

NEWS ON TRUE BUGS OF SERRA DE COLLSEROLA NATURAL PARK (NE IBERIAN PENINSULA) AND THEIR POTENTIAL USE IN ENVIRONMENTAL EDUCATION (INSECTA, HETEROPTERA)

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Abstract: A checklist of 43 Heteropteran species collected in the area of influence of Can Coll School of Nature is given. By its rarity in the Catalan fauna, the mirid *Deraeocoris (D.) schach* (Fabricius, 1781) and the pentatomid *Sciocoris (N.) maculatus* Fieber, 1851 are interesting species. Plus being rare species, the mirid *Macrotylus (A.) solitarius* (Meyer-Dür, 1843) and the pentatomid *Sciocoris (S.) umbrinus* (Wolff, 1804) are new records for the Natural Park. The mirids *Alloetomus germanicus* Wagner, 1939 and *Amblytylus brevicollis* Fieber, 1858, and the pentatomid *Eysarcoris aeneus* (Scopoli, 1763) are new contributions for the Park checklist. The Heteropteran richness of Can Coll suggests them as study group for the environmental education goals of this School of Nature.

Key words: Heteroptera, faunistics, new records, environmental education, Serra de Collserola, Catalonia, Iberian Peninsula.

Nuevos datos sobre chinches del Parque Natural de la Serra de Collserola (noreste de la península Ibérica) y su uso potencial en educación ambiental (Insecta, Heteroptera)

Resumen: Se presenta un listado de 43 especies de heterópteros recolectados dentro del área de influencia de la Escuela de Naturaleza de Can Coll. Por su rareza en la fauna catalana, son de interés el mírido *Deraeocoris (D.) schach* (Fabricius, 1781) y el pentatomido *Sciocoris (N.) maculatus* Fieber, 1851. Además de poco frecuentes, son nueva cita para el Parque Natural el mírido *Macrotylus (A.) solitarius* (Meyer-Dür, 1843) y el pentatomido *Sciocoris (S.) umbrinus* (Wolff, 1804). Los míridos *Alloetomus germanicus* Wagner, 1939 y *Amblytylus brevicollis* Fieber, 1858, y el pentatomido *Eysarcoris aeneus* (Scopoli, 1763) constituyen nuevas aportaciones para el catálogo del Parque. La riqueza de heterópteros en la zona de Can Coll sugiere proponerlos como grupo de estudio para los objetivos de educación ambiental de su escuela de naturaleza.

Palabras clave: Heteroptera, faunística, nuevas citas, educación ambiental, Serra de Collserola, Cataluña, península Ibérica.

Introduction

Heteroptera fauna of Catalonia has been the subject of increasing interest from the second half of the twentieth century, revealing the diversity of this group of insects in our country. As a result, a catalogue (Ribes *et al.*, 2004) and a checklist (Goula *et al.*, 2010) were published, informing about the 1064 species recorded until present in Catalonia.

The Heteroptera, or true bugs, gathered as a group can be qualified as euroic, though there are some families, genera and species that live only in very particular habitats (Henry, 2009). True bugs can be found in fresh water ecosystems as well as in terrestrial ones. They have a large range of diet regime that can be based on plant eating, pollen consumption, spores, and predation, or even be haematophagous like sundry species of assassin bugs of the Reduviidae family, that can transmit the Chagas Disease.

The role of Heteroptera in the ecosystems can be beneficial, harmful or even indifferent for the interests of people. Indeed there are species that feed on damaging species, that pollinate plants, or even they can be pests by its own by attacking plants, domestic animals or humans (Dolling, 1991). Due to the facility at collection, as well as the diversity of species and the easy separation and conservation of the material, cataloguing the Heteropterans is a relatively manageable task. This makes true bugs a good study group to understand and give a better view of the environmental state. Its frequently close relation to the vegetation makes them good candidates

to be used as bioindicators, as shown in Ribes *et al.* (2000, 2001) related to Collserola Park. Also Gessé & Goula (2006) characterized the Heteropteran biocenoses inhabiting four Mediterranean plant associations: dry grassland, calcicolous rosemary scrub, kermes oak scrub and evergreen oak forest.

Environmental education has largely gained a place in modern society, as a must to give the general public tools to understand nature's role in everyday life. Vertebrates, mainly birds and mammals, are the most common subject of study, as they have strong empathising feelings among human beings. Concerning terrestrial invertebrates, butterflies and sometimes beetles are the most preferred study groups. True bugs, with some species directly related to human welfare, have been usually neglected. However, true bugs living in terrestrial habitats fit most of the requirements to be useful in environmental education: easy to handle sized specimens, medium to moderate species richness, abundance in variety of ecological niches in which they play different roles and identification feasibility. Some special traits like aposematism, mimetism, myrmecomorphism or chemical defences, add interest to choose Heteroptera as study group.

The objectives of this article is to contribute to the general knowledge on Heteroptera in the Collserola Park, and to encourage these insects as model group for environmental education subject providing for the first time information on the biodiversity of true bugs in Can Coll.

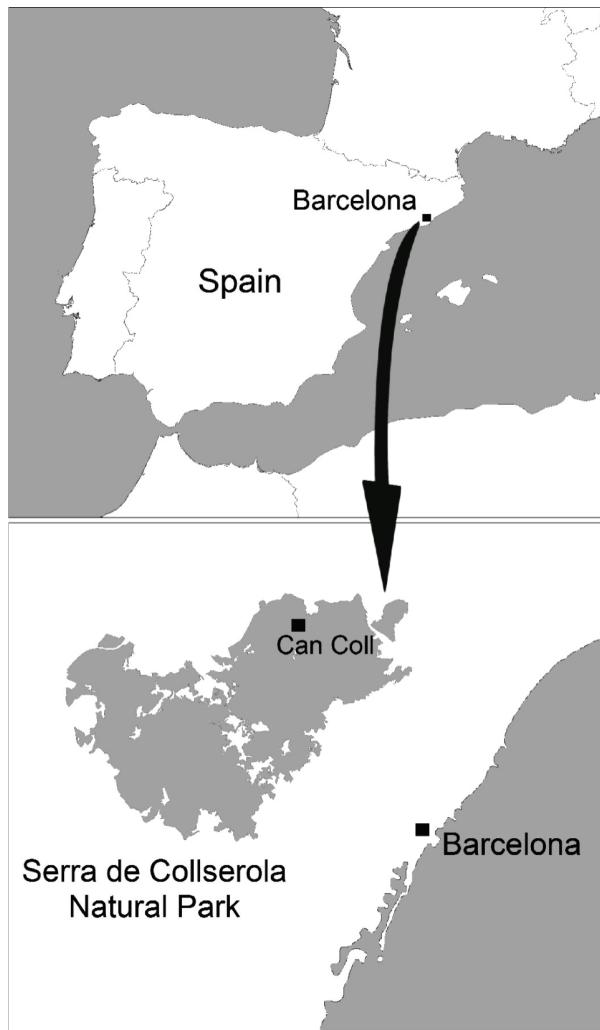


Fig. 1. Location of Serra de Collserola Natural Park and the study area in the Iberian Peninsula.

Material and Methods

The Serra de Collserola Natural Park has more than 8,000 ha of green area, adjacent to Barcelona metropolitan region (fig. 1). Its dimensions are 17 km long by 6 km large, and it is enclosed by the rivers Llobregat on the south and Besòs on the north, the city of Barcelona on the west and the Vallès Plain on the east (Cañas & Franquesa, 1989). The highest point is the Tibidabo Mountain (512 m a.s.l.) and its geographical situation permits a variation on the climates due to the presence of sunny and shady zones, with typical Mediterranean pine forests and divers types of oaks. As placed in the middle of a very crowded territory, roughly inhabited by ca. 4 million people, the Park has a central role in the leisure activities in green areas and in environmental education and sensitization of general public. Human activity may be developed in harmony with conservation goals planned by the Park management in the frame of Catalonia rules.

The proximity of the Park to many research institutions enhances it to be an accessible investigating area, also because of having a good access from the urban spaces. Many research groups have already made biodiversity and environmental studies in the Park, either on vertebrates or invertebrates. Concerning the latter two articles published on Heteropteran biocenoses of four different vegetation communities (Ribes et al., 2000, Ribes et al., 2001) and a compilation list of the Heteroptera species in the Park was published (Ribes & Ribes, 2001).

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The fieldwork was conducted in the surroundings of Can Coll Environmental Education Center (UTM 31T 426 885/4591735), an old traditional Catalan farmhouse with labored areas, nowadays converted in a school of nature. It is mainly ringed by Mediterranean type forest with holm oak (*Quercus ilex*) and Aleppo pine (*Pinus halepensis*), and bushy plant Mediterranean associations (Mederos et al., 2009). The once human laboured farmland now abandoned near Can Coll makes the area an appropriate place for the study of Heteropterans.

Two days of prospection were done in the meadows of Can Coll during a course on Heteroptera addressed to motivated general public in the frame of the School of Nature activities. Collections took place on 25th of May 2010 and 5th of June 2010. Samples were taken in the natural surrounding vegetation and in abandoned agricultural land, by means of a sweeping net 30cm diameter. Specimens were preserved in 70° ethanol, and studied under the binocular microscope for identification (Nikon SMZ-1).

Specimens were identified using the following literature: Cimicomorpha. Tingidae: Péricart (1983); Miridae: Wagner (1974a, 1974b, 1975); Nabidae: Péricart (1987); Anthocoridae: Péricart (1972); Pentatomorpha. Berytidae: Péricart (1984); Lygaeidae: Péricart (1999a, 1999b, 1999c); Coreidae, Alydidae and Rhopalidae: Moulet (1995); Pentatomidae: Derjanschi & Péricart (2005), Kis (1984) and Stichel (1959-1962). Also help was provided by Wachmann et al. (2004, 2006, 2007, 2008).

Results and Discussion

The checklist of true bugs found in Can Coll consists of 43 species distributed by families as follows: Tingidae, 2; Miridae, 15; Nabidae, 1; Anthocoridae, 1; Berytidae, 1; Lygaeidae, 6; Coreidae, 5; Alydidae, 1; Rhopalidae, 1; Cydnidae, 1; Pentatomidae, 9; with Miridae as the most abundant taxon, just like it is the proportion in the case of whole Catalonia checklist (Goula et al., 2010).

Collections are attributed to Luis Mata and Marta Goula, conducting the Heteroptera course, in the name of all course attendants. Species identification was performed by the authors.

Infraorden CIMICOMORPHA Leston, Pendergrast & Southwood, 1954

Family Tingidae Laporte, 1832

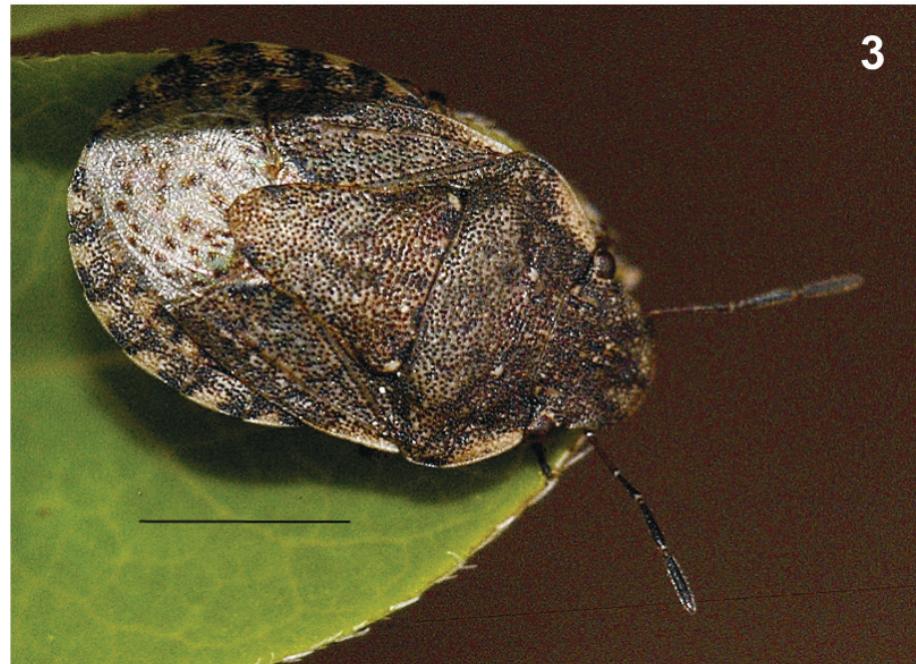
- Subfamily Tinginae Laporte, 1832
1. *Dictyla echii* (Schrank, 1782)
 2. *Tingis (Tingis) auriculata* (A. Costa, 1847)

Family Miridae Hahn, 1833

Subfamily Deraeocorinae Douglas & Scott, 1865

3. *Deraeocoris (Deraeocoris) ruber* (Linnaeus, 1758)
 4. *Deraeocoris (Deraeocoris) schach* (Fabricius, 1781)
 5. *Alloetomus germanicus* Wagner, 1939
- Subfamily Mirinae Hahn, 1833
6. *Adelphocoris lineolatus* (Goeze, 1778)
 7. *Closterotomus norwegicus* (Gmelin, 1790)
 8. *Closterotomus trivialis* (A. Costa, 1853)
 9. *Cyphodema instabilis* (Lucas, 1849)

Fig. 2. Habitus of *Deraeocoris schach*. Scale line 1mm. Photo J. M. Sesma. **Fig. 3.** Habitus of *Sciocoris maculatus*. Scale line 1mm. Photo J. M. Sesma.



Subfamily Orthotylinae Van Duzee, 1916 (1865)

- 10. *Heterotoma planicornis* (Pallas, 1772)
 - 11. *Pachytomella passerinii* (A. Costa, 1842)
 - 12. *Strongylocoris atrocoeruleus* (Fieber, 1864)
- Subfamily Phylinae Douglas & Scott, 1865
- 13. *Amblytylus brevicollis* Fieber, 1858
 - 14. *Lepidargyrus ancorifer* (Fieber, 1858)
 - 15. *Macrotylus (Alloeonycha) solitarius* (Meyer-Dür, 1843)
 - 16. *Pachyxyphus lineellus* (Mulsant, 1852)
 - 17. *Psallus (Psallus) aurora* (Mulsant & Rey, 1852)

Family Nabidae A. Costa, 1853

Subfamily Nabinae A. Costa, 1853

- 18. *Himacerus (Aptus) mirmicoides* (O. Costa, 1834)

Family Anthocoridae Fieber, 1836

Subfamily Anthocorinae Fieber, 1836

- 19. *Anthocoris nemoralis* (Fabricius, 1794)

Infraorden PENTATOMORPHA Leston,
Pendergrast & Southwood, 1954

Family Berytidae Fieber 1851

Subfamily Berytiniae Fieber, 1851

- 20. *Berytinus (Lizinus) montivagus* (Meyer-Dür, 1841)

Family Lygaeidae Schilling, 1829 (sensu Péricart, 1999)

Subfamily Lygaeinae Schilling, 1829

- 21. *Spilostethus pandurus* (Scopoli, 1763)

- Subfamily Geocorinae Dahlbom, 1851
- 22.** *Geocoris (Piocoris) erythrocephalus* (Lepeletier & Serville, 1825)
Subfamily Heterogastrinae Stål, 1872
- 23.** *Platyplax inermis* (Rambur, 1839)
Subfamily Oxycareninae Stål, 1862
- 24.** *Macroplax fasciata fasciata* (Herrich-Schaeffer, 1835)
25. *Oxycarenus (Oxycarenus) lavaterae* (Fabricius, 1787)
Subfamily Rhyparochrominae Amyot & Serville, 1843
- 26.** *Drymus (Drymus) pilipes* Fieber, 1861
- Family Coreidae Leach, 1815**
- Subfamily Coreinae Leach, 1815
- 27.** *Gonocerus insidiator* (Fabricius, 1787)
- 28.** *Haploprocta sulcicornis* (Fabricius, 1794)
Subfamily Pseudophloeinae Stål, 1872
- 29.** *Coriomeris affinis* (Herrich-Schaeffer, 1839)
30. *Loxocnemis dentator* (Fabricius, 1794)
31. *Strobilotoma typhaecornis* (Fabricius, 1803)
- Family Alydidae Amyot & Serville, 1843**
- Subfamily Micrelytrinae Stål, 1872
- 32.** *Micrelytra fossularum* (Rossi, 1790)
- Family Rhopalidae Amyot & Serville, 1843**
- Subfamily Rhopalinae Amyot & Serville, 1843
- 33.** *Brachycarenus tigrinus* (Schilling, 1829)
- Family Cydnidae Billberg, 1820**
- SubFamily Cydninae Billberg, 1820
- 34.** *Geotomus elongatus* (Herrich-Schaeffer, 1840)

- Family Pentatomidae Leach, 1815**
- Subfamily Podopinae Amyot & Serville, 1843
- 35.** *Graphosoma italicum* (Müller, 1766)
Subfamily Pentatominae Leach, 1815
- 36.** *Dyroderes umbraculatus* (Fabricius, 1775)
37. *Eurydema (Eurydema) oleracea* (Linnaeus, 1758)
38. *Eysarcoris aeneus* (Scopoli, 1763)
39. *Neottiglossa lineolata* (Mulsant & Rey, 1852)
40. *Nezara viridula* (Linnaeus, 1758)
41. *Sciocoris (Neosciocoris) maculatus* Fieber 1851
42. *Sciocoris (Sciocoris) sulcatus* Fieber, 1851
43. *Sciocoris (Sciocoris) umbrinus* (Wolff, 1804)

From this list, the following four species deserve to be highlighted, as they have been very scarcely recorded from Catalonia:

1. *Deraeocoris (Deraeocoris) schach* has only two finding references in Catalonia, both in the city of Barcelona and its surroundings (Ribes *et al.*, 2008; Goula & Mata, 2011). The habitus of the species is shown in figure 2. The largest fraction of this terrestrial bug was captured on *Spartium junceum* (Ribes *et al.*, 2008), a Mediterranean host plant very commonly found in all Catalonia. Therefore, the distribution in Catalan territories could be greater than expected for this Euromediterranean species.

2. *Macrotylus (Alloeonycha) solitarius* has two previous bibliographic references in Catalonia, based on only one locality (Ribes *et al.*, 2004). Its distribution is not well defined, but it is an apparently European bug, frequently related to the *Stachys recta* mint (Ribes, 1992).

3. *Sciocoris (Neosciocoris) maculatus* (fig. 3), recorded thrice in Catalonia (Ribes *et al.*, 2004). It is a Mediterranean

species, which extends to Turkestan. It has been captured on different vegetal communities, and specially on *Thymus vulgaris* (Gessé & Goula, 2006).

4. *Sciocoris (Sciocoris) umbrinus*, with a Eurosiberian distribution, has only three previous finding references in Berguedà and Maresme counties (Ribes *et al.*, 2004).

A checklist of 427 true bugs in Serra de Collserola Natural Park (formerly named Collserola Park) was published by Ribes & Ribes (2001). Lindberg (1933) stated *Adelphocoris lineolatus* in “Tibidabogebiet” (V.1927, Eingr. Nr. 105.1927), but the citation was not included in Ribes & Ribes (2001). *Deraeocoris (Knighthocapsus) lutescens* (Schilling, 1837) and *Strongylocoris cicadifrons* A. Costa, 1853 are recorded under “Spanien, Barcelona” (Lindberg, 1933). Lack of more precise locality information does not allow including those Lindberg’s reports in the Natural Park true bugs checklist, although both species are listed by Ribes & Ribes (2001).

Ribes *et al.* (2008) cited two species collected within the Park enlarging the checklist: the coreid alien true bug *Leptoglossus occidentalis* Heidemann, 1910 and the mirid *Phytocoris (Compsocerocoris) sanctipetri* Carapezza, 1985. In the present work, we add five new species records to that checklist: the mirids *Macrotylus (A.) solitarius*, *Alloetomus germanicus* and *Amblytylus brevicollis*, and the pentatomids *Sciocoris (S.) umbrinus* and *Eysarcoris aeneus*. The Serra de Collserola Natural Park includes at present 434 Heteropteran species, which represents about 40% of true bug Catalan fauna (1064 species stated in the checklist by Goula *et al.* 2010).

Conclusion

The study is based on a relatively non-in-depth sampling, consisting of only two days of fieldwork. But, despite of that limitation, it has been possible to contribute with valuable material to the characterization of local fauna. Assessing the results of this work, we can affirm that the area of Can Coll, and by extension the Collserola Natural Park, may be considered an interesting site for its bug species richness. The fact of the near location to Barcelona consolidates the entire Park as one remarkable green area in the metropolitan conurbation context.

The relevance of Heteroptera in nature deserves them to be known and appreciated by the general public, and implemented in environmental education activities. Several pioneer experiences as the course on Heteroptera in Can Coll during which the samples examined in this paper were collected, or biodiversity observation activities promoted by Barcelona municipality addressed to the general public, have proved that Heteroptera can successfully be used for educational purposes.

We firmly encourage to research on true bugs all over the country, having promising prospects to enlarge the knowledge about this interesting group of insects.

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