paratypes ♂♂ largely broken in pieces, hypopygia of 2 paratypes and remnants of the holotype hypopygium available for study.

Niphadobata arverna BRUNHES, 1986: Described from France, Puy-de-Dôme, after 5 ♂♂, 6 ♀♀, as follows: holotype ♂, Chaîne des Dômes, le Sarcoui, 19.XII.1982, 1100 m; 1 ♂, 2 ♀♀ paratypes, Chaîne des Dômes, au col des Guales, 1.I.1983, 950 m; 3 ♂♂, 4 ♀♀ paratypes, Massif de Sancy, Puy de l'Aiguiller, 17.XII.1983, 1524 m. The holotype and 1 paratype ♀ are preserved in the Paris Museum (BRUNHES 1986) but could not be traced (L. MATILE pers. comm. 2000). The location of the remaining type material is not known.

Discussion

Examination of the type material showed that the generally accepted interpretation of *lutescens*, based on BURGHELE-BĂLĂCESCO (1969) is correct. The species can be easily recognized by the ♂ hypopygial structures, such as the mid-ventral comb on sternite 9 (fig. 4), the characteristic prolongations of the aedeagus and the large apical hook of the parameres (fig. 18).

The inclusions in the glass slides of the holotype ♂ of *brevirostris* do not allow any identification. On the basis of the original description and accompanying key of Finnish species it must be concluded that *brevirostris* is a junior synonym of *lutescens*.

The number of antennal segments is 6-7, and the lobe at the base of the gonostyle is absent. Of the species occurring in Finland, this combination of characters applies to *lutescens* only. The synonymy of *brevirostris* with *araneoides*, based on study of the types by SVENSSON (1969) and followed since is certainly not correct. The additional characters mentioned by TAHVONEN (1932) to separate *brevirostris* from *lutescens*, especially the short rostrum with associated characters, are most likely related to the very small size of the holotype (3 mm) and in our view not significant.

Study of type material of the subsequently described species *besucheti* and *jurassica* showed that they have to be considered junior synonyms of *lutescens*. The same applies most probably for *arverna* for which only the description with figures is available. All 3 taxa show the same diagnostic characters as *lutescens* and additional characters to separate them from *lutescens* or each other are apparently not present.

BOURNE (1979a) mentioned that in *jurassica* the ventral comb at sternite 9 is absent in the holotype and present in 2 paratypes. Unfortunately, the hypopygium of the holotype is largely destroyed and the “comb” character no longer discernable. However, the parameres are distinctly of the *lutescens* type (fig. 18) and the paratypes examined also belong to *lutescens*. The special characters for *arverna* (larger tubercles on the dorsal side of the hypopygium, BRUNHES 1986: fig. 1A), *besucheti* and *jurassica* (pilosity, colour, copulatory organs) fall within the variability of *lutescens* and in our opinion are not sufficient enough to maintain their species status.

Distribution

The actual distribution of *lutescens* is not yet fully understood. The species is distributed over large parts of Europe. However, for many of the records predating the (re)descriptions of *botosaneanui* (1969), *austriaca* (1980) and *belgica* (1984) it is still not certain to which species they pertain. The species is known from the following countries:

Austria: Known from the federal states Oberösterreich, Tirol and Vorarlberg (CHRISTIAN 2009; ME), the specified altitudes ranging from 550-2200 m.

Belgium: Restricted to the Plateau de Hautes Fagnes in the province Liège (TOLLET 1957, GROOTAERT 1984), found at 600-700 m.

Bulgaria: Listed from Bulgaria by BURGHELE-BĂLĂCESCO (1969) without information on the locality or material examined.

Czech Republic: Known from several localities in Bohemia and Moravia (KRATOCHVÍL 1936a, STARÝ 1971, STARÝ et al. 2005; TL *bohémica*; ME) with altitudes cited from 200-680 m.

Finland: Widespread but not known from north of the Arctic Circle, Paljakka near Kuusamo at about 66°N being the most northern locality (TL; ME).

France: With certainty known from the Departments Puy-de-Dôme, Ain, Haute-Savoie and Isère (TL *arverna*; TL *jurassica*; ME) at altitudes up to 1700 m.

Older records from the Alsace, Meurthe-et-Moselle and Côte-d'Or might as well refer to *belgica*.

Germany: Known from the federal states Mecklenburg-Vorpommern (BURGHELE-BĂLĂCESCO 1969), Niedersachsen, Sachsen-Anhalt, Thüringen, Bayern (REUSCH & OOSTERBROEK 2000; ME), Brandenburg (BARNDT 2004) and Berlin (DEICHEL 2004).

Lithuania: Recorded for the first time by PODENAS & VISARCIUK (2006).

Poland: The material examined and the localities listed in KRZEMIŃSKI (1984) are from the southern provinces Kielce, Krakow and Bielsko.

Portugal: Province Guarda, west of the Serra da Estrela (EIROA & BAEZ, 2002; ME).

Russia: Listed in SAVCHENKO (1982, 1989b) from the "European part of the USSR", citing BOLDYREV (1913) who has recorded the species from the Leningradskaya oblast, the Smolensk and Moscow regions, and near Venev in the Tulsckaya oblast.

Slovakia: Widespread (KRATOCHVÍL 1936a; TL *bohemica*) at altitudes from 180 to at least 1350 m.

Switzerland: With certainty known from the cantons Thurgau, Schwyz, Aargau, Jura, Neuchâtel and Vaud (TL *besucheti*; ME), the specified altitudes ranging from 400-1600 m. The record from canton Zürich (HUGUENIN 1888, as *araneoides*) most probably also refers to *lutescens* (NADIG 1943a). Material listed in BOURNE (1979a: numbers R-Y) turned out to belong predominantly to *belgica*. Graubünden in PODENAS et al. (2006) could not be confirmed (no *lutescens* material in the NADIG collection).

Ukraine: Known from near Kiev (SAVCHENKO 1982).

The following country records refer to other species or are in need of confirmation:

Bosnia-Herzegovina: KRZEMIŃSKI (1982, map only); to be confirmed, probably based on *major* STROBL, 1900, a nomen dubium.

Denmark: See above under *belgica*.

Hungary: KRZEMIŃSKI (1982, map only); to be confirmed, might be related to the remark about Hungary under *araneoides*.

Italy: The species has been recorded from northern Italy several times (review: VANIN & MASUTTI 2008). The recent interpretation of *lutescens* by Italian workers is based on SÜSS (1982) (S. VANIN pers. comm. 2008). Examination of the SÜSS material as far as present in the VANIN collection shows that the species *botosaneanui* is involved. Other Italian material identified as *lutescens* turned out to belong to *austriaca*, and in a few cases *alpina*. All this ends up to the fact that we have not seen a single *lutescens* from Italy. Therefore, the presence of the species in Italy is to be confirmed still.

Montenegro: As far as examined, material listed in SIMOVA-TOSIC (1992) belongs to *alpina*.

Netherlands: See above under *belgica*.

Norway: KRZEMIŃSKI (1982, map only); to be confirmed, not listed for Norway by TJEDER (1955, 1965).

Romania: KRZEMIŃSKI (1982, map only); to be confirmed, the only record (PÉTERFI 1965) is from near Cluj and might as well pertain to *alpina* or *botosaneanui*.

Spain: The species has been recorded from Spain several times including the Sierra de Guadarrama (review: ESCOLÀ & BELLÉS 1977). No Spanish *lutescens* material was studied, but given the presence of the species in central Portugal, it is not unlikely that it also occurs in Spain.

Sweden: Without locality, 2 ♂♂ labelled “Sweden, Heeger” in NMWA (LACKSCHEWITZ 1940, TJEDER 1955); to be confirmed; no specimen for Sweden are mentioned in the detailed account by HEEGER (1848) on a *Sphaeconophilus* from Mödling, Austria, most probably *austriaca*.

***Chionea (Sphaeconophilus) pyrenaea* (BOURNE, 1981)**

Diagnosis

♂ sternite 9 medially with a comb of fine bristles, at least on one third of the posterior half (fig. 12). Narrow prolongations of aedeagus tubular and long, at least one third of length of aedeagus itself; lower corner of aedeagus well developed and apical hook large (fig. 19).

Type material

Niphadobata pyrenaea BOURNE, 1981: Described after a ♂ holotype and a ♂ paratype, from France, Ariège, Montferrier près de Lavelanet, sous une vieille souche dans une forêt d'hêtre [below an old tree trunk in a beech forest], 27.XI.1980, 800 m, C. BESUCHET & I. LÖBL leg. (MHNG, alc.). Both types have been examined; the date on both labels is 28.XI.1980.

Discussion

This species of the subgenus *Sphaeconophilus* is clearly separated from most other species. The presence of the mid-ventral comb of fine bristles on sternite 9 separates it from *alpina* and *belgica*. The relatively long aedeagal prolongations separate it from *lutescens* (prolongations short) and *botosaneanui* (prolongations absent). The apparently closely related species *bezzii* has tergite 9 broad, not emarginate as in *pyrenaea*.

Distribution

Only known after the 2 type ♂♂ from Montferrier at the foot of the French Pyrenees at about north of Andorra.

5. Zusammenfassung

Diese Revision der europäischen Arten der Gattung *Chionea* (Diptera, Limoniidae) in den 2 Untergattungen *Chionea* (2 Arten) und *Sphaeconophilus* (7 Arten) schließt einen bebilderten Bestimmungsschlüssel mit ein sowie für jede Art Diagnose, Typus-Material, Synonymie, Diskussion und Details über Länder, aus denen die Art bekannt ist oder gemeldet wurde. *C. (S.) bezzii* aus dem Nordwesten Spaniens ist neu für die Wissenschaft. 7 neue Synonymien werden festgestellt und Lectotypen bestimmt für *C. (S.) lutescens* LUNDSTRÖM, 1907, *C. (S.) belgica* (BECKER, 1912) und *C. (S.) italica* VENTURI in FRANCISCOLO, 1955. Die Arbeit schließt mit einem ausführlichen Literaturverzeichnis mit Bezug auf die europäischen *Chionea*-Arten und einer Liste des bearbeiteten Materials.

6. References

BEZZI (1919) contains a review of all 19th and early 20th century papers on *Chionea* known to him. This list of references includes, apart from the titles mentioned in the main text, all papers on West Palaearctic *Chionea* known to us that are not included in BEZZI (1919).

- ALEXANDER, C.P. (1920): The crane-flies of New York. Part II. Biology and phylogeny. – Memoirs, Cornell University Agricultural Experiment Station, **38**: 691-1133.
- ALEXANDER, C.P. (1932): New or little-known Tipulidae from eastern Asia (Diptera). X. – Philippine Journal of Science, **49**: 105-136.
- ALEXANDER, C.P. (1936): New or little-known Tipulidae from eastern Asia (Diptera). XXX. – Philippine Journal of Science, **60**: 165-204.
- AUER, A. (1962): Bericht über neue Erfolge bei der Aufsammlung von Höhlentieren im Toten Gebirge. – Mitteilungen der Sektion Ausseerland des Landesvereins für Höhlenkunde in der Steiermark, **2**: 26.
- AUER, A. & GAISBERGER, K. (1978): Weitere Aufsammlungen von Kleintieren in Höhlen des Salzkammergutes. – Mitteilungen der Sektion Ausseerland des Landesvereins für Höhlenkunde in der Steiermark, **16**, Biospeläologisches Sonderheft: 1-15.
- AUER, A. & MAIS, K. (1968): Verzeichnis der im Toten Gebirge und Dachstein durch Mitglieder der Sektion Ausseerland aufgesammelten oder beobachteten rezenten Höhlentiere. – Mitteilungen der Sektion Ausseerland des Landesvereins für Höhlenkunde in der Steiermark, **6**: 22-25.
- BÄBLER, E. (1910): Die wirbellose, terrestrische Fauna der nivalen Region. – Revue Suisse de Zoologie, **18**: 761-915.
- BANGERTER, H. (1932): Zwei seltene Mücken. – Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **15**: 204-206.
- BANGERTER, H. (1939): Die Eriopterini des Sensetales bei Flamatt-Neuenegg. – Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **17**: 482-487.
- BANGERTER, H. (1943): Die Eriopterini des Sensetales bei Flamatt-Neuenegg. II. Teil. – Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **19**: 20-22.

- BARNDT, D. (2004): *Chionea (Sphaeconophilus) lutescens lutescens* Lundström 1907 (Diptera: Limoniidae) – Erstnachweis einer Schneemückenart für Brandenburg. – Märkische Entomologische Nachrichten, **6** (2): 1-6.
- BAU, A. (1910): Beitrag zur Kenntnis der Dipterenfauna Vorarlbergs. – Jahresbericht des Landesmuseums-Vereins für Vorarlberg, **46**: 299.
- BAUMANN, E. (1977): Untersuchungen über die Dipterenfauna subterranean Gangsysteme und Nester von Wühlmäusen (*Microtus*, *Clethrionomys*) auf Wiesen der montanen Region im Naturpark Hoher Vogelsberg. – Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere, **104**: 368-414.
- BECKER, T. (1912a): Note préliminaire sur un Diptère nouveau de Belgique. – Annales de la Société Entomologique de Belgique, **56**: 142-144.
- BECKER, T. (1912b): Berichtigung. – Annales de la Société Entomologique de Belgique, **56**: 418.
- BELLÉS, R.X. (1987): Fauna cavernícola intersticial de la península Ibérica i les Illes Balears. – Moll, Mallorca. 207 pp.
- BELLÉS, R.X. & ESCOLÀ, O. (1977): *Niphadobata alpina* (Dipt. Tipulidae) en acvidades Ibericas. – In: Comunicacions del 6è Simposium d'Espeleologia Barcelona. Bioespeleologia, **1977**: 69-73.
- BELLSTEDT, R. (1992): Schneeinsekten im Thüringer Wald. Ein Beitrag zum Gedenken an den Gothaer Insektenforscher Gustav Jänner. – Abhandlungen und Berichte des Museums der Natur Gotha, **17**: 88.
- BENAZZI, M. (1930): Nuove catture di *Chionea* (Diptera) nelle Alpi italiane. – Bollettino dei Musei di Zoologia ed Anatomia Comparata della R. Università di Torino, **41** (8): 1-5.
- BEZZI, M. (1900): Sulla presenza del genere *Chionea* Dalman in Italia, e la riduzione delle ali nei ditteri. – Rendiconti dell'Istituto Lombardo di Scienze e Lettere (Ser. 2), **33**: 511-526.
- BEZZI, M. (1908): Die *Chionea* der Alpen. – Societas Entomologica, **23** (13): 97-99.
- BEZZI, M. (1914): Ditteri cavernicoli dei Balcani raccolti dal dott. K. Absolon (Brünn). – Atti della Società Italiana di Scienze Naturali e del Museo Civile di Storia Naturale, **53**: 207-230.
- BEZZI, M. (1919): Rinvenimento di una *Chionea* (Dipt.) nei dintorni di Torino. – Bullettino della Società Entomologica Italiana, **49**: 12-49.
- BIRÒ, L. (1885): *Chionea araneoides* in Ungarn. – Zoologischer Jahresbericht, **1885**: 423.
- BITSCH, J. (1955): Le genre *Chionea* (Dipt., Tipulidae). Écologie, systématique et morphologie. – Travaux du Laboratoire de Zoologie et de la Station Aquicole Grimaldi de la Faculté des Sciences de Dijon, **11**: 1-26.
- BOHEMAN, C.H. (1846): Ny art af slägtet *Chionea*. – Ofversigt af Kongliga Vetenskaps-Akademiens Handlingar, **1846**: 178-179.
- BOLDYREV, B. (1911): Hunting insects on snow. – Entomologicheskoe Obozrenie, **11**: 408-409 (in Russian).
- BOLDYREV, B. (1913): On the Diptera of the genus *Chionea* Dalm. observed in Russia (Diptera, Limnobiidae). – Entomologicheskoe Obozrenie, **13**: 308-322 (in Russian with German summary).
- BOLIVAR, C. (1916): Nota: sesión 10 de Marzo 1916. Comunicaciones. – Boletín de Sociedad Española de Historia Natural, **1916**: 130-131.
- BOLOGNA, M.A. & VIGNA TAGLIANTI, A. (1985): Fauna cavernicola delle Alpi Liguri. – Annali del Museo Civico di Storia Naturale Giacomo Doria, **84**: 1-389.
- BOURNE, J.D. (1975): La faune des grottes de la Bouna (Ain). – Stalactite, **25**: 15-17.
- BOURNE, J.D. (1977a): Influence du milieu extérieur et des faciès physiques des biotopes cavernicoles sur le peuplement des entrées de trois grottes. – Proceedings 7th International Congress on Speleologie, Sheffield: 60-63.

- BOURNE, J.D. (1977b): Remarques sur la présence du genre *Niphadobata* (= *Chionea*) à basse altitude. – *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, **50**: 338.
- BOURNE, J.D. (1979a): Description de trois nouvelles espèces du genre *Niphadobata* (Diptera: Tipulidae) avec quelques remarques biogéographiques. – *Revue Suisse de Zoologie*, **86**: 233-249.
- BOURNE, J.D. (1979b): Insectes du froid et de la neige. – *Revue Mensuelle des Musées et des Collections de la Ville de Genève*, **193**: 2-5.
- BOURNE, J.D. (1981a): Une nouvelle espèce du genre *Niphadobata* des Pyrénées françaises (Diptera: Tipulidae). – *Revue Suisse de Zoologie*, **88**: 765-767.
- BOURNE, J.D. (1981b): Notes sur les Diptères aptères du genre *Niphadobata* en Suisse et données biométriques sur une population. – *Bulletin Romand d'Entomologie*, **1**: 45-52.
- BRAUNS, A. (1938): Über Flügelrudimente der Dipterengattung *Chionea* Dalm. (Fam. Limnobiidae). – *Zoologischer Anzeiger*, **123** (7/9): 180-184.
- BREUSS, W. (1995): Zum Vorkommen von Arthropoden in einigen Höhlen Vorarlbergs (Österreich) (Arachnida, Hexapoda, Crustacea). – *Bericht des Naturwissenschaftlich-Medizinischen Vereins in Innsbruck*, **82**: 227-240.
- BREUSS, W. (2004): Bemerkungen zur Wirbellosenfauna von Höhlen Vorarlbergs und angrenzender Gebiete. – *Vorarlberger Naturschau*, **15**: 127-138.
- BROEN, B. VON & MOHRIG, W. (1965): Zur Frage der Winteraktivität von Dipteren in der Bodenstreu. – *Deutsche Entomologische Zeitschrift*, (N.F.) **12**: 303-310.
- BRUGE, H. (2006): *Chionea* (= *Niphadobata*) *belgica* (Becker, 1912) au Lembeekbos à Halle (Diptera Limoniidae). – *Bulletin de la Société Royale Belge d'Entomologie*, **141**: 122-123.
- BRUNHES, J. (1986): Un Limoniide aptère nouveau du Massif Central français: *Niphadobata arverna* n.sp. (Dipt.). – *Bulletin de la Société Entomologique de France*, **91**: 47-52.
- BUCK, M. (1997): Untersuchungen zur ökologischen Einnischung saprophager Dipteren unter besonderer Berücksichtigung der Phoridae und Sphaeroceridae (Brachycera/Cyclorrhapha). – Dissertation, Universität Ulm. 194 + iv pp.
- BURGHELE-BĂLĂCESCO, A. (1969): Révision des genres *Chionea* et *Niphadobata* en Europe centrale et méridionale (Dipt. Tipulidae). – *Annales de la Société Entomologique de France*, (N.S.) **5**: 983-1000.
- BÜRGIS, H. (1982): Die Schneefliege *Chionea*, ein echtes Schneeinsekt. – *Mikrokosmos*, **71**: 40-44.
- BÜRGIS, H. (1992): Die Winterinsekten vom Heidenberg bei Lautertal-Raidelbach (nordwestlicher Odenwald). – *Bericht des Naturwissenschaftlichen Vereins in Darmstadt*, (N.F.) **15**: 41-54.
- BYERS, G.W. (1961): Biology and classification of *Chionea* (Diptera: Tipulidae). – *Proceedings of the Eleventh International Congress of Entomology*, **1**: 188-191.
- BYERS, G.W. (1983): The crane fly genus *Chionea* in North America. – *Kansas University Science Bulletin*, **52**: 59-195.
- BYERS, G.W. (1995): New species of Nearctic snow crane flies of the genus *Chionea* (Diptera: Tipulidae). – *Proceedings of the Entomological Society of Washington*, **97**: 508-514.
- CAODURO, G., OSELLA, G. & RUFFO, S. (1994): La fauna cavernicola della regione Veronese. – *Memorie del Museo Civico di Storia Naturale di Verona* (IIa serie), Sezione Scienze della Vita (A: Biologica), **11**: 1-144 (Limoniidae: 75).
- CASPERS, N. (1980): Die Emergenz eines kleinen Waldbaches bei Bonn. – *Decheniana*, Beiheft **23**. Bonn. 175 pp.
- CASPERS, N. & NOLL, R. (1981): Beitrag zur Kenntnis der Limoniidae, Trichoceridae und Tipulidae des Naturparks Kottenforst-Ville (Insecta, Diptera, Nematocera). – *Decheniana*, **134**: 197-214.

- CHRISTIAN, E. (1980): Eine neue Schneefliege aus der *Chionea*-Verwandtschaft: *Niphadobata austriaca* n. sp. (Dipt.: Tipulidae). – Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen, **32**: 77-79.
- CHRISTIAN, E. (2009): Snow flies of the genus *Chionea* (Diptera: Limoniidae) in Austria. – In: KROPF, C. & HORAK, P. (eds): Towards a natural history of arthropods and other organisms. In memoriam Konrad Thaler. – Contributions of Natural History, Bern, **12** (in press).
- COLLART, A. (1945): Propos d'un entomologist fagnard. – Revue Hautes Fagnes, **20** (3): 1-6.
- CRAMER, E. (1968): Die Tipuliden des Naturschutzparkes Hoher Vogelsberg. – Deutsche Entomologische Zeitschrift, (N.F.) **15**: 133-232.
- CZERNY, L. (1930): Dipteren auf Schnee und in Höhlen. – Izvestija na Csarskité Prirodonaučni Institutu v Sofija (Mitteilungen aus den Königlichen Naturwissenschaftlichen Instituten in Sofia), **3**: 113-118.
- CZIŽEK, K. (1915): Zweiflügler, Diptera. In: Bezirkskunde des Brünner Gebietes. – Zehnter Bericht des Lehrerkulubs für Naturkunde Jena, **1909-1914**: 1-7.
- CZIŽEK, K. (1931): Die mährischen Arten der Dipterenfamilien Limoniidae und Cylindrotomidae. – Zeitschrift des Mährischen Landesmuseums, **28**: 1-207.
- DALMAN, J.W. (1816): *Chionea araneoides*. Ett nytt inländskt insekt af tvåningarnas Ordning. – Kongliga Svenska Vetenskaps-Akademiens Handlingar, (3) **19**: 102-105. [Abstract with figures in Isis, **1824** (7): 416-419]
- DALMAN, J.W. (1823): Analecta entomologica. – Lindhianis, Holmiae [= Stockholm], 1: vii + 104 pp.
- DALMAN, J.W. (1824): *Chionea araneoides*, eine neue schwed. Mücke von Dalman. – Isis, **1824** (7): 416-419.
- DEICHSEL, R. (2004): Ein Vorkommen der Schneemücke *Chionea lutescens* (Dipt. Limoniidae) im Stadtgebiet von Berlin. – Entomologische Nachrichten und Berichte, **48**: 53.
- DEMEL, K. (1924): Nad Wigrami. Szkice naturalisty. – Przyrodnik, Cieszyn, **1-3**: 1-130.
- DORN, K. (1983): Untersuchungen über die Invertebratenfauna Wittgensteiner Fließgewässer. – Dissertation, Universität Bonn. 131 pp.
- EDWARDS, F.W. (1936): Pupae and living adults of *Chionea lutescens* Lundström from Denmark. – Proceedings of the Royal Entomological Society of London, **10**: 89-91.
- EIROA (ALVAREZ), M.E. & BAEZ, M. (2002): Limoniidae. – In: CARLES-TOLRA, M. (ed.): Catalogo de los Diptera de Espana, Portugal y Andorra. Monografias Sociedad Entomologica Aragonesa, **8**: 54-57 (in Spanish).
- EISENBEIS, G. & WICHARD, W. (1985): Atlas zur Biologie der Bodenarthropoden. – Stuttgart. XIV, 434 pp. [English edition: 1987, Atlas on the biology of soil arthropods. – Berlin. xiv, 437 pp.]
- ENDERLEIN, G. (1936): 22. Ordnung: Zweiflügler, Diptera. – In: BROHMER, P., EHRMANN, P. & ULMER, G. (eds): Die Tierwelt Mitteleuropas, **6** (2), Insecta 3, Abt. 16. – Leipzig. 259 pp.
- ERBER, D. (1972): Einige Fundorte für *Chionea lutescens* (Dipt. Tipulidae) in Hessen. – Entomologische Zeitschrift, **82**: 169-175.
- ERICHSON, W.F. (1851): Insekten. – In: MENETRIES, E.: Dr. A.Th. v. Middendorffs Reise in den äussersten Norden und Osten Sibiriens, Wirbellose Thiere. – St. Petersburg, **2** (1): 45-76.
- ESCOLÀ, O. & BELLÉS, R.X. (1977): Sobre el gènere *Niphadobata* Enderlein a la Península Ibèrica. – In: Comunicacions del 6è Simposium d'Espeleologia Barcelona. – Bioespeleologia, **1977**: 65-68.
- ESPAÑOL, F. (1955): Nuevos datos sobre la entomofauna cavernicola de la provincia de Lerida. – Eos, **31**: 261-273.
- FELDMANN, R. & REHAGE, H.O. (1973): Westfälische Nachweise des Winterhaftes (*Boreus westwoodi*) und der Schneefliege (*Chionea lutescens*). – Natur und Heimat, Münster, **33**: 47-40.

- FOCARILE, A. (1961): Nuovi ritrovamenti di *Chionea alpina* Bezzi nelle prealpi Lombarde (Diptera Limnobiidae). – Bollettino della Societa Entomologica Italiana, **91**: 43-47.
- FOCARILE, A. (1963): Nuovi dati sulla geonomia di *Chionea alpina* Bezzi in Lombardia (Diptera Limnobiidae). – Bollettino della Societa Entomologica Italiana, **92**: 94-96.
- FOCARILE, A. (1975): *Chionea minuta* Tahv. specie boreo-alpina nuova per la fauna italiana e terza serie di dati sulla geonomia de *Chionea alpina* Bezzi (Diptera Limnobiidae). – Atti dell'Accademia delle Scienze di Torino. 1. Classe di Scienze Fisiche, Matematiche e Naturali, **109**: 135-144.
- FRANCISCOLO, M.E. (1955): Fauna cavernicola del Savonese. – Annali del Museo Civico di Storia Naturale Giacomo Doria, **67**: 1-223.
- FRANZ, H. (1989): Familie Tipulidae. – In: FRANZ, H. (ed.): Die Nordostalpen im Spiegel ihrer Ländertierwelt, Diptera Orthorapha, **6/1**: 204-230.
- FRANZ, H. (1990): Fam.: Tipulidae, Limoniidae, Cyliindrotomidae, Ptychopteridae. – Catalogus Faunae Austriae, **19A**: 1-57.
- FREY, R. (1913): Beitrag zur Kenntnis der Arthropodenfauna im Winter. – Meddelanden af Societas pro Fauna et Flora Fennica, **39**: 106-121.
- FREY, R. & STORÅ, R. (1941): Nematocera. – In: Enumeratio insectorum fenniae. VI. Diptera. Helsingfors Entomologiska Bytesforening: 43-56.
- GAISBERGER, K. (1976): Die rezente Fauna der Höhlen des Losergebietes. – Mitteilungen der Sektion Ausseerland des Landesvereins für Höhlenkunde in der Steiermark, **34**: 4.
- GAISBERGER, K. (1984): Katalog der rezenten Höhlentiere (Wirbellose) des Toten Gebirges. – Schriftenreihe des Heimatmuseums Ausseerland, **6**: 1-30.
- GOETGHEBUER, M. (1931): Les Diptères du Plateau des Hautes-Fagnes. – Bulletin et Annales de la Société Royale Entomologique de Belgique, **71**: 171-182.
- GOETGHEBUER, M. & TONNOIR, A. L. (1920): Catalogue raisonné des Tipulidae de Belgique. – Bulletin de la Société Entomologique de Belgique, **2**: 104-112, 131-147.
- GRAF, G. (1965): Beobachtungen und Höhlentieraufsammlungen in der Großen Brettsteinhöhle (Kat. Nr. 1625/36). – Mitteilungen der Sektion Ausseerland des Landesvereins für Höhlenkunde in der Steiermark, **4**: 1.
- GROOTAERT, P. (1984): Redescription of *Niphadobata belgica* (Becker, 1912) comb. nov. (Diptera: Tipulidae), a snowfly from low altitudes in Belgium. – Annales de la Société Royale Zoologique de Belgique, **114**: 241-247.
- HACKMAN, W. (1961): Über die Dipterenfauna in den Gängen von Feldmäusen (*Microtus arvalis*). – Proceedings of the Eleventh International Congress of Entomology, **1**: 215-217.
- HACKMAN, W. (1963): Studies on the Dipterous fauna in burrows of voles (*Microtus*, *Clethrionomys*) in Finland. – Acta Zoologica Fennica, **102**: 1-64.
- HACKMAN, W. (1980): A check list of the Finnish Diptera. 1. Nematocera and Brachycera (s. str.). – Notulae Entomologicae, **60**: 17-48.
- HÅGVAR, S. (1971): Field observations on the ecology of a snow insect, *Chionea araneoides* Dalm. (Dipt. Tipulidae). – Norsk Entomologisk Tidsskrift, **18**: 33-37.
- HÅGVAR, S. (1976a): Phenology of egg development and egg-laying in a winter-active insect, *Chionea araneoides* Dalm. (Dipt. Tipulidae). – Norwegian Journal of Entomology, **23**: 193-195.
- HÅGVAR, S. (1976b): Winter-active insects enclosed by ice from supercooled rain. – Norwegian Journal of Entomology, **23**: 204.
- HEEGER, E. (1848): Beiträge zur Naturgeschichte der Kerfe in Beziehung auf ihre verschiedenen Lebenszustände, ihre Feinde in jedem Zustande, ihre Nahrung. – Isis, **1848** (5): 321-347.

- HEIJERMAN, T. (1987): De sneeuwmug *Niphadobata belgica* (Becker, 1912) in Nederland (Diptera: Tipulidae). – Entomologische Berichten, Amsterdam, **47**: 113-118.
- HEIM DE BALSAC, H. (1934): Un Diptère peu connu de la faune française: *Chionea lutescens*. Précisions sur sa Biologie. – Bulletin de la Société Entomologique de France, **39**: 102-105.
- HESELHAUS, S. (1914): Über Arthropoden in Nestern. – Tijdschrift voor Entomologie, **57**: 62-88.
- HÖVEMEYER, K. (1996): Die Dipterengemeinschaft eines Erlenuferwaldes in Südniedersachsen. – Braunschweiger Naturkundliche Schriften, **5** (1): 71-84.
- HUGUENIN, G. (1888): Diptera, Familie Tipulidae Schiner. Fauna insectorum helvetiae. – Schaffhausen. 73 pp. [Beilage der Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **8**: 1-73]
- ITÄMIES, J. & LINDGREN, E. (1985): The ecology of *Chionea* species (Diptera, Tipulidae). – Notulae Entomologicae, **65**: 29-31.
- JANETSCHKE, H. (1950): Die tierische Besiedlung Nordtiroler Höhlen in ihren Beziehungen zum Problem der alpinen Prälazialrelikte. – Natur und Land, **36** (5/6): 84-90.
- JÄNNER, G. (1919): Schneedecke und Insektenwelt in Thüringen. – Internationale Entomologische Zeitschrift Guben, **13** (10): 78-85.
- KLÖCKER, A. (1900): *Chionea araneoides* Dalman, en for vor fauna ny flue. – Entomologiske Meddelelser, **2**: 104.
- KRATOCHVÍL, J. (1936a): Renseignements sur les espèces de genre *Chionea* Dalm. de Tchécoslovaquie (Dipt. Tipulidae). – Bulletin de la Société Entomologique de France, **41**: 243-250.
- KRATOCHVÍL, J. (1936b): Dve dipterologicke kapitoly. – Vědi Přírodní, **17**: 256-260.
- KRATOCHVÍL, J. (1938): Nova kriteria k stanoveni druhove prislusnosti samcich imag ceskoslovenskych kratkorohych zastupco rodu *Chionea* Dalm. – Sbornik Klubu Přírodovědeckého v Brně, **20**: 61-67.
- KRZEMIŃSKI, W. (1978): The genera *Chionea* Dalm. and *Niphadobata* Enderl. (Diptera, Limoniidae) in Poland. – Prace Zoologiczne, **24**: 109-127.
- KRZEMIŃSKI, W. (1982): Contributions to the taxonomy of the European species of *Chionea* Dalman (Diptera: Limoniidae). – Entomologica Scandinavica, **13**: 193-200.
- KRZEMIŃSKI, W. (1984): Limoniidae of Poland (Diptera, Nematocera). Part 1: subfamily Eriopterinae. – Acta Zoologica Cracoviensia, **27**: 437-518.
- LACKSCHEWITZ, P. (1940): Die paläarktischen Rhamphidiinen und Eriopterinen des Wiener Naturhistorischen Museums. – Annalen des Naturhistorischen Museums Wien, **50** (1939): 1-67.
- LASAR, R. (1985): Käfer und andere Tiergruppen als Bewohner von Quellen im Bergischen Land. – Jahresbericht des Naturwissenschaftlichen Vereins zu Wuppertal, **38**: 16-19.
- LESNE, P. (1911): Sur le genre *Chionea* en Alsace. – Bulletin de la Société Entomologique de France, **1911**: 170-171.
- LOEW, H. (1871): Ueber die bisher auf der Galizischen Seite des Tatragebirges beobachteten Dipteren. – Jahrbuch der Kaiserlich-Königlichen Gelehrten-Gesellschaft in Krakau, **41**: 1-18.
- LUNDSTRÖM, C. (1907): Beiträge zur Kenntnis der Dipteren Finnlands, 3. Cyliptotomidae und Limnobiidae. – Acta Societatis pro Fauna et Flora Fennica, **29** (8): 1-31.
- LUNDSTRÖM, C. (1912): Beiträge zur Kenntnis der Dipteren Finnlands, 8. Suppl. 2, Mycetophilidae, Tipulidae, Cyliptotomidae und Limnobiidae. – Acta Societatis pro Fauna et Flora Fennica, **36** (1): 1-70.
- MANEVAL, H. (1936): Renseignements nouveaux sur le genre *Chionea* (Dipt. Tipulidae). – Bulletin de la Société Entomologique de France, **41**: 40-42.
- MARCHAND, W. (1917): Notes on the habits of the snow-fly (*Chionea*). – Psyche, **24**: 142-153.

- MARÉCHAL, P. (1939): *Chionea lutescens* Lund. (Dipt. Limon.) à la Baraque Michel. – Bulletin et Annales de la Société Entomologique de Belgique, **79**: 117-124.
- MASUTTI, L. (1979): Insetti e nevi stagionali. Riflessioni su reperti relativi alle Alpi Carniche e Giulie. – Bollettino dell Istituto di Entomologia di Bologna, **34**: 75-94.
- MEIJERE, J.C.H. DE (1920): Studien über palaearktische, vorwiegend holländische Limnobiiden, insbesondere über ihre Kopulationsorgane (Fortsetzung). – Tijdschrift voor Entomologie, **63**: 46-86.
- MENDL, H. (1972): Förekomsten av *Chionea* i Messaureområdet. – Fauna och Flora, **67** (5): 200-201.
- MENDL, H. (1975): Limoniinen aus dem Oberen Fulda-Gebiet, insbesondere um Schlitz (Diptera, Tipulidae). Ein Beitrag zur Kenntnis der Limoniinen-Fauna des Deutschen Mittelgebirgsraumes (Mit Anhang: Cylindrotomidae und Ptychopteridae). – Beiträge zur Naturkunde Ostthessens, **9/10**: 183-206.
- MENDL, H. (1977): Die Limoniiden und Cylindrotomiden aus den Sammlungen des Oberösterreichischen Landesmuseums zu Linz a. d. Donau (Diptera, Limoniidae, Cylindrotomidae). – Naturkundliches Jahrbuch der Stadt Linz, **23**: 35-50.
- MENDL, H. (1978): Limoniiden (Diptera, Nematocera) aus dem Allgäu. 1. Voralpengebiet. – Mitteilungen der Münchener Entomologischen Gesellschaft, **66**: 101-125.
- MENDL, H. (1979): Limoniiden (Diptera, Nematocera) aus dem Gebiet des Torneträsk (Swedisch Lappland). – Fauna Norrlandica, **5**: 1-43.
- MENDL, H., MÜLLER, K. & VIRAMO, J. (1977): Vorkommen und Verbreitung von *Chionea araneoides* Dalm., *C. crassipes* Boh. und *C. lutescens* Lundstr. (Diptera, Tipulidae) in Nordeuropa. – Notulae Entomologicae, **57**: 85-90.
- MENDL, H. & REUSCH, H. (1989): Liste der aus der Bundesrepublik Deutschland bis jetzt bekannten Stelmücken (Diptera Nematocera: Limoniidae). – Braunschweiger Naturkundliche Schriften, **3** (2): 429-453.
- MENDL, H., SOLEM, J.O. & BRETTEEN, S. (1987): Distribution and seasonal abundance of adult Limoniidae (Insecta Nematocera: Limoniidae) in the Dovrefjell National Park, South Norway. – Fauna Norvegica (B), **34**: 63-72.
- MENIER, J.J. & MATILE, L. (1976): Un Tipulide aptère nouveau de France: *Niphadobata ancae* n.sp. Dipt. – Bulletin de la Société Entomologique de France, **81**: 277-280.
- NABAGLO, L. (1973): Participation of invertebrates in decomposition of rodent carcasses in forest ecosystems. – Ekologia Polska, **21**: 251-270.
- NADIG, A. (1943a): Neue Feststellungen über Verbreitung, Morphologie und Ökologie der Schneefliegen-Gattung *Chionea*. – Verhandlungen der Schweizerischen Naturforschenden Gesellschaft, **123**: 132.
- NADIG, A. (1943b): Beiträge zur Kenntnis der Diptere ngattung *Chionea* (I. Teil). – Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **19**: 53-65.
- NADIG, A. (1944): Weitere Beobachtungen über die Ökologie der „Schneefliegen“-Gattung *Chionea*. – Verhandlungen der Schweizerischen Naturforschenden Gesellschaft, **124**: 138-139.
- NADIG, A. (1945): Beiträge zur Kenntnis der Diptere ngattung *Chionea* (II. Teil: Die Copulation). – Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **19**: 308-316.
- NADIG, A. (1949): Beiträge zur Kenntnis der Diptere ngattung *Chionea*. III. Teil: Die Faktoren, welche für das Vorkommen auf dem Schnee maßgebend sind. – Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **22**: 323-345.
- NARCHUK, E.P. (1998): A new subspecies of the genus *Chionea* Dalman (Diptera, Limoniidae) from Magadan Region. – Zoologicheskii Zhurnal, **77**: 494-498 (in Russian) (English translation: 1998, Entomological Review **78**: 266-270).
- NIELSEN, P. (1925): Stankelben. – Danmarks Fauna, **28**. København. 165 pp. (in Danish).

- NIELSEN, P. (1941): Danmarks Stankelben (Nematocera polyneura). – Flora og Fauna, **47**: 81-91 (in Danish).
- NOLL, R. (1985): Taxonomie und Ökologie der Tipuliden, Cylindrotomiden, Limoniiden und Trichoceriden unter besonderer Berücksichtigung der Fauna Ostwestfalens. – Decheniana, Beiheft **28**. Bonn, 265 pp.
- NOVAK, T. (2005): Terrestrial fauna from cavities in Northern and Central Slovenia, and a review of systematically ecologically investigated cavities. – Acta Carsologica, Ljubljana, **34**: 169-210.
- NOVAK, T. & KUSTOR, V. (1983): On the ecology of an alpine cave. – Memoires de Biospeologie, **10**: 117-125.
- NOVAK, T., SIVEC, I., JANŽEKOVİĀ, F. & CHRISTIAN, E. (2007): *Chionea austriaca* in caves and artificial galleries of Slovenia (Diptera, Limoniidae). – Revue Suisse de Zoologie, **114**: 49-57.
- OBENBERGER, J. (1923): Entomology on the skies. – Āasopis Āeské Společnosti Entomologické, **20**: 126 (in Czech).
- OOSTERBROEK, P. & SIMOVA-TOSIC, D. (2004): An annotated list of the species of Pediciidae, Limoniidae and Cylindrotomidae of Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Montenegro and Macedonia, with additions for the Tipulidae (Insecta, Diptera). – Studia Dipterologica, **10**: 441-452.
- PAKALNISKIS, S., BERNOTIENE, R., LUTOVINOVAS, E., PETRASIUNAS, A., PODENAS, S., RIMSAITE, J., SAETHER, O.A. & SPUNGIS, V. (2006): Checklist of Lithuanian Diptera. – New and Rare for the Lithuanian SSR Insect Species, **18**: 16-154.
- PÉTERFI, F. (1965): *Chionea (Niphadobata) lutescens* Lundst., un Dipter apter interessant in Fauna Republicii Populare Romane. – Studia Universitatis Babeş-Bolyai. Cluj Series II. Biologia, **1**: 53-55.
- PETERSEN, F.T. & JONG, H. DE (2001): Limoniidae. – In: PETERSEN, F.T. & MEIER, R. (eds): A preliminary list of the Diptera of Denmark. – Steenstrupia, **26**: 148-151.
- PEYERIMHOFF, P. DE (1906): Recherches sur la fauna cavernicole des Basses-Alpes. – Bulletin de la Société Entomologique de France, **1906**: 203-222.
- PEYERIMHOFF, P. DE (1911): Captures et observations. – Bulletin de la Société Entomologique de France, **1911**: 102-103.
- PIERRE, C. (1924): Diptères: Tipulidae. – Faune de France, **8**. Paris. 159 pp.
- PODENAS, S., GEIGER, W., HAENNI, J.-P. & GONSETH, Y. (2006): Limoniidae & Pediciidae de Suisse. – Fauna Helvetica, **14**. Neuchâtel. 375 pp.
- PODENAS, S. & VISARČUK, D. (2006): Twelfe new Nematoceros flies (Diptera: Nematocera) recorded in Lithuania in 1995-2005. – New and Rare for Lithuania Insect Species, **17**: 74-77.
- RESSL, F. (1983): Naturkunde des Bezirkes Scheibbs. Die Tierwelt des Bezirkes Scheibbs, Band **2**. – Scheibbs. 584 pp.
- REUSCH, H. (1988): *Niphadobata belgica* (Becker, 1912) neu für Deutschland (Diptera: Limoniidae). – Entomologische Zeitschrift, **98** (20): 300-304.
- REUSCH, H. (1997): Notes on *Chionea (Sphaeconophilus)* species in Central Europe (Diptera: Limoniidae). – Bulletin de la Société Neuchâteloise des Sciences Naturelles, **120**: 169-173.
- REUSCH, H. & BELLSTEDT, R. (2001): Checkliste der Stelzmücken Thüringens (Diptera: Limoniidae et Pediciidae). – Check-Listen Thüringer Insekten und Spinnentiere, **9**: 71-78.
- REUSCH, H. & OOSTERBROEK, P. (2000): Übersicht der aus den einzelnen deutschen Bundesländern bekannten Stelzmücken (Diptera: Limoniidae et Pediciidae). – Braunschweiger Naturkundliche Schriften, **6** (1): 149-164.
- RIMSKY-KORSAKOW, A.P. (1925): Einige Beobachtungen an Zweiflüglern aus der Gattung *Chionea* Dalm. – Zeitschrift für Wissenschaftliche Insektenbiologie, **20**: 69-76, 99-105.

- RONDANI, C. (1841): Sopra una specie di insetto dittero. Memoria I. – Nuovi Annali delle Scienze Naturali e Rendiconto Bologna, **6**: 284.
- ROSZKOWSKI, W. (1925): *Chionea lutescens* in the Polish Tatra. – Polskie Pismo Entomologiczne, **4**: 79-82 (in Polish).
- ROUARD, I.M.M. (1985): Assemblée mensuelle du 3 avril 1985. – Bulletin et Annales de la Société Royale Belge d'Entomologie, **121**: 459.
- SAHLBERG, J. (1976): *Chionea araneoides*. – Acta Societatis pro Fauna et Flora Fennica, **9**: xxxvii-xxxviii.
- SALMELA, J. (2001): Adult craneflies (Diptera: Nematocera) around springs in southern Finland. – Entomologica Fennica, **12**: 139-152.
- SÁMAL, J. (1925): Note on the entomological knowledge of the Sumava. – Acta Musei Nationalis Pragae, **99**: 41-43 (in Czech).
- SAVCHENKO, E.N. (1969): Fam. Limoniidae (Limnobiidae). Limoniid flies. – In: BEI-BIENKO, G.Y. (ed.): Determinative tables of insects from the European part of the USSR, Diptera and flies. – Nauka, **5**. - Leningrad, pp. 86-112 (in Russian).
- SAVCHENKO, E.N. (1981): On the systematic position of the Limoniid-fly *Chionea crassipes* Boh. (Diptera, Limoniidae). – Vestnik Zoologii, **1981** (2): 74-76 (in Russian).
- SAVCHENKO, E.N. (1982): Limoniid-flies (subfamily Eriopterinae). – Fauna Ukrainy, **14** (3). Kiev. 335 pp. (in Ukrainian).
- SAVCHENKO, E.N. (1989a): Family Limoniidae (Limnobiidae). – In: BEI-BIENKO, G.Y. (ed.): Key to the Insects of the European part of the USSR, Volume **5**, Diptera and Siphonaptera, Part 1: 119-163 (Smiths. Inst. Libr. and Nat. Res. Found. Wash. DC: i-xxii, 1-1233).
- SAVCHENKO, E.N. (1989b): Limoniidae fauna of the USSR. – Akad. Nauk Ukrainian SSR. - Kiev. 377 pp. (in Russian).
- SAVCHENKO, E.N., OOSTERBROEK, P. & STARY, J. (1992): Family Limoniidae. - In: SOÓS, Á., PAPP, L. & OOSTERBROEK, P. (eds): Catalogue of the Palaearctic Diptera, **1**. – Budapest. pp. 183-374.
- SCHACHT, W. (1999): Zweiflügler aus Bayern XVI. Ergänzungen zu Mendl & Reusch (1989) „Liste der aus Deutschland bekannten Stelzmücken“ (Diptera: Pediciidae, Limoniidae). – Entomofauna, **20** (7): 129-137.
- SCHMÖLZER, K. (1962): Die Kleintierwelt der Nunatakker als Zeugen einer Eiszeit-Überdauerung. – Mitteilungen aus dem Zoologischen Museum in Berlin, **38**: 171-400 (Diptera: 188-190, 312-321).
- SCHULTZ, H., JANECEK, B., HESS, M., REUSCH, H. & GRAF, W. (2006): Das Makrozoobenthos des Natura 2000-Gebietes St. Lorenzener Hochmoor (Andertal, Kärnten) unter besonderer Berücksichtigung der Libellenfauna (Insecta: Odonata). – Carinthia II, **116**: 343-358.
- SÉGUY, E. (1950): La biologie des Diptères. – Encyclopedie Entomologique (A), **26**. Paris. 609 pp.
- SIEBKE, H. (1877): Enumeratio insectorum norwegicorum. Facs. IV, Catalogum Dipteriorum continentem. – Christianiae. 255 pp.
- SILHAVY, V. (1945): Nova lokalita bezkridle mouchy *Chionea lutescens* Lunds. var. *bohemica* Krat. z Moravy. – Entomologické Listy, **8**: 29.
- SIMM, K. (1938): Notatki zoologiczne do fauny Tatr. – Kosmos, Ser. A., Lwów, **63** (3): 75-78.
- SIMOVA-TOSIC, D. (1992): Contribution to the study of Limoniidae in Yugoslavia. – Acta Zoologica Cracoviensia, **35**: 139-146.
- SIMOVA-TOSIC, D. & SIVEC, I. (1977): Two rare species of Limoniidae (Diptera) from Slovenia. – Acta Entomologica Jugoslavica, **13**: 45-49 (in Serbo-Croatian with English summary).

- SÖMME, L. & ÖSTBYE, E. (1969): Cold-hardiness in some winter active insects. – Norsk Entomologisk Tidsskrift, **16**: 45-48.
- STARÝ, J. (1969): Revision der Arten der Unterfamilie Limoniinae (Tipulidae, Diptera) aus den Sammlungen des Mährischen Museums in Brno mit besonderer Berücksichtigung der Fauna Mährens. Teil 1: Tribus Limoniini und Peditiini. – Časopis Moravského Museo v Brne, **54**: 131-160.
- STARÝ, J. (1971): Revision der Arten der Unterfamilie Limoniinae (Tipulidae, Diptera) aus den Sammlungen des Mährischen Museums in Brno mit besonderer Berücksichtigung der Fauna Mährens. Teil 2: Tribus Hexatomini und Eriopterini. – Časopis Moravského Museo v Brne, **55**: 133-194.
- STARÝ, J. (1981): Nachträge und Berichtigungen zur Limoniiden-Fauna der Tschechoslowakei (Diptera), 2. – Acta Rerum Naturalium Musei Nationalis Slovenici Bratislava, **27**: 99-122.
- STARÝ, J. (1997): Limoniidae. – In: CHVALA, M. (ed.): Checklist of Diptera (Insecta) of the Czech and Slovak Republics. – Karolinum-Charles University Press, Prague: 11-15.
- STARÝ, J. (2001): Faunistic Records of Limoniidae, Peditiidae and Cylindrotomidae (Diptera) from Hungary. – Folia Entomologica Hungarica, **62**: 199-204.
- STARÝ, J., KUBIK, S. & BARTAK, M. (2005): Limoniidae. – In: BARTAK, M. & KUBIK, S. (eds): Diptera of Podyjí National Park and its environs. – Česká Zemědělská Univerzita v Praze: 24-32.
- STARÝ, J. & ROZKOŠNÝ, R. (1970): Die Slowakischen Arten der Unterfamilie Limoniinae (Tipulidae, Diptera). – Acta Rerum Naturalium Musei Nationalis Slovenici Bratislava, **15**: 75-136.
- STRINATI, P. (1966): Faune cavernicole de la Suisse. – Annales de Speleologie, **21**: 5-268.
- STRINATI, P. & AELLEN, V. (1964): Deux grottes des Grisons (Val d'Avers). – Bulletin du Section Neuchâteloise des Société Suisse de Speleologie, **8**: 6-9.
- STRINATI, P. & AELLEN, V. (1967): Faune actuelle de deux grottes suisses de haute altitude. – Rassegna Speleologica Italiana, **19**: 84-87.
- STROBL, P.G. (1898): Diptera fauna of Bosnia, Hercegovina and Dalmatia. – Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, **10**: 387-466, 562-616 (in Serbo-Croatian).
- STROBL, P.G. (1900): Dipterenfauna von Bosnien, Herzegovina und Dalmatien. – Wissenschaftliche Mitteilungen aus Bosnien und Herzegovina, **7**: 552-670.
- STROUHAL, H. & VORNATSCHEK, J. (1975): Katalog der rezenten Höhlentiere Österreichs. – Annalen des Naturhistorischen Museums Wien, **79**: 401-542.
- STRÜBING, H. (1958): Schneeinsekten. – Neue Brehm Bücherei, **220**: 1-47.
- SÜSS, L. (1982): Nota sula *Chionea* s.l. italiane. – Bollettino di Zoologia Agraria e Bachicoltura, (2) **16**: 113-133.
- SÜSS, L. (1986): *Chionea araneoides* Dalman (Diptera Limnobiidae) nuova per la fauna italiana. – Bollettino di Zoologia Agraria e Bachicoltura, (2) **18**: 51-63.
- SVENSSON, S.A. (1966): Studier över vissa vinteraktiva insektens biologi. – Norsk Entomologisk Tidsskrift, **13**: 335-338.
- SVENSSON, S.A. (1969): Identities of *Chionea minuta* and *brevirostris* Tahvonen 1932. – Opuscula Entomologica, **34**: 242.
- SZULCZEWSKI, J.W. (1947): Fauna nasiezna Wielkopolskiego Parku Narodowego. – Prace Monograficzne Wielkopolskiego Parku Narodowego, Poznań, **2**: 1-17.
- TAHVONEN, E. (1932): Berichte über die *Chionea*-Arten in Finnland. – Notulae Entomologicae, **12**: 40-46.
- TAHVONEN, E. (1942): Beobachtungen über Winterinsekten. – Annales Entomologici Fennici, **8**: 203-214.

- TARWID, K. (1947): *Chionea* Meig. dans les Monts Tatra polonais (Dipt., Limnobiidae). – Wykaz Prac Mat.-przyr., **1939-1945**: 274.
- THALER, K. (1977): Fragmenta Faunistica Tirolensia. III. (Insecta ... Opiliones). – Veröffentlichungen des Tiroler Landesmuseums Ferdinandeum, **57**: 137-151.
- THALER, K. (2002): Fragmenta Faunistica Tirolensia. XIV. (Arachnida ... Limoniidae). – Veröffentlichungen des Tiroler Landesmuseums Ferdinandeum, **82/I**: 39-56.
- THALER, K. & KNOFLACH, B. (2001): Funde hochalpiner Spinnen in den mittleren Ostalpen (Tirol, Graubünden) 1997-2000 und Beifänge. – Veröffentlichungen des Tiroler Landesmuseums Ferdinandeum, **81**: 195-203.
- THEOWALD, Br. (1971): Die Tipuliden der Benelux-Länder (Diptera, Tipulidae). – Tijdschrift voor Entomologie, **114**: 217-238.
- TJEDER, B. (1955): Catalogus Insectorum Sueciae. 14. Diptera: Fam. Tipulidae. – Opuscula Entomologica, **20**: 229-247.
- TJEDER, B. (1965): Faunistic notes on Norwegian Tipulidae (Dipt.). – Norsk Entomologisk Tidsskrift, **13**: 41-46.
- TOLLET, R. (1957): Nouvelle capture de *Chionea lutescens* var. *bohemica* Kratochvíl (Diptera-Limoniidae). – Bulletin et Annales de la Société Royale Entomologique de Belgique, **93**: 119-120.
- TURCHETTO, M. & VANIN, S. (1998): Contributo alla conoscenza della struttura muscolare nel genera *Chionea* (Dalman, 1916) (Diptera: Limoniidae). – Atti XVIII Congresso Nazionale Italiano di Entomologie. Supplemento Atti Accademia Nazionale di Entomologie, Anno XLVI: 1-40.
- TURQUIN, M.J. (1973): La colonisation de quelques grottes de Jura par *Niphadobata alpina* Bezzi (Diptera, Tipulidae). – International Journal of Speleologie, **5**: 21-29.
- VANIN, S., CANETTI, N. & TURCHETTO, M. (2004): Osservazioni sulla fauna ditterologica del ghiacciaio della Marmolada (Italia, Dolomiti). – Lavori della Società Veneziana di Scienze Naturali, **29**: 9-15.
- VANIN, S. & MASUTTI, L. (2008): Studies on the distribution and ecology of snow flies *Chionea lutescens* and *Chionea alpina* (Diptera: Limoniidae) in Italy. – Italian Journal of Zoology, **75** (2): 147-154.
- VANIN, S. & TURCHETTO, M. (2004): Studio sull'entomofauna invernale delle regione dolomitica. – Atti Congresso Italiano di Entomologie **2002**, Catania, Italia. Tipografia Coppini, Firenze: 149-135.
- VENTURI, F. (1956): Di alcune *Chionea* (Limnobiidae) italiane nel quadro delle species europee. – Memorie del Museo Civico di Storia Naturale di Verona, **5**: 93-105.
- VORNATSCHER, J. (1964): Die lebende Tierwelt der Dachstein Höhlen. – Third International Congress of Speleology, Vienna, **3**: 143-147
- WEBER, G. & WEIDEMANN, G. (1993): *Niphadobata lutescens* (Lundström, 1908) and *N. belgica* (Becker, 1912) from the Solling mountains, Lower Saxony, FRG (Diptera, Limoniidae). – Deutsche Entomologische Zeitschrift, (N.F.) **40**: 259-263.
- WOJTUSIAK, H. (1950): The temperature preferendum of winter insects of the genus *Boreus* (Panorpidae) and *Chionea* (Diptera). – Bulletin International de l'Académie Polonaise des Sciences et des Lettres, Series B-2, Zoologique, **11**: 123-143.

Figure credits

BOURNE (1981a): fig. 19; BURGHELE-BĂLĂCESCO (1969): fig. 10, 11, 18; BYERS (1983): fig. 25; CHRISTIAN (1980): fig. 22-24; GROOTAERT (1984): fig. 14, 21; HEIJERMAN (1987): fig 1; KRATOCHVÍL (1936a): fig. 2; KRZEMIŃSKI (1982): fig. 5-7, 12, 17; SAVCHENKO (1982): fig. 3, 4, 20; SÜSS (1982): fig. 8, 9, 13.

Addresses of the authors:

Dr. Pjotr Oosterbroek
Section Entomology, Zoological Museum
University of Amsterdam
Plantage Middenlaan 64
NL-1018 DH Amsterdam
E-Mail: P.Oosterbroek@uva.nl

Dr. Herbert Reusch
BAL – Bureau of Applied Limnology and Landscape Ecology
Wellendorf 30
D-29562 Suhlendorf
E-Mail: Herbert.Reusch@t-online.de

Appendix

Material examined other than type material

All material preserved in alcohol unless stated otherwise.

C. (C.) araneoides

Austria: Kärnten, Großglockner, Guttal, 2♂♂, 2♀♀, 1980, 1750-1950 m, K. THALER leg. (ZMAN); Niederösterreich, Lunz, 1♂, 4.I.1973, Erdboden, H. MALICKY leg. (ZFMK).

Czech Republic: Bohemia, Šumava Mts, Loučovice nr. Vyšší brod, Luč Nature Reserve, J. MACA leg. (ZMAN): 1♂, 4♀♀, 25.I.1996; 2♂♂, 2♀♀, 7.III.1996; 10♂♂, 4♀♀, 16.I.1997; 10♂♂, 10♀♀, 27.II.1997; Moravia, Hrubý Jeseník Mts, Skřítek peat-bog, soil trap, J. ROHÁČEK leg. (ZMAN): 1♂, 4-18.X.1978; 4♂♂, 6♀♀, 18.X-1.XI.1978; 7♂♂, 2♀♀, 1-27.XI.1978.

Finland: Wichtis, 1♂, no date, J. SAHLBERG leg. (FMNH, dry); Hattula, 1♂, I.1923, A. WEGELIUS leg. (FMNH, dry); Maaninka, Liesjärvi, Heinäsuo, 63.03N/27.10E, 3♂♂, early.I.2006, R. DE GOEDE leg. (ZMAN); Lapin, Kynsivaara 730:563, 1♂, 15.XI.1983, 100 %, -2°C (N), J. VIRAMO leg. (WKKP); Oulu, Kiiminki, Lumelta, 7224:139, J. VIRAMO leg. (WKKP): 1♂, 11-12.II.1977; 1♂, 14.I.1979; Oulu, Kuusamo 7343: 516 Ruka, 1♂, 5.III.1979, J. VIRAMO leg. (WKKP); Oulu, Kuhmo (WKKP): 2♂♂, 3.XII.1983, 100 %, +1 °C; 2♂♂, 12.II.1984, -3°C; numerous specimens in 13 samples (ZFMK) from the Muhos region, as reviewed in MENDEL et al. (1977).

Italy: Lombardia, Sondrio, Valfurva, 3♂♂, 1♀, 20-30.XII.1981, 1300-1400 m, L. SÜSS leg. (CSVI); Lombardia, Sondrio, S. Nicolo, 3♂♂, 27.XII.1984, L. SÜSS leg. (CSVI); Trentino, Trento, Folgaria, southern face of Cornetto, UTM 32 T0669750 5089680, 1♀, 6.I.2006, 1950 m, F. MASON & A. ZERBINI leg. (ZMAN).

Poland: Tatra Mts, Morskie Oko, 1♂, 4.II.1984, B. SOSZYNISKI (?) leg. (ZMAN); Zaroja - Babia Göra, 1♂, 1♀, 3.I.1975, 600 m, W. KRZEMIŃSKI leg. (ZFMK).

Romania: Retezat National Park, Pierele Valley, 45.24.59N/22.53.25E, 1♂, 13.I.2008, ca. 1200 m, C.O. MANCI leg. (COMR); Retezat National Park, West Jiu Valley, 45.15.52N/22.52.33E, 1♂, 13.II.2008, ca. 1100 m, C.O. MANCI leg. (COMR); 1♂, without data, ex. coll. L. UJVAROSI (ZMAN).

Russia: Kola peninsula, Hibin Mts, near Kirovsk, 2♂♂, 6.XI.1988, on snow, O. KURINA leg. (coll. Kurina).

Slovakia: Vysoké Tatry Mts, Studená dolina (valley) near Kamzík, 3♂♂, II.1953, 1200 m, S. HRABÉ leg. (JSOC).

Sweden: Numerous specimens (ZFMK) from the Abisko (20 samples) and Messaure (9 samples) regions, as reviewed in MENDEL et al. (1977).

Switzerland: Graubünden, all A. NADIG leg. (except 1x BIVERONI leg.) (BNMC): Albulatal, Preda, CH-Koord. 779,.../162,..., 5♂♂, 1♀, 24.XII.1942, ca. 1820 m (further details in NADIG 1943b: 56, as *minuta*, date 24.12.42); Churwaldener Tal, Parpan, CH-Koord. 761,.../181,..., 1♀, 10.II.1945, ca. 1600 m (further details in NADIG 1949: 330-1, date 10.2.45); Engadin, without locality or date, 2♂♂, 1♀; Hinterrheintal, Sufers, CH-Koord. 747,.../159,..., 1♂, 1♀, 26.I.1943, ca. 1500 m (further details in NADIG 1943b: 56, as *minuta*, date 26.1.43); Münstertal, Sta. Maria, CH-Koord. 828,.../165,..., 1♂, 1♀, 2.I.1943, ca. 1400 m (further details in NADIG 1943b: 56, as *minuta*, date 2.1.43); Münstertal, Tschieriv, Buffalora, CH-Koord. 816,.../168,..., ca. 2200 m: 1♂, 2.I.1942, auf Schnee, +1°C; 1♂, 5.I.1942, auf Schnee, -1°C; 3♂♂, 11♀♀, ??I.1943; 17♂♂, 13♀♀, 1-8.2.1944; Oberengadin, Bevers, God da Cuas, CH-Koord. 786,.../158,..., 1♂, 24.XII.1942, ca. 1800 m, (further details in NADIG 1943b: 56, as *minuta*, date 24.12.42); Oberengadin, Madulein, Val d'Es-cha, CH-Koord. 788,.../164,030, 1♀, 12.III.1942, 2300 m (further details in NADIG 1943b: 56, as *minuta*, date 29.1.43); Oberengadin, Maloja, CH-Koord. 773,.../141,..., 1♂, 29.I.1943, ca. 1820 m (further details in NADIG 1943b: 56, as *minuta*, date 29.1.43); Oberengadin, Morteratsch, CH-Koord. 792,380/147,680, 1♂, 1♀, 9.III.1942, 1900 m, Luftfeuchtigkeit 30 % (further details in NADIG 1943b: 56, as *minuta*, date 9.3.42); Oberengadin, Zuoz, CH-Koord. 792,.../164,..., 2♀♀, 9.IX.1946, 1750 m, Waldrand, über A.J.?, 1750 m, Himmel bedeckt, es schneit nass, Lufttemperatur 0°C, Luftfeuchtigkeit ca. 100 %; 2♂♂, 4.XII.1947, 1800 m, ca. 40 cm Schnee, Lufttemperatur ca. -3°C; Puschlav, Brusio, Viano, CH-Koord. 808,500/126,000, 1♀, 3.III.1941, 1330 m, Luftfeuchtigkeit 30 % (further details in NADIG 1943b: 56, as *minuta*, date 3.3.41); Schanfigg, Arosa, Litzirüti, CH-Koord. 772,.../185,..., 1♂, 13♀♀, 4.II.1945, 1520-1720 m (further details in NADIG 1949: 330, date 4.2.45); Schanfigg, Langwies, Litzirüti, CH-Koord. 773,.../185,..., 1♂, 4.II.1945, 1700 m, Schnee, *alpina* det. NADIG; Schanfigg, Maladers, CH-Koord. 761,.../189,..., 1♀, 11.II.1945, 1200 m, Lufttemperatur +0,5°C, Luftfeuchtigkeit 84 %; Unterengadin, Lavin, Plattas, CH-Koord. 804,200/183,540, 1♀, 2.II.1941, 1500 m, Lufttemperatur +2°C; Unterengadin, Susch/Süs, Clüs, CH-Koord. 802,700/181,740, 1500 m: 1♂, 22.I.1942, Waldlichtung, Schnee, Lufttemperatur -0,5°C; 13.I.1947; 1 copula, 1♂, Waldlichtung, oberflächlicher Nassschnee, Lufttemperatur 0 - +2°C, leg. BIVERONI; Unterengadin, Zernez, God sur I Fuorn, CH-Koord. 811,500/172,050, 1♂, 5.I.1942, 1840 m, Schnee, Lufttemperatur -1°C; Unterengadin, Zernez, II Fuorn, CH-Koord. 812,.../171,..., ca. 1800 m: 1♂, 3♀♀, 25.XII.1937, auf Schnee, Luftfeuchtigkeit 30 % (further details in NADIG 1943b: 56, as *minuta*, date 25.12.37); 1♂, 2.I.1941 (further details in NADIG 1943b: 56, as *minuta*, date 2.1.41); 1♂, 2.I.1942, 6 cm Schnee; 1♂, 1♀, 4.I.1942, auf Schnee; 1♂, 2♀♀, 5.I.1942, auf Schnee, Lufttemperatur -1,5°C, Luftfeuchtigkeit 25-45 %; 1♂, 5♀♀, ??I.1943; 5 copulas, 14♂♂, 5♀♀, 27.II.1944, Copulas im Tod getrennt; 21♂♂ (incl. 8 ZMAN), 23♀♀ (incl. 8 ZMAN), 27-29.II.1944, auf Schnee; 4♂♂, 5♀♀, 28.II.1944, auf Schnee; 6 copulas, 28.II.1944, auf Schnee, Lufttemperatur -2,5°C; 7 copulas (incl. 2 ZMAN), 28.II.1944, auf Schnee, in Copula bei Zimmertemperatur; Unterengadin, Zernez, II Fuorn-Buffalora, CH-Koord. 812,.../171,..., 1800-1900 m: 5♂♂, 4♀♀, 2.I.1942, 6 cm Neuschnee, Lufttemperatur +1°C, Luftfeuchtigkeit 30 %; 6♂♂, 3♀♀, 3-6.I.1942, auf Schnee, Lufttemperatur 0 - -2°C, Luftfeuchtigkeit 30 %; Unterengadin, Zernez, II Fuorn-Buffalora, Stabelchod, CH-Koord. 814,.../171,..., 7♂♂, 1♀, 13.I.1943, ca. 1940 m (further details in NADIG 1943b: 56, as *minuta*, date 13.1.43).

C. (C.) crassipes crassipes

Finland: Oulu, Kiiminki, 1 ex, 13.XII.1972-15.I.1973, J. VIRAMO leg. (ZFMK); Oulu, Kuusamo, 1♂, 1 ex., 9.III.1969, J. VIRAMO leg. (ZFMK); Oulu, Kuusamo, Kiutak, Talvil, 2♂♂, 3.III.1970, J. VIRAMO leg. (WKKP); Oulu, Kuusamo, Oulanka, 1 ex., 9.III.1970, T. SILLANPÄÄ leg. (ZFMK); Oulu, Kuusamo, 7367:605 Ampumarana, 2.III.1980 (WKKP): 3♂♂, T. SILLANPÄÄ leg.; 5♂♂, J. VIRAMO leg.; Oulu, Kuusamo, Asema-Ryticia 10:30-12 (WKKP): 2♂♂, 22.II.1983, 6♂♂, 6.III.1983; Oulu, Kuusamo, Asema-Meriosa, 1♂, 23.II.1983 (WKKP).

Sweden: Numerous specimens (ZFMK) from the Abisko (36 samples) and Messaure (15 samples) regions, as reviewed in MENDEL et al (1977).

C. (S.) alpina

Andorra: Sant Julia, Canya de les Grailes, 1♂, 5.I.1969, O. ESCOLÁ leg., *catalonica* det. J.D. BOURNE (MHNG).

Austria: Nordtirol, Umg. Innsbruck, Nordkette (Flenchkar ?), 1 ♂, 15.VII.-26.X.1976, 2100 m, Bodenfallen (ZFMK); Oberösterreich, Mammuthöhle, 10 ♂♂, 1 ♀, IX.-XII.1962 (NMWA); Oberösterreich, Kraulhöhle (1547/14), Obertraun, 1 ♂, 16.VII.1979, 1450 m, K. GAISBERGER leg. (NMWA); Oberösterreich, Backofen, Schönbergalm, 1 ♂ (prepared on glass), 16.VII.1979, K. GAISBERGER leg. (NMWA); Steiermark, Weinbergloch, Triebeinalpe / Gußwerk (1813/5), 1 ♂, 8.VIII.1976, 1200 m, A. MAYER leg. (NMWA); Steiermark, Großes Loserloch (1623/8), Loser, Altaussee, 2 ♂♂, 1 ♀ (prepared on glass), 19.V.1979, 1615 m, K. GAISBERGER leg. (NMWA); Steiermark, Pseudoskorpionshöhle (1623/63), Loser, Altaussee, 2 ♂♂ (1 prepared on glass), 4 ♀♀, 19.VII.1979, 1625 m, K. GAISBERGER leg. (NMWA); Steiermark, Warscheneck, Steileckhöhle (1635/6), 7 ♂♂, 8 ♀♀, 4 ex., before 13.XII.1979, 1160 m, K. GAISBERGER leg. (ZMAN); Steiermark, Totes Gebirge, Kriemandlhöhle (1622/8), 6 ♂♂, 19 ♀♀, before 30.VII.1980, 1740 m, K. GAISBERGER leg. (ZMAN).

France: Drôme, Léomcel, Grotte de Chovet, 1 ♂, 4.XII.1975, Lab. Biol. Souterraine Univ. Lyon leg. (MHNG); Alpes-de Haute-Provence, Mélan près de Sisteron, Grotte de St.-Vincent, 13 ♂♂, 8 ♀♀, 13.IV.1977, 1500 m, J.D. BOURNE leg. (MHNG); Hautes-Alpes, Belvédère de Ciry du Mt Viso, 2 ♂♂, 25.IX.1980, 2200 m, sous pierre au bord du Guil, C. BESUCHET leg. (MHNG); Haute-Savoie, Flaine, 1 ♂, 14.XII.1975, 1700 m, C. BESUCHET leg., *lutescens* det. J.D. BOURNE (MHNG); Haute-Savoie, Prodianz / Avoriaz, 1 ♂, 29.II.1976, 1300 m, sur la neige, C. BESUCHET leg. (MHNG).

Germany: Bayern, Gutenalp, Oytal, Allgäuer Alpen, 2 ♂, 3 ♀♀, X.1971-15.V.1972, 1100 m, Barberfalle, STRAUß leg. (ZFMK); Bayern, Gutenalp, Oytal, Allgäuer Alpen, 1 ♂, 3 ♀♀, 4.I.1973, auf Schnee, MENDL leg. (ZFMK).

Italy: Friuli-Venezia Giulia, Pordenone, Val Settimana, 1 ♀, early.XII.1995, su neve, 1100 m, S. VANIN leg. (CSVI); Friuli-Venezia Giulia, Pordenone, da loc. Crosetta verso Candaglia, 2 ♀♀, 2.I.1999, su neve, 1100 m, S. VANIN leg. (CSVI); Lombardia, Sondrio, Bormio, Parco Bagni, C. FAVA leg., 1 ♂, 1 ♀, 17.I.1985, C. FAVA leg. (CSVI); Lombardia, Sondrio, Bormio, M. Reit, C. FAVA leg. (CSVI); 1 ♂, 2 ♀♀, 22.I.1985; 1 ♂, 26.I.1985; Lombardia, Sondrio, S. Caterina Valfurva, 1 ♂, 2.I.1986, 1800 m (CSVI); Lombardia, Sondrio, Valfurva, 1 ♀, 20-30.XII.1981, 1300-1400 m, L. SÜSS leg., *araneoides* det. L. SÜSS (CSVI); Lombardia, Sondrio, Valfurva, verso Forni, 1 ♂, 2.I.1987 (CSVI); Piemonte, Cuneo, Sampeyre, Colle del Prete dint., 1 ♂, 2.XI.2002, 1700 m, in casa e legnaia, G. GARDINI leg. (CSVI); Piemonte, Cuneo, Sampeyre, Becetto-Meire Rua, 1 ♂, 1 ♀, 2.I.2003, 1600 m, in casa e legnaia, G. GARDINI leg. (CSVI); Trentino-Alto-Adige, Trento, Prealpi Venete, Monte Paganella, Grotta Cesare Battisti, 2 ♂♂, 2 ♀♀, 15.X.1978, M.G. PAOLETTI leg. (JSOC); Trentino-Alto Adige, Trento, Com. Avio, Monti Lessini, Abisso di Scortigara, 1 ♂, 3.XII.1995, N. TOMELLERI leg. (CSVI); Veneto, Belluno, Tre Cime di Lavaredo, Strada per Rif. Auronzo, 1 ♂, 9.IV.1996, su neve, S. VANIN leg. (CSVI); Veneto, Belluno, Pecol, 1 ♀, 23.XII.1997, su neve, S. VANIN leg. (CSVI); Veneto, Belluno, Tambre, loc. Col Indes, sentiero Rif Semenza, 1 ♂, 1 ♂, 25.I.1998, su neve, S. VANIN leg. (CSVI); Veneto, Belluno, Vette Feltrine, Cas. Erera-Piani Eterni, 1 ♂, 14.II.1998, S. VANIN leg. (CSVI); Veneto, Belluno, Pso San Pellegrino, verso Cima Furca Rosso, 2 ♂♂, 15.II.1998, 1800-2500 m, S. VANIN leg. (CSVI); Veneto, Belluno, Strada do S. Fosca verso Mondeval, 1 ♂, 22.II.1998, 1400-1900 m, S. VANIN leg. (CSVI); Veneto, Belluno, S. Vito di Cadore, sentiero 228 vers Rif. Scotter, S. VANIN leg. (CSVI); 1 ♂, 31.XII.1998, 1300-1580 m; 2 ♂♂, 1.I.1999, 1300-1580 m, su neve; 1 ♀, 14.I.2004; Veneto, Belluno, Dolomiti bellunesi, Gh. inf. Mte Antelao (CSVI): 1 ♂, 16.X.1998, S. CRIVELLARI leg.; 2 ♂♂, 2 ♀♀, 1.VII.1999, S. VANIN & S. CRIVELLARI leg.; Veneto, Belluno, S. Canale d'Agordo, Gares, C.na Cime Cornelle, 10 ♂♂ (incl. 5 ♂♂ ZMAN), 4 ♀♀, 5.XII.1999, 1330 m, su neve, LAZZARIS-VANIN leg. (CSVI, ZMAN); Veneto, Belluno, Tambre, loc. Col Indes, sentiero Rif Semenza tra Capanna degli Alpini e Madonna del Sasso, 3 ♂♂, 7 ♀♀, 15.XII.2002, su neve, S. VANIN leg. (CSVI); Veneto, Belluno, Misurina, Rif. Auronzo, 3 ♀♀, 13.I.2004, su neve, S. VANIN leg. (CSVI); Veneto, Treviso, Mt. Grappa vers Sud, C.ma della Mandria - Mt. Meatte- Val delle Mure- Val di Archeson, 2 ♂♂, 1 ♀, 6.I.1999, 1300-1500 m, su neve, S. VANIN leg. (CSVI); Veneto, Vicenza, Arzignano near Passo d. Vena, 1600 m, F. MASON & A. ZERBINI leg.: UTM 32 T0676350 5081974, 2 ♂, 3 ♀, 25.XII.2005; UTM 32 T0676941 5082201, 1 ♂, 1 ♀, 19.I.2006 (CNBF).

Montenegro: Durmitor, 1 ♂, 1981 (ZMAN, dry); Durmitor, Zupci, 1 ♂, 1 ♀, 22.VI.1988, 2000 m, PAVICEVIC leg. (ZMAN, published as *lutescens* in SIMOVA 1992).

Romania: 1 ♂, without data, ex. coll. L. UJVAROSI (ZMAN).

Spain: Catalunya, Gerona, Serra del Cadi, Grallera Gran de Cornellana, 5 ♂♂, 23.VIII.1970, O. ESCOLÁ leg. (MHNG, sub nom. *catalonica*); Catalunya, Lleida, Grallera Petita del Boixader, Josa del Cadi, 1 ♂, 1 ♀, 6.X.1968, 2400 m, O. ESCOLÁ leg., *catalonica* det. M. CARLES-TOLRÀ (MZBS); Catalunya, Lleida, Grallera de Prat Rodó, Pedró 4 Batlles, Port del Comte, 1 ♂, 1 ♀, 19.VII.1970, O. ESCOLÁ leg. (MHNG, sub nom. *catalonica*).

Switzerland: Graubünden, all A. NADIG leg. (except 1x BIVERONI leg.) (BNMC): Albulatal, Preda, Mignaclas, CH-Koord. 779,000/162,670, 1 ♀, 24.XII.1942, 1800 m (further details in NADIG 1943b: 55, as *alpina*, date 24.12.42); Churwaldener Tal, Parpan, Tschuggen, CH-Koord. 762,.../181,..., 1 ♂, 12.II.1943, 1520 m, Lufttemperatur -1°C, Luftfeuchtigkeit 30 % (further details in NADIG 1943b: 56, under *minuta*, date 12.2.43); Münstertal, Lü, Champs Lungs, CH-Koord. 824,700/167,380, 1 ♀, 2.I.1943, 1900 m (further details in NADIG 1943b: 55, as *alpina*, date 2.1.43); Münstertal, Tschieriv, Buffalora, CH-Koord. 816,.../168,..., 1 ♂, 1 ♀, 2.I.1941, ca. 2200 m (further details in NADIG 1943b: 55, as *alpina*, date 2.1.41); Oberengadin, Bevers, God da Cuas, CH-Koord. 786,.../158,..., 1 ♂, 24.XII.1942, 1750-1800 m (further details in NADIG 1943b: 55, as *alpina*, date 24.12.42); Oberengadin, Morteratsch, CH-Koord. 792,380/147,680, 1 ♂, 9.III.1942, 1900 m, Luftfeuchtigkeit 30 % (further details in NADIG 1943b: 55, as *alpina*, date 9.3.42); Puschlav, Brusio, Viano, CH-Koord. 807,920/126,000, 1 ♂, 3.III.1941, 1000 m, Luftfeuchtigkeit 30 % (further details in NADIG 1943b: 55, as *alpina*, date 3.3.41); Schanfigg, Arosa, Furggawald, CH-Koord. 772,610/183,620, 1 ♀, 22.III.1942, 1700 m (further details in NADIG 1943b: 55, as *alpina*, date 22.3.42); Schanfigg, Arosa, Litzirüti, CH-Koord. 772,.../185,..., 5 ♂♂, 4 ♀♀, 4.II.1945, 1520-1720 m (further details in NADIG 1949: 330, date 4.2.45); Schanfigg, Langwies, Litzirüti, CH-Koord. 773,.../185,..., 1700 m: 1 ♂, 31.I.1943 (further details in NADIG 1943b: 55, as *alpina*, date 31.1.43); 3 ♂♂, 2 ♀♀, 4.II.1945, Schnee; Schanfigg, Maladers, CH-Koord. 761,.../189,..., 2 ♂♂, 11.II.1945, 1200 m, Schnee, Lufttemperatur +0,5°C, Luftfeuchtigkeit 84 %; Schanfigg, Molinis, Batjändja, CH-Koord. 769,400/188,400, 1 ♀, 15.II.1943, 1050 m (further details in NADIG 1943b: 55, as *alpina*, date 15.2.43); Unterengadin, Susch/Süs, Clüs, CH-Koord. 802,700/181,740, 1500 m: 1 ♂, 22.I.1941 (further details in NADIG 1943b: 55, as *alpina*, date 22.1.41); 1 ♂, 13.I.1947, Waldlichtung, oberflächlicher Nassschnee, Lufttemperatur 0 - +2°C, leg. BIVERONI; Unterengadin, Zernez, Wiesen unter God dal Fuorn, CH-Koord. 812,200/171,770, 1 ♀, 6.I.1942, 1800 m, Schnee, erfroren, Luftfeuchtigkeit 25 %; Unterengadin, Zernez, God sur Il Fuorn, CH-Koord. 811,500/172,050, 1 ♀, 26.XII.1942, 1840 m (further details in NADIG 1943b: 55, as *alpina*, date 26.12.42); Unterengadin, Zernez, Il Fuorn, CH-Koord. 812,.../171,..., ca. 1800 m: 1 ♂, 1 ♀, 4.I.1942, auf Schnee; 1 copula, 2 ♂♂, 1 ♀, 5.I.1942, auf Schnee, Lufttemperatur -1,5°C, Luftfeuchtigkeit 25-45 %; 1 ♂, 1 ♀, 15.I.1942, auf Schnee, Lufttemperatur -0°C, Luftfeuchtigkeit 45 %; 2 ♂♂, 13.I.1943 (further details in NADIG 1943b: 55, as *alpina*, date 13.1.43); 1 ♂, 2 ♀♀, 2-3.II.1944, auf Schnee; 1 ♀, 28.II.1944, auf Schnee, Lufttemperatur -2,5°C; 1 Copula, 29.II.1944, auf Schnee, in Copula bei Zimmertemperatur; Unterengadin, Zernez, Il Fuorn-Buffalora, CH-Koord. 812,.../171,..., 1800-1900 m: 3 ♂♂, 7 ♀♀, 2.I.1942, 6 cm Neuschnee, Lufttemperatur 1°C, Luftfeuchtigkeit 30 %; 3 ♂♂, 3 ♀♀, 3-6.I.1942, auf Schnee, Lufttemperatur 0 - -2°C, Luftfeuchtigkeit 30 %; Val Bregaglia, Stampa, Malojakehren, Paddo del Maloja, CH-Koord. 773,230/140,700, 1 ♂, 21.II.1943, 1700 m, Schnee, Tauwetter; Graubünden, Unterengadin, Ramosch, Clisot, Charbunera, 1100-1300 m, THALER leg. (ZFMK): 2 ♂♂, 4 ♀♀, 6.XII.1970-17.I.1971; 1 ♂, 16.I-21.III.1971; Graubünden, Dischmalal, 3 ♂♂, 3 ♀♀, 30.V-24.VII.1979, B. WARTMANN leg. (CGBD, dry); Graubünden, Ofenpass, 1 ♀, 5.X.1980, 2200 m, C. DUFOUR leg., *lutescens* det. PODENAS (MHNN); Graubünden, Parc National Suisse, Val Sasso, 1 ♂, 8.X.1980, sur neige (MHNN); Ticino, Scudellate, 1 ♂, 31.XII.1975, 800 m, C. BESUCHET leg. (MHNG); Ticino, Mte Bisbino, ca. 6 km SE Mte Generoso, CH-Koord. 726,500/081,900, 3 ♂♂, 1 ♀, IV.1985-VI.1987, 1100 m, pièges a sel, C. BESUCHET leg. (MHNG); Valais, Col du Simplon, 1 ♂, 18.I.2008, 2100 m, près d'une forêt de Mélèzes, N. MARTINEZ leg. (MHNN, dry).

C. (S.) austriaca

(For samples which contain ♂♂ and ♀♀, the ♀♀ are mentioned just for the record because we were unable to discriminate ♀♀ at the species level.)

Austria: Niederösterreich, Feichsen, Gaisberg, am Feichsenbach, 1 ♂, 1 ♀, 11-19.II.1970, Barberfalle, E. HÜTTINGER leg. (ZFMK); Niederösterreich, St. Anton a.d. Jeßu, Kreuztanne, Westhang, 2 ♂♂, 2 ♀♀, I-II.1972, Bodenfalle, E. HÜTTINGER leg. (ZFMK); Niederösterreich, Schoberberghöhle b. Schwarzen-

bach a.d. Pielach, 1 ♂, 1 ♀, 1 ex., IX.1978-23.VI.1979, Bodenfalle, H. SCHÖNMANN & E. CHRISTIAN leg. (ZFMK); Niederösterreich, Lunz am See, Schwabenreithöhle (1832/32), 4 ♂ ♂, 14 ♀ ♀, X.1978-10.IX.1979, 950 m, H. MALICKY leg. (ZMAN); Niederösterreich, Schoberberghöhle (1836/51), Schwarzenbach / P., 2 ♂ ♂, 1 ♀ (prepared on glass), 23.VI.1979, 1025 m, H. SCHÖNMANN leg. (NMWA); Niederösterreich, Eisgrube (1836/50), Schwarzenbach / P., 4 ♂ ♂ (1 prepared on glass), 5 ♀ ♀, 23.VI.1979, 930 m, H. SCHÖNMANN leg. (NMWA); Niederösterreich, St. Corona / W., 1 ♂, without date, 1000 m, H. SCHÖNMANN leg. (NMWA); Niederösterreich, St. Corona / W., 5 ♂ ♂, 1 ♀, 7-14.III.1980, auf Neuschnee, H. SCHÖNMANN leg. (NMWA); Niederösterreich, Türritzer Alpen, cave Goldlochschwinde (1837/25), 1 ♂, 1980/81, 630 m, H. RASCHKO leg. (ZMAN); Niederösterreich, Lunz am See, Hirschfallhöhle (1823/5), 2 ♂ ♂, 2 ♀ ♀, before 29.IX.1984, 930 m, M. FISCHHUBER leg. (ZMAN); Wien, Sievering, 2 ♂ ♂ (prepared on glass), 20.XII.1980, J. GRUBER leg. (NMWA); Wien, Gütenbachtal, 2 ♂ ♂, 3 ♀ ♀, 24.XI.1982-15.I.1983, 360 m, W. BITTERMAN leg. (ZMAN); Steiermark, Schladming, 2 ♂ ♂, 2 ♀ ♀, 24.I.1980, auf Schnee, Temp +3°C, H. SCHÖNMANN leg. (NMWA); Steiermark, Schödlkugelhöhle (1621/13), Bad Mittendorf, 1 ♂ (prepared on glass), 30.III.1978, K. GAISBERGER leg. (NMWA); Steiermark, Grebenzen, Zeutschach, 1 ♂, 21.II.1991, 1100 m, H. GROSS leg. (ZMAN); Nordtirol, Innsbruck, Nordkette, 1 ♂, 7.X.1977-16.V.1978, 2000 m, EBENB./RIEF leg. (NMWA); Nordtirol, Innsbruck, Tuxer Alpen, Patscherkofel, 1 ♂, 15.VII.-6.X.1987, 2130 m (NMWA).

Hungary: Vas, Körmend, Nádasdhegyaja, Csömöc menti T.K., Gyunóc, talajscapda, 1 ♂, 1 ♀, 11.I.1995, C. SZINETÁR leg. (JSOC, published as *belgica* in STARÝ 2001).

Italy: Friuli-Venezia Giulia, Pordenone, Val Settimana, 1 ♂, early.XII.1995, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Friuli-Venezia Giulia, Pordenone, da loc. Crosetta verso Candaglia, 1100 m, S. VANIN leg., *lutescens* det. S. VANIN (CSVI): 2 ♂ ♂, 2.I.1999, su neve; 4 ♂ ♂, 2 ♀ ♀, 26.II.2006; Piemonte, Cuneo, Sampeyre, Becetto-Meire Rua, 1 ♂, 1.I.2004, 1600 m, su neve, G. GARDINI leg. (CSVI); Trentino-Alto Adige, Trento, Val Cava-Valle dei Mocheni, 1 ♂, 1 ♀, 1.III.1998, 1320-1850 m, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Trentino-Alto Adige, Trento, Pieve Tesino, Valmalene, 1 ♂, 1 ♀, 3-5.I.2001, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Veneto, Belluno, Tambre, loc. Col Indes, sentiero Rif Semenza, su neve, S. VANIN leg., *lutescens* det. S. VANIN: 2 ♂ ♂, 1 ♀, 12.XII.1997, 1300 m (CSVI); 7 ♂ ♂, 9 ♂ ♂, 15.XII.2002 (ZMAN); Veneto, Belluno, Pecol-Penolici, Mt. Civetta, 1 ♂, 5 ♀ ♀, 23.XII.1997, 1800 m, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Veneto, Belluno, Mt. Pizzoc, 5 ♂ ♂, 3 ♀ ♀, 24.I.1998, 1100-1565 m, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Veneto, Belluno, Strada do S. Fosca verso Mondeval, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI): 1 ♂, 22.II.1998, 1400-1900 m; 1 ♂, 2 ♀ ♀, 6.I.2000, 1400-1650 m; Veneto, Belluno, Mt. Grappa vers Nord, Val delle Bocchette tra Bocchette di Cima (1345) e Cima Grappa (1775), 2 ♂ ♂, 26.II.1998, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Veneto, Belluno, S. Vito di Cadore, sentiero 228 vers Rif. Scotter, S. VANIN leg., *lutescens* det. S. VANIN (CSVI): 5 ♂ ♂, 31.XII.1998, 1300-1580 m, su neve; 2 ♂ ♂, 2 ♀ ♀, 12.I.2004; 2 ♂ ♂, 14.I.2004; Veneto, Belluno, Cima Mt. Pizzoc, 1 ♂, 24.II.1999, 1500 m, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Veneto, Belluno, Piano del Cansiglio, 3 ♂ ♂, 4.XII.1999, 1800 m, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Veneto, Belluno, S. Canale d'Agordo, Gares, C.na Cime Cornelle, 1330 m, su neve, Lazzaris-VANIN leg., *lutescens* det. S. VANIN (CSVI): 1 ♂, 5.XII.1999; 4 ♂ ♂, 4.I.2001; 2 ♂ ♂, 7.I.2001; Veneto, Belluno, Misurina, Rif. Auronzo, 1 ♂, 3 ♀ ♀, 13.I.2004, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Veneto, Treviso, Mt. Grappa vers Sud, C.ma della Mandria- Mt. Meatte- Val delle Mure- Val di Archeson, 2 ♂ ♂, 1 ♀, 6.I.1999, 1300-1500 m, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI); Veneto, Vicenza, Enego-Valmaron, su neve, S. VANIN leg., *lutescens* det. S. VANIN (CSVI): 1 ♂, 27.XII.1997, 1300 m; 1 ♂, 1 ♀, 27.XII.1997, 2000 m; 2 ♂ ♂, 5.I.1998, 1300 m.

Slovenia: Grmada, nr 1406, 2 ♂ ♂, 3 ♀ ♀, 29.XI.1969-5.II.1970 (ZMAN, published as *alpina* in SIMOVA-TOSIC & SIVEC 1977); Mount Raduha, Cave Brezno pod Durcami, 1 ♂ (incomplete, identification not certain), 10 ♂ ♂, 6.IV.1974, 1840 m, T. NOVAK leg. (ZMAN); without locality, 1 ♂, 1975, *alpina* det. D. SIMOVA (ZMAN, dry); Jaklova Luknja, Glazuta, Mislinja, 1 ♂, 9-11.I.1978, KUSTOR & NOVAK leg., IZRK 1432 (PMLS); Rdeske Jama, Rdecki vrh, Suhi dol pri Slovenj Gradcu, 1 ♂, 12.I.1978, KUSTOR & NOVAK leg., IZRK 7393 (PMLS); Sp. Zapecka Pec Vumred, Radlje Obdrave, 1 ♂, 15.I.1978, KUSTOR & NOVAK leg., IZRK 1428 (PMLS); Racki Pekel, Rabanov Kot, Luce v Savinliski Dolini, 1 ♂, 6.I.1979, NOVAK & STANGEL leg., IZRK 7705 (PMLS); Ocvirkova Jama, Stadlerjev Gozd, Liboje, Celje, 1 ♂, 9.I.1979, NOVAK & STANGEL leg., IZRK 7671 (PMLS); Jama v Kamnolomu pri Suhem, Suho (Senthur pri Celju), 1 ♂, 18.I.1979, NOVAK & PROSEK leg., IZRK 7522 (PMLS); Brdajsava Jama,

Rosive, Sava (Litija), 1 ♂, 1 ♀, 21.I.1979, NOVAK & PROSEK leg., IZRK 7459 (PMLS); Triglav, Krma-Tal, 2 ♂♂ (prepared on glass), 2 ♀♀, 18.II.1980, above 1000 m, auf Schnee, T. NOVAK leg. (NMWA, sub nom. *austriaca*); pothole Brezno za klančičem (Cad. No. 8514), 980 m, Koritnice, UTM VL 45, 13 ♂♂, 13 ♀♀, 980 m, 20.IV.2000, S. POLAK leg. (NMPS, ZMAN); pothole Brezno I v oddelku 13/b, (Cad. No. 4267), Dedna gora, Snežnik, UTM VL 55, 8 ♂♂, 4 ♀♀, 2.XI.2002, 1045 m, S. POLAK leg. (NMPS, ZMAN); cave Obcestna jama, (Cad. No. 7190), Mt. Soriška planina, UTM VM 22, 2 ♂♂, 5 ♀♀, 7.XII.2002, 1274 m, S. POLAK leg. (NMPS); Velika Milanja, MSS, Koritnice, UTM VL 44, 9 ♂♂, 3 ♀♀, 23.V.2003, 1099 m, S. POLAK leg. (NMPS); Mt. Mali Snežnik, vrtača, UTM VL 54, 3 ♂♂, 6 ♀♀, 5.XI.2004, 1600 m, S. POLAK leg. (NMPS); in front of pothole Brezno pri Stanišču, (Cad. No. 4296), Mt. Snežnik, UTM VL 54, 2 ♂♂, 3 ♀♀, 26.IX.2004.-3.X.2005, 1308 m, S. POLAK leg. (NMPS).

C. (*S.*) *belgica*

(For samples which contain ♂♂ and ♀♀, the ♀♀ are mentioned just for the record because we were unable to discriminate ♀♀ at the species level.)

Belgium: Liège, Moha, 1 ♂ (prepared on glass), 19.XII.1978-3.I.1979, R. DETRY leg. (KBIN); Virton, Ethe-Buxenol, 1 ♂, 1 ♀, 3.XII.1981-12.II.1982, L. BAERT leg. (ZMAN).

Denmark: Without locality, 4 ♂♂, XI.[18]99-3.XII.[19]00, *araneoides* det. A. KLØCKER (UZMK); this sample might refer to the 3 specimens taken late November 1899 in a garden in Valby, a suburb to Copenhagen (KLØCKER 1900, as *araneoides*); Gentofte, 3 ♂♂, 1 ♀, XI.1934, 2 ♂♂, 2 ♂♂, XI.1935, J.P. KRUGER leg., *lutescens* det. J.P. KRUGER (UZMK).

France: Ain, Torcieu, Gouffre de Lent, 1 ♂, 20.X.1977, Lab. Biol. Souterraine Univ. Lyon leg., *lutescens* det. J.D. BOURNE (MHNG); Ain, Cormoran, Bdc 4b ToCo 702, 1 ♂, 8.XII.1978 (MHNG, sub nom. *jurassica*); Haute-Savoie, Flaine, 1 ♂, 14.XII.1975, 1700 m, C. BESUCHET leg., *lutescens* det. J.D. BOURNE (MHNG); Haute-Savoie, Nion/Morzine, C. BESUCHET leg., *lutescens* det. J.D. BOURNE (MHNG); 2 ♂♂, 3 ♀♀, 13.I.1974, sur la neige; 11 ♂♂, 7 ♀♀, 2.XI.1974, 1500 m; Haute-Savoie, Mont Salève, 1 ♂, 27.X.1979, 1200 m, C. BESUCHET leg., *lutescens* det. J.D. BOURNE (MHNG).

Germany: Bayern, Allgäu, Kempten, beim Stadtweiher u. am Wildmoosbach, 1 ♂, 3 ♀♀, 10.I.1986, H. MENDEL leg. (ZFMK); Hessen, Vogelsberg, 1 ♂, XI.1964, E. CRAMER leg., *lutescens* det. B. MANNHEIMS (ZFMK); Hessen, Bad Hersfeld, Obersberg, Barberfallen, V. PUTHZ leg., *lutescens* det. H. MENDEL (ZFMK); 16 ♂♂, 23 ♀♀, 16.II.1976-20.I.1977; 6 ♂♂, 5 ♀♀, 18.II.1978-31.III.1979; 1 ♂, 20.X-22.XI.1979; Niedersachsen, Rannenberg (LK Schaumburg), 2 ♂♂, XI.1987, P. SPRICK leg. (ZFMK); Schleswig-Holstein, b. Eutin, Kiel, 1 ♂, 1 ♀, no date, A. REMANE leg., *lutescens* det. B. MANNHEIMS (ZFMK).

Netherlands: All Limburg, 28.XII.1983-25.II.1984, *belgica* det. Th. HEIJERMAN (ZMAN; for details see HEIJERMAN 1987); Epen, 14 ♂♂, 12 ♀♀; Eys, 1 ♀; Felder, 2 ♂♂, 7 ♀♀; Kapel, 8 ♂♂, 7 ♀♀; Vijlen, 5 ♂♂, 10 ♀♀; Wijlre, 1 ♀.

Switzerland: Neuchâtel, Ponts de Martel, 2 ♂♂, 1 ♀, 20.IV-19.X.1974, R. GREBER leg. (CGBD, dry); Neuchâtel, Forêt de Peseux, 2 ♂♂, 3 ♀♀, 6.XII.1978, 700 m, sur la neige, W. MATHEY leg., *lutescens* det. J.D. BOURNE (MHNG); Neuchâtel, Pierre à Bot, 1 ♂, 1.XI.1986 (MHNN); Valais, Plan de Cou (ver le col), 7 ♂♂, 2 ♀♀, 7(?) .XI.1967, 1800 m, J. AUBERT leg., *lutescens* det. J.D. BOURNE (MHNG); Vaud, Fracherets / Gryon, 3 ♂♂, 2 ♀♀, 26.XII.1977, 1600 m, C. BESUCHET leg., *lutescens* det. J.D. BOURNE (MHNG); Vaud, Chenit, Chalet à Roch, all *lutescens* det. J.D. BOURNE (MHNG): 1 ♂, XII.1977, D. CHERIX leg.; 4 ♂♂, 2 ♀♀, 10.XII.1977, sur neige, D. CHERIX leg.; 1 ♂, 21.I.1979, 1300 m, sur la neige, J.D. BOURNE leg.; 29 ♂♂ (incl. 10 ♂♂ ZMAN), 4.XII.1979, 1320 m, pièges-super-colony *F. lugubris*, J.D. BOURNE leg.; Vaud, Marchairuz, 2 ♂♂, 1 ♀, I.1978, 1350 m, piège, J.D. BOURNE leg., *lutescens* det. J.D. BOURNE (MHNG); Vaud, Fracherets, all C. BESUCHET leg., *lutescens* det. J.D. BOURNE (MHNG): 1 ♂, 24.XII.1978, 1600 m, sur la neige; 1 ♂, 31.XII.1980; Vaud, Chenit, Plateau de la Bize, 1 ♂, 2 ♀♀, 17.XII.1978, 1250 m, J.D. BOURNE leg., *lutescens* det. J.D. BOURNE (MHNG); Vaud, La Dôle, all C. BESUCHET leg., *lutescens* det. J.D. BOURNE (MHNG): 1 ♂, IX.1979, 1550 m; 1 ♂, IX.1979, 1600 m, dans mousses; Vaud, La Rippe, 7 ♂♂, 3 ♀♀, 5.I.1980, 600-800 m, sur la neige, +3°C, J.D. BOURNE leg., *lutescens* det. J.D. BOURNE (MHNG); Vaud, Montricher, 2 ♂♂, 6.I.1980, 900-1100

m, sur la neige, J.D. BOURNE leg., *lutescens* det. J.D. BOURNE (MHNG); Vaud, Cave Noir VD 43, 1 ♂, 25.IX.1980, AELLEN & STRINATI leg., *lutescens* det. J.D. BOURNE (MHNG); Ticino, Scudellate, 1 ♂, 31.XII.1975, 800 m, C. BESUCHET leg., *alpina* det. J.D. BOURNE (MHNG); Ticino, Mte Bisbino, ca. 6 km SE Mte Generoso, CH-Koord. 726,500/081,900, 3 ♂♂, 2 ♀♀, IV.1985-VI.1987, 1100 m, pièges a sel, C. BESUCHET leg. (MNHG); Graubünden, Bündner Oberland/Surselva, Flims, Waldhaus, Runca-Höhe, Runca Sura, CH-Koord. 739,480/188,740, 3 ♂♂, 1 ♀, 11.II.1944/(1945?), 1300 m, Schnee, Lufttemperatur -1,5°C, *alpina* det. NADIG (BNMC).

C. (S.) botosaneanui

(For samples which contain ♂♂ and ♀♀, the ♀♀ are mentioned just for the record because we were unable to discriminate \$\$ at the species level.)

Czech Republic: Moravia, Vsetínské vrchy (hills), Cáb Mt., Kutaný, 2 ♂♂, 1 ♀, no date, soil trap, L. BRABEC leg. (JSOC, published as *kratochvili* in STARÝ 1981); Moravia, Moravskoslezské Beskydy Mts, Kněhyně Mt: 3 ♂♂, 2 ♀♀, 2.XI.1982-18.V.1983, 1000 m, Bodenfalle, L. BRABEC leg. (ZFMK); 29 ♂♂, 22 ♀♀, 3.V.1997, JASKULA leg. (ZMAN); 8 ♂♂, 8 ♀♀, 3.V.1997, soil traps, L. BRABEC leg. (ZMAN).

Italy: Lombardia, Sondrio, S. Caterina Valfurva, 1 ♂, 1.I.1991, L. SÜSS leg., *lutescens* det. L. SÜSS (CSVI); Lombardia, Sondrio, S. Caterina Valfurva, 4 ♂♂, 6 ♀♀ (incl. 2 ♂♂, 3 ♀♀ ZMAN), 2.I.1986, 1800 m (CSVI, ZMAN); Lombardia, Sondrio, Valfurva, 3 ♂♂, 3 ♀♀, 20-30.XII.1981, 1300-1400 m, L. SÜSS leg., *lutescens* det. L. SÜSS (CSVI); Lombardia, Sondrio, Valfurva, verso Forni, 2 ♂♂, 2.I.1987 (CSVI); Trentino-Alto Adige, Trento, Val Brenta, S. Antonio di Mavignola, 1 ♂, 2 ♀♀, 6.I.2001, N. CANETTI leg., *lutescens* det. S. VANIN (CSVI); Veneto, Belluno, Cortina d'Ampezzo, 7 ♂♂, 1 ♀ (incl. 2 ♂♂ ZMAN), 27.XII.1980, R. ROSSI leg., *lutescens* det. L. SÜSS (CSVI, ZMAN); Veneto, Verona, M. Baldo, Telegrafo, 2 ♂♂, 1 ♀, 6.X.1968, OSELLA leg. (SEAP); Veneto, Verona, Malcesine, M. Baldo, Selva Pezzi: Stazione 1, pitfall trap n. 4, UTM 32 T 644311 5068609, 1 ♂, 9.XI.2005-24.V.2006, 1547 m, Abetino [= fir-wood]; Stazione 2, pitfall trap n. 7, UTM 32 T 644298 5068531, 1 ♂, 1 ♀, 9.XI.2005-24.V.2006, 1534 m, Bosco misto [= mixed wood], L. SPADA leg. (CNBF).

Poland: Zaroja - Babia Göra (WKKP): 1 ♂, 27.XI.1976, *kratochvili* det. W. KRZEMIŃSKI; 3 ♂♂, 27.XI.1976, W. KRZEMIŃSKI leg.; 1 ♂, 28.XI.1976, W. KRZEMIŃSKI leg.; Tatra Mts, Morskie Oko, 1 ♂, 1 ♀, 4.II.1984, B. SOSZYŃSKI (?) leg. (ZMAN).

Romania: Hunedoara county, Nucsoara, 45.28.50N/22.56.14E, 1 ♂, 12.II.2008, ca. 600 m, C.O. MANCI leg. (COMR); Retezat National Park, Pierele Valley: 45.24.33N/22.53.45E, 1 ♂, 5.I.2008, ca. 1100 m; 45.24.59N/22.53.25E, 1 ♂, 13.I.2008, ca. 1200 m, C.O. MANCI leg. (COMR); 1 ♂, without data, ex. coll. L. UJVAROSI (ZMAN).

C. (S.) lutescens

(For samples which contain ♂♂ and ♀♀, the ♀♀ are mentioned just for the record because we were unable to discriminate ♀♀ at the species level.)

Austria: Nordtirol, Innsbruck, Umg. Ötztal-Brunnen, 1 ♂, 2.XI.1972-12.V.1973, THALER leg. (ZFMK); Nordtirol, Umg. Innsbruck, ... (Stams, Lochenboden ?), 9 ♂♂, 9 ♀♀, 22.IX.1974-8.II.1975, Bodenfalle (ZFMK); Nordtirol, Waldvast oberh. Matrei, 6 ♂♂, 6 ♀♀, 29.VIII-17.XI.1976, 1400-1700 m, K. THALER leg. (ZFMK); Nordtirol, surroundings of Innsbruck, 1 ♂, 3 ♀♀, 2 ex., 29.VIII-17.XI.1976, above 600 m, K. THALER leg. (ZMAN).

Czech Republic: Bohemia, Krkonose Mountains, 2 ♂♂, 2.VII.1988-26.VIII.1989 (ZMAN, dry); Bohemia, Šumava Mts., Loučovice nr. Vyšší brod, Luč Nature Reserve, 2 ♂♂, 27.II.1997, J. MACA leg. (ZMAN); Moravia, Moravia, Hrubý Jeseník Mts, Skřítek peat-bog, soil trap, J. ROHÁČEK leg. (ZMAN except 2 ♂♂ 1977 JSOC): 2 ♂♂, 12-25.X.1977; 11 ♂♂, 4 ♀♀, 18.X-1.XI.1978; 56 ♂♂, 42 ♀♀, 1-27.XI.1978; Moravia, district Opava, Úvalenské louky, meadows, soil trap, J. ROHÁČEK leg. (ZMAN): 7 ♂♂, 5 ♀♀, 22.XI-8.XII.1982; 3 ♂♂, 9 ♀♀, 8-21.XII.1982; 8 ♂♂, 16 ♀♀, 21.XII.1982-11.I.1983; 5 ♂♂, 10 ♀♀, 11.I-8.III.1983; Moravia, district Olomouc, Hynkov, soil trap, Z. RUMLER leg. (ZMAN,

ZFMK): 1 ♂, 24.X-6.XI.1984; 7 ♂♂, 6 ♀♀, 6-19.XI.1984; 15 ♂♂, 13 ♀♀, 19.XI-4.XII.1984; 13 ♂♂, 27 ♀♀, 4.XII.1984-29.III.1985; Moravia, district Šumperk, Moravičany, soil trap, Z. RUMLER leg. (JSOC, ZMAN): 2 ♂♂, 7-22.XI.1984; 2 ♂♂, 2 ♀♀, 22.XI-3.XII.1984; 16 ♂♂, 22 ♀♀, 3.XII.1984-26.III.1985; Moravia, district Olomouc, Střeň, soil trap, Z. RUMLER leg. (JSOC, ZMAN): 2 ♂♂, 2 ♀♀, 6-22.XI.1984; 3 ♂♂, 3 ♀♀, 22.XI-4.XII.1984; 17 ♂♂, 4.XII.1984-27.III.1985.

Finland: Etelä Suomi, Esboo [= Espoo], Westend, 1 ♂, 30.X.1959, W. HACKMAN leg. (ZMHF, dry); Etelä Suomi, Hattula, 1 ♂, without date, A. WEGELIUS leg. (ZMHF, dry, spec. typ. No 4099); Itä Suomen, Maaninka, Liesjärvi, Heinäsuo, 63o03'N/27o10'E, 1 ♂, early.I.2006, R. DE GOEDE leg. (ZMAN); Länsi Suomi, Ab Kiikala, 2 ♂♂, 13.I.1979, A. ALBRECHT leg. (ZMHF, dry); Oulu, Paljakka b. Kuusamo, 1 ♂, 2 ♀♀, 17.XI-15.XII.1971, Barberfallen, HUTTUNEN leg. (NMWA); Oulu, Muhos Wiese b. Oulu, 2 ♂♂, 25-26.X.1971, Barberfallen, HUTTUNEN leg. (ZFMK); Oulu, Kiiminki, J. VIRAMO leg. (WKKP): 2 ♂♂, 28.XI.1972; 2 ♂♂, 28.XI.1978; 1 ♂, 14.I.1979; 2 ♂♂, 15.I.1979; 1 ♂, 19.XII.1980; 3 ♂♂, 19.XII.1982; 1 ♂, 3.XII.1983; 1 ♂, 23.XII.1983; 1 ♂, 30.X.1983; 1 ♂, 1.XII.1983; Oulu, Kiiminki, Barberfallen, Temp +0°C, J. VIRAMO leg. (ZFMK): 1 ♂, 10.XII.1972; 1 ♂, 19.XII.1972; Oulu, Kiiminki, Lumelta, Barberfallen, J. VIRAMO leg. (ZFMK): 1 ♂, 13.XII.1971; 2 ♂♂, 19.XII.1972.

France: Ain, Torcieu, Gouffre de Lent, Lab. Biol. Souterraine Univ. Lyon leg. (MHNG): 1 ♂, 17.XII.1974; 1 ♂, 30.IX.1975; 1 ♂, 4.XII.1975; Ain, Fort l'Ecluse, Grotte de la Bouna, sur pierre, 1 ♂, I.1977, J.D. BOURNE leg. (MHNG); Haute-Savoie, Flaine, 2 ♂♂, 14.XII.1975, 1700 m, C. BESUCHET leg. (MHNG); Haute-Savoie, Prodianz/Avoriaz, 1 ♂, 29.II.1976, 1300 m, sur la neige, C. BESUCHET leg., *alpina* det. J.D. BOURNE (MHNG); Isère, Crolle, Grotte de Guiers Morte, 2 ♂♂, 2 ♀♀, without date, 1700 m, Lab. Biol. Souterraine Univ. Lyon leg. (MHNG).

Germany: Bayern, a.d. Kirmach im Kemptener Wald, Barberfallen, H. MENDEL leg. (ZFMK): 1 ♂, 4 ♀♀, 15.XI.1971-20.II.1972; 1 ♂, XI.1971-8.III.1972; 18 ♂♂, 20 ♀♀, IX.1972-2.I.1973; 10 ♂♂, 7 ♀♀, I.IX-15.XII.1974; 18 ♂♂, 12 ♀♀, 15.XII.1974-8.II.1975; Bayern, Gutenalp, Oytal, Allgäuer Alpen, 1 ♂, 14.V.1972, 1100 m, Barberfalle, STRAUß leg., *alpina* det. H. MENDEL (ZFMK); Bayern, Kemptener Wald, 1 ♂, 2 ♀♀, IX.1972-2.I.1973, Barberfallen, *lutescens* var. *bohemica* det. H. MENDEL (ZFMK); Bayern, Allgäuer Alpen, Birgsau, 4 ♂♂, 1 ♀, I-III.1973, in stillgelegter Falle (ZFMK); Bayern, Kirmach, Mehlblockmoos, Kemptener Wald, 3.I-3.V.1973, Barberfallen, H. MENDEL leg. (ZFMK): 13 ♂♂, 19 ♀♀, *lutescens* det. H. MENDEL; 4 ♂♂, 4 ♀♀, *lutescens* var. *bohemica* det. H. MENDEL; Bayern, Ochsentobel, Kürnach b. Kempten, Barberfallen (ZFMK): 1 ♂, 2 ♀♀, 15.XI.1971-4.I.1972; 2 ♂♂, 4 ♀♀, 3-20.I.1973; 9 ♂♂, 9 ♀♀, 15.X.1973-2.I.1974; 2 ♂♂, 3 ♀♀, 2.I-21.III.1974; 2 ♂♂, 4 ♀♀, 17.XII.1974-20.I.1975; Bayern, Ochsentobel-Ausgang, 1 ♂, 1 ♀, 11.XII.1973, auf Schnee am Bach, Temp +3°C, H. MENDEL leg. (ZFMK); Bayern, Ochsentobel, 3 ♂♂, 1.XI-17.XII.1974, Barberfallen unter Buchen, H. MENDEL leg. (ZFMK); Bayern, Eichholz, nördl. Kempten, 2 ♂♂, 9.XI-8.XII.1973, Lichtfalle auf Garagendach (ZFMK); Bayern, Schorenmoos, b. Eichholz, Fichten, 7 ♂♂, 6 ♀♀, 1.X-13.XII.1975, Barberfallen, H. MENDEL leg. (ZFMK); Bayern, Leuthenhofener Moos, Unt. Fichten, 4 ♂♂, 3 ♀♀, 19.X.1975-1.III.1976, Th. SONNENMOSER leg. (ZFMK); Bayern, Schorenmoos, b. Eichholz, nördl. Kempten, 2 ♂♂, 2 ♀♀, 15.XII.1975-5.III.1976, 2 ♂♂, 17 ♀♀, XII.1975-5.III.1976, 8 ♂♂, 10 ♀♀, 10.XI.1976-15.II.1977, Barberfallen, H. MENDEL leg. (ZFMK).

Poland: Krakow, 8 ♂♂, 27.III.1977 (WKKP); Ojcou - Zlota Göra, 12 ♂♂, 17 ♀♀, 25.III.1972, L. NABAGLO leg. (WKKP).

Portugal: Guarda, Rodeio Grande (Seia), 2 ♂♂, X.1999, J.M. GROSSO-SILVA leg. (1 ♂ MCTB, 1 ♂ USCS).

Switzerland: Aargau, Aristau, 1 ♂, 1 ♀, VI.1974, barbertrap, E. WUNDERLICH leg. (CGBD, dry); Jura, Bourguignon, Chétion, 3 ♂♂, 3 ♀♀, 14.XII.1971, Barberfallen, URS MARTI leg. (ZFMK); Neuchâtel, Pierre à Bot, 1 ♂, 10.II.1996, sur neige, +1°C, C. DUFOUR leg. (MHNN); Schwyz, Altmatt, 1 ♂, 1 ♀, 7.XI.1983, tourbière, C. BESUCHET leg. (MHNG); Thurgau, Hefenbrofen, vieille souch, 1 ♂, 16.XII.1978, C. BESUCHET leg. (MHNG, sub nom. *besucheti*); Vaud, Fracherets, 1 ♂, 24.XII.1978, 1600 m, sur la neige, C. BESUCHET leg. (MHNG); Vaud, Chenit, Chalet à Roch, 2 ♂♂, 4.XII.1979, 1320 m, pièges-super-colony *F. lugubris*, J.D. BOURNE leg. (ZMAN); Vaud, Montricher, 2 ♂♂, 6.I.1980, 900-1100 m, sur la neige, J.D. BOURNE leg. (MHNG).