

Contribution to the knowledge of the Auchenorrhyncha fauna of bogs and fens of Ticino and Grisons, with some new records for Switzerland (Hemiptera: Fulgoromorpha et Cicadomorpha)

Valeria Trivellone¹

Abstract: 97 species belonging to 7 different families of Fulgoromorpha and Cicadomorpha from various wetland areas of the Cantons of Ticino and Grisons are reported. Specimens were collected between 1991 and 1998 for two arthropod research projects. Eight species were new to Switzerland. The ecological significance of the recorded species is briefly discussed.

Zusammenfassung: Beitrag zur Kenntnis der Zikadenfauna der Hoch- und Niedermoore des Tessin und Graubündens, mit einigen Neufunden für die Schweiz. Es werden 97 Zikadenarten aus 7 verschiedenen Familien von verschiedenen Feuchthabitateen der Kantone Tessin und Graubünden mitgeteilt. Das Material stammt aus zwei Arthropoden-Erfassungen aus den Jahren 1991-1998. Acht Arten waren neu für die Schweiz. Habitate, Wirtspflanzen, Generationenzahl und andere ökologische Ansprüche werden anhand der Literatur kurz diskutiert.

Keywords: Leafhoppers, planthoppers, faunistics, marshland, peat bogs, Switzerland

1. Introduction

The Swiss Auchenorrhyncha fauna has been studied by Hoffmänner (1924), Cerutti (1938, 1939a, 1939b, 1939c), Günthart (1971, 1974, 1984, 1987, 1994, 1997, 2000), Günthart *et al.* (2004), Mühlethaler (2001) and Mühlethaler *et al.* (2009). A preliminary species list was produced by Günthart & Mühlethaler (2002). Altogether, about 500 species were recorded, but this number could further increase. This paper presents the results of Fulgoromorpha and Cicadomorpha (except Typhlocybinae) collected during two research projects between 1991 and 1998. The first survey dealt with the marshland habitat of Bolle di Magadino (Ticino), carried out by Lucia Pollini Paltrinieri, the second took place in peatlands of the Canton of Ticino and Moesano (Canton of Grisons), carried out by Filippo Rampazzi. Results on others insect taxa have been published by Rampazzi (1997, 1998, 2002), Rampazzi & Dethier (1997) and Pollet & Rampazzi (2003).

The present study focuses primarily on species new to Switzerland, presents data on their collecting sites in Ticino and Moesano with remarks on their habitat. Furthermore, a list of collected species from Swiss wetland habitats is given.

2. Study sites, material and methods

Sixteen selected sites (14 in the Canton of Ticino and two in the Canton of Grisons: Moesano) were sampled in 1998 (Site 1) and 1991-1993 (Sites 2-16) (Tab. 1 and Fig. 1). Site 1 comprises the two main plant communities: pseudo-reedbeds dominated by *Phragmites australis* and *Carex* spp. community.

¹ Peschiera 29, CH-6982 Agno; email: valeria.trivellone@gmail.com

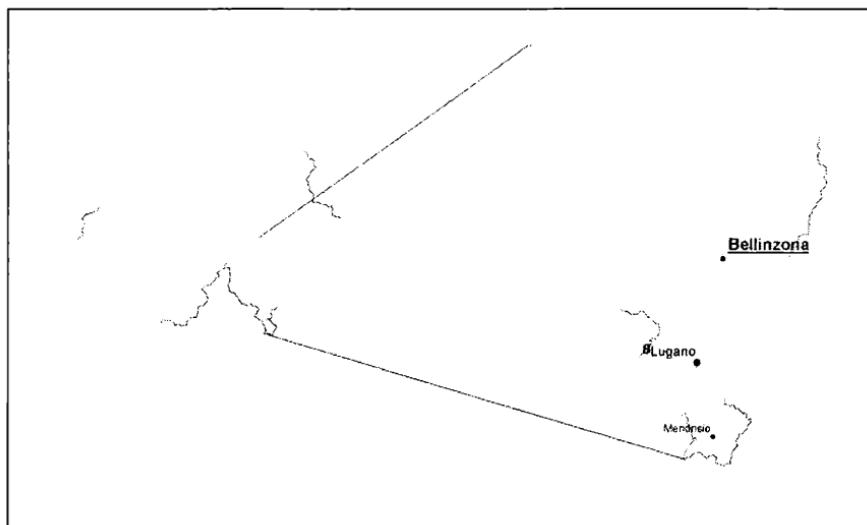


Figure 1: Location of sites. Left: Switzerland. Right: Canton of Ticino (shaded): 1: Bolle di Magadino (BOM); 2: Dalpe (BED); 3: Personico (BDP); 4: Mesocco (a: BSR, b: SUO, c: SDG); 5: Medeglia (MED); 6: Quinto (a: CAD, b: CDR); 7: Olivone (a: CAM, b: PSO, c: FRO); 8: Astano (ERB); 9: Comignolo (GDL); 10: Osco (NPI); 11: Castaneda (PDS); 12: Airolo (PSC); 13: Intragna (PSA); 14: Bignasco (PIA); 15: Losone (ARB); 16: Chironico (VEL).

Table 1. List of collecting sites in Canton Ticino and Moesano (Grisons).

| No. | Collecting Sites | Abbr. | Altitude (m) | Coordinates |
|-----|--|-------|--------------|-----------------|
| 1 | Locarno, Bolle di Magadino, Ticino | BOM | 194 | 709.850/112.250 |
| 2 | Dalpe, Bedrina, Ticino | BED | 1230 | 702.500/148.800 |
| 3 | Personico, Bolle di Pianazzora, Ticino | BDP | 1705 | 714.800/133.175 |
| 4 | Mesocco, Bosch de San Remo, Grisons | BSR | 1630 | 734.240/146.420 |
| 4b | Mesocco, Suossa, Grisons | SUO | 1700 | 735.240/144.690 |
| 4c | Mesocco, Sass de la Golp, Grisons | SDG | 1950 | 734.140/149.160 |
| 5 | Medeglia, Boscior, Ticino | MED | 945 | 718.000/109.720 |
| 6 | Quinto, Cadagno di Fuori, Ticino | CAD | 1915 | 696.880/155.960 |
| 6b | Quinto, Canariscio di Ritom, Ticino | CDR | 1950 | 696.160/154.430 |
| 7 | Olivone, Campra di Là, Ticino | CAM | 1425 | 709.770/153.060 |
| 7b | Olivone, Pian Segno, Ticino | PSO | 1655 | 707.900/154.430 |
| 7c | Olivone, Frodalera, Ticino | FRO | 1760 | 706.840/154.100 |
| 8 | Astano, Erbagni, Ticino | ERB | 700 | 705.540/096.610 |
| 9 | Camignolo, Gola di Lago, Ticino | GDL | 965 | 718.040/107.040 |
| 10 | Osco, Nei Pini, Ticino | NPI | 2020 | 701.060/151.640 |
| 11 | Castaneda, Pian di Scignan, Grisons | PDS | 1500 | 729.800/125.950 |
| 12 | Airolo, Pian Secco, Ticino | PSC | 1850 | 687.070/154.140 |
| 13 | Intragna, Pian Segna, Ticino | PSA | 1175 | 692.700/115.100 |
| 14 | Bignasco, Piano, Ticino | PIA | 1430 | 691.000/130.450 |
| 15 | Losone, Pian d'Arbigo, Ticino | ARB | 275 | 700.780/114.360 |
| 16 | Chironico, Vel, Ticino | VEL | 1445 | 704.250/146.180 |

The Sites 2-16 include twelve peat-bogs of the southern Swiss Alps. Each different type of bog plant community (Pino mugo-Sphagnetum, Sphagno-Caricetum rostratae, Eriophoro-Trichophoretum caespitosae, Caricetum limosae, Rynchosporietum albae and Eleocharitetum pauciflorae) and their contact areas (woods, shrubs, pastures and meadows) were sampled. Three sampling methods were used: pitfall trapping, sweep-netting and pan trapping. Most of the material was collected by a sweep-net. Samples were taken from May to September.

The material comprised 6123 specimens of Fulgoromorpha and Cicadomorpha (except Typhlocybinae that will be considered for a following work), and was preserved in 70% alcohol. The nomenclature and identification are based on Ribaut (1952), Della Giustina (1989) and Holzinger *et al.* (2003). The main ecological parameters (host plants, diet width, generation numbers and overwintering stage) are taken from Nickel and Remane (2002) and Nickel (2003), however the data on the ecology of the species collected in Switzerland, especially for the alpine habitats, need to be validated. Species distribution data within Europe are taken from Asche & Hoch (2004). All identified specimens are deposited in the Cantonal Natural History Museum of Lugano (Ticino).

3. Results

3.1 Species accounts

Altogether 29 species of Fulgoromorpha and 68 species of Cicadomorpha belonging to 7 different families were identified (see Table 2). The first 8 of the following species are new to Switzerland:

Cixius similis Kirschbaum, 1868

Material – Site 3: 3.VIII.1992, 1 ♀; Site 5: 28.V.1991, 1 ♂; Site 8: 23.V.1991, 5 ♀♀; Site 9: 1.VI.1991, 1 ♂; Site 11: 29.VII.1992, 3 ♀♀; Site 13: 5.VI.1991, 1 ♂, 1 ♀; 13.VII.1992, 2 ♀♀.

Notes – In Europe this species is reported from Austria, Britain Isles, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Lithuania, Norway, Poland, Russia, Slovakia, Sweden, Netherlands, Ukraine and former Yugoslavia.

Conometus lorifer Ribaut, 1948

Material – Site 2: 14.VII.1992, 1 ♀; Site 3: 3.VII.1991, 1 ♂; Site 8: 9.VII.1991, 1 ♂; 29.VII.1991, 7 ♂♂, 7 ♀♀; 7.VII.1992, 1 ♂, 4 nymphs; 1.IX.1992, 3 ♂♂, 4 ♀♀; Site 10: 19.IX.1991, 1 ♀; Site 13: 21.VIII.1991, 4 ♂♂, 2 ♀♀; 8.IX.1992, 1 ♂, 1 ♀; Site 14: 29.VIII.1991, 7 ♂♂, 10 ♀♀; 16.IX.1992, 14 ♂♂, 8 ♀♀; Site 15: 24.VII.1991, 1 ♂, 2 ♀♀; 2.VII.1992, 3 ♂♂, 16 ♀♀. In Germany this species is known from *Juncus*. In this study it was abundantly collected from the phytocenosis of Sphagno-Caricetum rostratae and it occurred between 275 and 1430 m, one single individual was found up to 2020 m.

Notes – This species is known from Austria, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, France, Germany, Hungary, Italy, Macedonia, Poland, Romania, Sardinia, Slovakia, Slovenia, Ukraine and former Yugoslavia.

Paraliburnia adela (Flor, 1861)

Material – Site 1: 4.VIII.1998, 1 ♂, on pseudo-reedbeds.

Notes – Species listed from Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Romania, Russia, Sweden and the Netherlands.

***Dicranotropis montana* (Horváth, 1897)**

Material – Site 4b: 25.VI.1991, 3 ♂♂, 2 ♀♀; 16.VI.1992, 1 ♂, on pasture grasses at altitudes of 1700 m.

Notes – Species so far listed from Austria, Germany, France, Italy and Romania.

***Stroggylocephalus agrestis* (Fallén, 1806)**

Material – Site 1: 7.VII.1998, 3 ♂♂, 2 ♀♀; 21.VII.1998, 4 ♂♂; 4.VIII.1998, 1 ♂; 2.IX.1998, 1 ♂; Site 9: 2.IX.1992, 15 ♂♂. Found in Magnocaricion association (*Carex elata*, *C. rostrata*, *C. vesicaria*) in Site 9, and on pseudo-reedbeds and *Carex* spp. in Site 1.

Notes – In Europe this species is reported from Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Norway, Poland, Romania, Russia, Sicily, Slovakia, Sweden, Netherlands, Ukraine and former Yugoslavia.

***Ophiola cornicula* (Marshall, 1866)**

Material – Site 12: 21.VIII.1992, 1 ♂, Pino mugo- Sphagnetum.

Notes – In Europe this species is reported from Austria, Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Great Britain, Italy, Latvia, Lithuania, Romania, Russia, Slovakia, Slovenia, Sweden, Netherlands, Ukraine and former Yugoslavia.

***Jassargus dentatus* D'Urso, 1980**

Material – Site 9: 2.IX.1992, 2 ♂♂; 20.VII.1993, 5 ♂♂, 2 ♀♀; Site 11: 19.VIII.1991, 5 ♂♂, 6 ♀♀; 29.VII.1992, 1 ♂; 17.IX.1992, 4 ♂♂, 5 ♀♀; Site 13: 8.IX.1992, 1 ♂, 1 ♀; Site 14: 16.IX.1992, 1 ♀; Site 15: 24.VII.1991, 1 ♂. Found in Rynchosporonetum albae, Sphagno-Caricetum rostratae, Eriophoro-Trichophoretum caespitosi and Pino mugo- Sphagnetum communities and on heather-moor. It occurred at altitudes ranging from 965 to 1500 m.

Notes – This species is reported as endemic to the Piedmont (Italy) and Slovenia.

***Rhopalopyx monticola* Ribaut, 1939**

Material – Site 4b: 12.VIII.1992, 2 ♂♂. Site 13: 5.VI.1991, 1 ♂. Found on heather-moor and pasture grasses at altitudes of 1175 m (Site 13) and 1700 m (Site 4).

Notes – In Europe this species is reported only from France.

***Psammotettix dubius* Ossiannilsson, 1974**

Material – Site 4a, 4b, 4c: 2.VIII.1991, 1 ♂; 4.VIII.1991, 2 ♂♂; 5.VIII.1991, 6 ♂♂; 4.IX.1991, 9 ♂♂; 11.VIII.1992, 7 ♂♂; 12.VIII.1992, 2 ♂♂; 13.VIII.1992, 1 ♂; Site 5: 6.V.1992, 3 ♂♂; 3.IX.1992, 4 ♂♂; 28.VI.1993, 2 ♂♂; Site 6a, 6b: 5.IX.1991, 3 ♂♂; 6.IX.1991, 4 ♂♂; 19.VIII.1992, 10 ♂♂; Site 7a, 7b, 7c: 30.VII.1992, 1 ♂; 6.VIII.1992, 6 ♂♂; 7.VIII.1992, 1 ♂; Site 9: 2.V.1992, 1 ♂; 2.IX.1992, 1 ♂; 20.VII.1993, 2 ♂♂; Site 12: 21.VIII.1992, 5 ♂♂; Site 13: 8.IX.1992, 1 ♂; Site 16: 13.VIII.1991, 2 ♂♂. Found mainly in the Eriophoro-Trichophoretum caespitosi community. It occurred at altitudes ranging from 945 to 1950 m.

Notes – In Europe this species is reported from Scandinavia, central Russia and Austria. Recently it was also published from Switzerland, Canton of Grisons, Alp Flix (Mühlethaler *et al.* 2007). However, it should be noted that this taxon belongs to the *Psammotettix nodosus* group, which is taxonomically difficult (Nickel, pers. comm.).

3.2 Ecological notes

3.2.1 Marshland habitat (Site 1)

Pseudo-reedbeds: Eight species were collected from reed dominated by *Phragmites australis*: *Euides basilinea*, *Megamelus notula*, *Paraliburnia adela*, *Strogylocephalus agrestis*, *Cicadella viridis*, *Macrosteles laevis*, *Recilia coronifer*, *Psammotettix* spec. The group of Auchenorrhyncha is dominated by species with 1-2 generations per year (71%) and species which are hibernating as egg (71%). Furthermore, two species are monophagous 1st level (25%), *E. basilinea* on *Phragmites australis* and *P. adela* on *Phalaris arundinacea*. *M. notula* and *S. agrestis* are both monophagous 2nd level on *Carex* spp. (25%).

***Carex* spp.:** In total 17 species were collected from *Carex* spp.: *Myndus musivus*, *Stenocranus major*, *E. basilinea*, *Megamelus notula*, cf. *Hyledelphax elegantula*, *Ribautodelphax albostriata*, *Strogylocephalus agrestis*, *Cicadella viridis*, *Macrosteles septemnotatus*, *M. laevis*, *Recilia coronifer*, *Cicadula quadrinotata*, *Paralimnus phragmitis*, *Arocephalus longiceps*, *Psammotettix* sp., *Ps. alienus*, *Ps. confinis*. A large proportion of these are monophagous (59%) and hibernate as egg (65%). In particular, *E. basilinea* and *P. phragmitis* are both monophagous on *Phragmites australis*, *R. albostriata* on *Poa pratensis*, *M. septemnotatus* on *Filipendula ulmaria* and *S. major* on *Phalaris arundinacea*. Furthermore, *M. musivus* is monophagous on *Salix* spp. and *M. notula*, *C. quadrinotata* and *S. agrestis* on *Carex* spp. About 30% of the species are monovoltine, about 70% are mono-bivoltine. Out of 17 species collected from Site 1, seven (more than 40%) are hygrophilous (*E. basilinea*, *M. notula*, *P. adela*, *S. major*, *S. agrestis*, *C. quadrinotata*, *P. phragmitis*). The remaining species are mesophilous.

3.2.2 Peatland habitat (Site 2-16)

The peatland samples yielded altogether 91 species. In particular six stenotopic peatbog species were identified, two of them typhobiontic (*Cixius similis* and *Macrosteles sieberi*) and four of them typhophilous (*Kelisia ribauti*, *Oncodelphax pullula*, *Strogylocephalus livens* and *Macrosteles ossianilssonii*).

C. similis was collected in Eriophoro-Trichophoretum caespitosi and Molinetum caeruleae communities, from planar to montane altitudinal belt as already reported by Nickel et al. (2002). *M. sieberi* was found in association with *Rynchosporetum albae*, Sphagno-Caricetum rostratae and Eriophoro-Trichophoretum caespitosi. *K. ribauti* was collected on Sphagno-Caricetum rostratae; *O. pullula* only on Eriophoro-Trichophoretum caespitosi; *S. livens* was only caught by yellow-pan traps in Sites 9 and 13 on Magnocaricion associations and heather-moor, respectively, *M. ossianilssonii* on Pino mugo- Sphagnetum, Eriophoro-Trichophoretum caespitosi, *Rynchosporetum albae*, Sphagno-Caricetum rostratae and Eleocharitetum pauciflorae communities.

Totally the same rate of monophagous and oligophagous species were collected (about 40%) and high proportions of species with 1 generation per year (57%) and species hibernating as egg (62%). About 36% of all species were hygrophilous (hygro-mesophilous), over 60% mesophilous (meso-xerophilous). Only few xerophilous species were collected in these sites (4%).

4. Discussion and conclusion

The leafhopper and planthopper fauna of wetland habitats in Switzerland has hitherto been little investigated. In total 6123 specimens of Fulgoromorpha and Cicadomorpha were examined and 97 species were identified. Eight species were recorded for the first

time in Switzerland (*Cixius similis*, *Conomelus lorifer*, *Paraliburnia adela*, *Dicranotropis montana*, *Stragyllocephalus agrestis*, *Ophiola cornicula*, *Jassargus dentatus*, *Rhopalopyx monticola*).

The analysis of the ecological parameters for wetland habitats showed that a larger part of the species are monophagous (43%), followed by oligophagous (35%) and polyphagous (22%) species. Similar proportions could be observed for the different life cycles: a high percentage of species with 1 generation per year (50%), followed by species with 1-2 generations per year (30%) and with 2 generations per year (20%). Considering the overwintering stage, 63% of the species hibernated as egg, 32% as nymphs and only 5% as adults. The Auchenorrhyncha assemblage was further characterised by a low percentage of xerophilous species, whereas mesophilous and hygrophilous species prevailed in all sites as expected. Totally eighteen hygrophilous species characterized both marsh and peat land habitats and they were strictly associated with a single host plant species.

Following the categorization of Achtziger & Nickel (1997) and Nickel & Achtziger (2005), the recorded assemblages of species can be classified as rather specific, since monophagous, stenotopic, wing-dimorphic and mono- or bivoltine species dominate.

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Appendix: List of the identified specimens. Ecological parameters after Nickel & Remane (2002) and Nickel (2003): Diet width (m1 = 1st degree monophagous, m2 = 2nd degree monophagous, o1 = 1st degree oligophagous, o2 = 2nd degree oligophagous, po = polyphagous); Hibernation (E = egg stage, N = nymphal stage, A = adult stage) and altitudinal distribution.

| Taxon | Site | | Diet width | Voltinism | Hibernation | Altitude (m) | | | | |
|--|------|------|------------|-----------|-------------|--------------|--|--|--|--|
| | 1 | 2-16 | | | | | | | | |
| FULGOROMORPHA | | | | | | | | | | |
| Issidae | | | | | | | | | | |
| <i>Issus coleopteratus</i> (F.) ¹ | | 6 | po | 1 | N | 275-1430 | | | | |
| Cixiidae | | | | | | | | | | |
| <i>Cixius similis</i> Kbm. ² | | 15 | o2? | 1 | N | 700-1705 | | | | |
| <i>Myndus musivus</i> (Germ.) | 10 | | m2? | 1 | N | 195 | | | | |
| Delphacidae | | | | | | | | | | |
| <i>Acanthodelphax spinosa</i> (Fieb.) ³ | | 5 | m2 | (1-?)2 | N | 965 and 1445 | | | | |
| <i>Acanthodelphax denticauda</i> (Boh.) ⁴ | | 4 | m1 | 2 | N | 945 and 1445 | | | | |
| <i>Conomelus lorifer</i> Rib. ⁵ | | 96 | m2? | 1 | E | 275-2020 | | | | |
| <i>Dicranotropis divergens</i> Kbm. | | 21 | m1? | 2 | N | 965-1850 | | | | |
| <i>Dicranotropis montana</i> (Horv.) | | 6 | o1? | 1 | N? | 1700 | | | | |
| <i>Ditropis pteridis</i> (Spin.) | | 3 | m1 | 1 | N | 275 | | | | |
| <i>Enides basilinea</i> (Germ.) | 3 | | m1 | 1-2 | N | 194 | | | | |
| <i>Florodelphax leptosoma</i> (Fl.) | | 3 | m2 | 2 | N | 945 | | | | |
| <i>Kelisia vittipennis</i> (J. Shlb.) | | 423 | m2? | 1 | E | 965-1500 | | | | |
| <i>Kelisia guttula</i> (Germ.) | | 7 | m1? | 1 | E | 965 and 1655 | | | | |
| <i>Kelisia monoceros</i> Rib. | | 32 | m2 | 1 | E | 1430 | | | | |
| <i>Kelisia pallidula</i> (Boh.) | | 1 | m1 | 1 | E | 1445 | | | | |
| <i>Kelisia ribauti</i> (W.Wg.) | | 22 | m2? | 1 | E | 1430-1630 | | | | |
| <i>Kosswigianella exigua</i> (Boh.) | | 1 | m1 | 2 | N | 945 | | | | |
| <i>Hyledelphax elegantula</i> (Boh.) | 1 | 1 | o1 | 2 | N | 195-1430 | | | | |
| <i>Javesella discolor</i> (Boh.) | | 253 | po? | 1 | N | 1630-1850 | | | | |
| <i>Javesella obscurella</i> (Boh.) | | 6 | o1? | 2 | N | 1850 | | | | |
| <i>Laodelphax striatella</i> (Fall.) | | 68 | po? | 2 | N | 275-1700 | | | | |
| <i>Megamelus notula</i> (Germ.) ⁶ | 3 | 7 | m2 | 1-2 | E? | 194-1655 | | | | |
| <i>Muellerianella brevipennis</i> (Boh.) | | 1 | m1 | 1-2 | E | 1175 | | | | |
| <i>Muellerianella extrusa</i> (Scott) | | 1 | m1 | 1 | E | 1430 | | | | |
| <i>Oncodelphax pullula</i> (Boh.) | | 2 | m2? | 1 | N | 965 | | | | |
| <i>Paraliburnia adela</i> (Fl.) | 1 | | m1 | 1-2 | N | 194 | | | | |
| <i>Ribautodelphax albostriata</i> (Fieb.) | 1 | | m1 | 2 | N | 194 | | | | |
| <i>Stenocranus major</i> (Kbm.) | 3 | | m1? | 1 | A | 194 | | | | |
| <i>Toya propinquia</i> (Fieb.) ⁷ | | 5 | o1? | 2? | N | 700-1950 | | | | |
| CICADOMORPHA | | | | | | | | | | |
| Cercopidae | | | | | | | | | | |
| <i>Cercopis vulnerata</i> Rossi | | 20 | po | 1 | N | 700-1705 | | | | |
| Aphrophoridae | | | | | | | | | | |
| <i>Aphrophora major</i> Uhl. | | 26 | po | 1 | E | 275-700 | | | | |
| <i>Aphrophora alni</i> (Fall.) | | 1 | po | 1 | E | 965 | | | | |
| <i>Neophilaenus campestris</i> (Fall.) | | 916 | o1 | 1 | E | 945-2020 | | | | |
| <i>Philaenus spumarius</i> (L.) | | 24 | po | 1 | E | 700-1700 | | | | |

| Taxon | Site | | Diet width | Volti-nism | Hiber-nation | Altitude (m) |
|--|------|------|------------|------------|--------------|--------------|
| | 1 | 2-16 | | | | |
| Membracidae | | | | | | |
| <i>Stictocephala bisonia</i> K. & Y. | 2 | po | 1 | E | | 275 and 1175 |
| Cicadellidae | | | | | | |
| <i>Ulopa reticulata</i> (F.) | 16 | m1 | 1/2 | N/A | | 700-1230 |
| <i>Ledra aurita</i> (L.) | 1 | po | 1-2 | N | | 1230 |
| <i>Macropsis fuscula</i> (Zett.) | 7 | | | | | |
| <i>Anaceratagallia ribauti</i> (Oss.) | 1 | o2? | 1 | A | | 275 |
| <i>Anaceratagallia venosa</i> (Geofr.) | 36 | o2? | 1 | E | | 1655-1915 |
| <i>Metidiocerus elegans</i> (Fl.) | 1 | m2 | 1 | E? | | 700 |
| <i>Eupelix cuspidata</i> (F.) | 12 | m2? | 1/2 | N/A | | 945 |
| <i>Anosimus flavostriatus</i> (Don.) | 2 | o1 | 1 | E | | 1230 |
| <i>Planaphrodes nigrita</i> (Kbm.) | 1 | o1? | 1 | E | | 1850 |
| <i>Stroygocephalus agrestis</i> (Fall.) | 11 | 15 | m2? | 1 | E? | 195-965 |
| <i>Stroygocephalus livens</i> (Zett.) ⁸ | 3 | m2? | 1? | A? | | 965 and 1175 |
| <i>Cicadella viridis</i> (L.) | 107 | 327 | po | 1-2 | E | 195-1950 |
| <i>Errhomenus brachypterus</i> Fieb. | 4 | po? | 1/2 | N/A | | 1430 |
| <i>Evacanthus interruptus</i> (L.) | 3 | po | 1 | E | | 1655 |
| <i>Adarrus exornatus</i> Rib. | 14 | | | | | 1430-1705 |
| <i>Arocephalus longiceps</i> (Kbm.) ⁹ | 1 | o1 | (1?)2 | E | | 194 and 945 |
| <i>Balclutha punctata</i> (F.) | 234 | o1 | 1 | A | | 275-1500 |
| <i>Cicadula quadrimotata</i> (F.) | 2 | 682 | m2? | 1-2 | E | 965-1950 |
| <i>Colobottix morbillosus</i> (Mcl.) | 1 | m1? | 1 | N | | 1425 |
| <i>Conosanus obsoletus</i> (Kbm.) | 3 | o2 | 1 | E | | 965 |
| <i>Diplocolenus bohemani</i> (Zett.) | 1 | o1 | 1 | E | | 1430 |
| <i>Deltocephalus pulicaris</i> (Fall.) | 144 | o1 | 1-2 | E | | 1655-1915 |
| <i>Doratura stylata</i> (Boh.) | 1 | o1 | 1(-2?) | E | | 965 |
| <i>Ebarrius cognatus</i> (Fieb.) ¹⁰ | 5 | m2? | 1 | E? | | 965-1500 |
| <i>Elymiana sulphurella</i> (Zett.) | 1 | o1 | 1 | E | | 965 |
| <i>Errastunus ocellaris</i> (Fall.) | 1 | o1 | 2 | E | | 1700 |
| <i>Euscelis incisus</i> (Kbm.) | 3 | o2 | 1-2 | N/E | | 945-965 |
| <i>Goniagnathus brevis</i> (H.-S.) | 1 | m2? | 1 | A | | 1175 |
| <i>Henschia collina</i> (Boh.) | 1 | o1 | 2 | E | | 945 |
| <i>Idiodonus cruentatus</i> (Panz.) ¹¹ | 3 | po | 1 | E | | 1175-1700 |
| <i>Jassargus allobrogicus</i> (Rib.) | 10 | o1 | (1?)2 | E | | 1700 |
| <i>Jassargus bisubulatus</i> (Then) | 19 | | | | | 965 |
| <i>Jassargus bobbicala</i> Rem. & Schlz. | 6 | | | | | 1655 |
| <i>Jassargus dentatus</i> D'Urso | 34 | | | | | 965-1500 |
| <i>Jassargus flori</i> (Fieb.) | 2 | m1? | (1?)2 | E | | 965 and 1445 |
| <i>Limotettix striola</i> (Fall.) | 29 | o1 | (1?)2 | E | | 1425-1655 |
| <i>Macrosteles septemnotatus</i> (Fall.) | 22 | m1 | 2 | E | | 194 |
| <i>Macrosteles sexnotatus</i> (Fall.) | 17 | po | 2 | E | | 1655-1915 |
| <i>Macrosteles sieberi</i> (Edw.) | 26 | m1 | 2 | E | | 1425-1445 |
| <i>Macrosteles alpinus</i> (Zett.) | 243 | m2? | 1 | E | | 1705-1950 |
| <i>Macrosteles laevis</i> (Rib.) ¹² | 6 | 1 | po | (1?)2 | E | 194 and 945 |
| <i>Macrosteles horvathi</i> (W.Wg.) | 77 | m2 | 1-2 | E | | 1760-1915 |
| <i>Macrosteles ossianilssonii</i> Ldb. | 161 | po? | 1-2 | E | | 965-1700 |
| <i>Macustus grisescens</i> (Zett.) | 9 | o2 | 1 | N | | 1425 |

| Taxon | Site | | Diet width | Volti-nism | Hiber-nation | Altitude (m) |
|--|------|------|------------|------------|--------------|--------------|
| | 1 | 2-16 | | | | |
| <i>Ophiola cornicula</i> (Marsh.) | | 1 | o1? | 1 | E | 1850 |
| <i>Paralimnus phragmitis</i> (Boh.) | 1 | | m1 | 1(-2?) | E | 194 |
| <i>Psammotettix cephalotes</i> (H.-S.) | | 44 | m1 | 1-2 | E | 1850-1950 |
| <i>Psammotettix confinis</i> (Dhlb.) ¹³ | 15 | 18 | o1 | 2 | E | 194-2020 |
| <i>Psammotettix dubius</i> Oss. | | 96 | | | | 945-1950 |
| <i>Psammotettix nardeti</i> Rem. | | 7 | m1? | 1 | E | 1760 |
| <i>Psammotettix nodosus</i> (Rib.) | | 4 | ? | 1? | E | 1950 |
| <i>Psammotettix alienus</i> (Dhb.) | 2 | 2 | o1 | 2 | E | 194 and 1950 |
| <i>Recilia coronifer</i> (Marsh.) | 56 | 2 | o1 | 1 | E | 194 |
| <i>Rhopalopyx monticola</i> Rib. ¹⁴ | | 3 | | | | 1175-1700 |
| <i>Rhopalopyx elongata</i> W.Wg. | 1 | | ? | 2? | E | 965 |
| <i>Rhopalopyx vitripennis</i> (Fl.) | 1 | | m2? | 2 | E | 945 |
| <i>Sotanus thenii</i> (P. Löw) | 6 | | o1? | 1 | N | 1760-1950 |
| <i>Spudotettix subfusculus</i> (Fall.) | 63 | | po | 1 | N | 1175-1700 |
| <i>Streptanus aemulans</i> (Kbm.) | 2 | | o1 | 2? | E | 1700 |
| <i>Thamnotettix confinis</i> (Zett.) | 6 | | po | 1 | N | 1230-1500 |
| <i>Thamnotettix dilutior</i> (Kbm.) | 3 | | po? | 1 | N | 275 and 700 |
| <i>Verdanus abdominalis</i> (F.) | 494 | | o1 | 1 | E | 1445-1950 |

¹ Only 1 specimen at 275 and 1230 m, respectively² Only 1 specimen at 945, 965 and 1705 m, respectively³ Only 1 specimen at 965 m⁴ Only 1 specimen at 945 m⁵ Only 1 specimen at 1705 and 2020 m, respectively⁶ Only 1 specimen at 1655 m⁷ Only 1 specimen at 945, 965 and 1950 m, respectively⁸ Only 1 specimen at 1175 m⁹ Only 1 specimen at 194 m¹⁰ Only 1 specimen at 1425 and 1500 m, respectively¹¹ Only 1 specimen at 1175 m¹² Only 1 specimen at 945 m¹³ Only 1 specimen at 700, 1700, 1950 and 2020 m, respectively¹⁴ Only 1 specimen at 1175 m

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Autor(en)/Author(s): Trivellone Valeria

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