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A revision of the genus *Brachynotocoris* Reuter, 1880 and other miridological contributions (Hemiptera: Heteroptera: Miridae) from the Basque Country (northern Iberian Peninsula)

S. PAGOLA-CARTE

Azpeitia 3, 7. D; E-20010 Donostia (Gipuzkoa); E-mail: pagolaxpc@telefonica.net

Abstract

Several taxonomic contributions are made in the context of a faunistic, regional study of Miridae (Hemiptera: Heteroptera). In the «Faunistics» section, a total of 17 species are reported, 13 of them being new records for the Basque Autonomous Community (northern Iberian Peninsula). Among them, in the «Taxonomy section», *Phytocoris* (*Exophytocoris*) *buxi* Ribaut, 1928 and *P. (E.) fieberi* Bolívar, 1881 are studied in detail and the genus *Brachynotocoris* Reuter, 1880 is revised. Proposed are: (a) *Phytocoris* (*Exophytocoris*) *pseudobscuratus* Rieger & Pagola-Carte, 2009 **n. comb.** (new subgeneric combination); (b) *Brachynotocoris puncticornis* Reuter, 1880 = *Orthotylus parvintum* Lindberg, 1940 **n. syn.**; (c) *Brachynotocoris cyprius eduardwagneri* **n. ssp.**

Key words: Heteroptera, Miridae, *Phytocoris*, *Brachynotocoris*, faunistics, taxonomy, Basque Country, northern Iberian Peninsula.

Resumen

Una revisión del género *Brachynotocoris* Reuter, 1880 y otras contribuciones miridológicas (Hemiptera: Heteroptera: Miridae) desde el País Vasco (norte de la Península Ibérica)

Se realizan diversas contribuciones taxonómicas en el contexto de un estudio faunístico regional sobre Miridae (Hemiptera: Heteroptera). En el capítulo «Faunística» se presentan 17 especies, suponiendo 13 de ellas nuevos registros para la Comunidad Autónoma Vasca (norte de la Península Ibérica). Entre ellas, ya en el capítulo «Taxonomía», *Phytocoris* (*Exophytocoris*) *buxi* Ribaut, 1928 y *P. (E.) fieberi* Bolívar, 1881 son estudiadas en detalle y el género *Brachynotocoris* Reuter, 1880 es revisado. Se proponen: (a) *Phytocoris* (*Exophytocoris*) *pseudobscuratus* Rieger & Pagola-Carte, 2009 **n. comb.** (nueva combinación subgenérica); (b) *Brachynotocoris puncticornis* Reuter, 1880 = *Orthotylus parvintum* Lindberg, 1940 **n. syn.**; (c) *Brachynotocoris cyprius eduardwagneri* **n. ssp.**

Palabras clave: Heteroptera, Miridae, *Phytocoris*, *Brachynotocoris*, faunística, taxonomía, País Vasco, norte de la Península Ibérica.

Laburpena

Brachynotocoris Reuter, 1880 generoaren berrazterketa bat eta beste ekarpen miridologiko batzuk (Hemiptera: Heteroptera: Miridae) Euskal Herritik (Iberiar Penintsularen iparraldean)

Zenbait ekarpen taxonomiko egiten dira Miridae (Hemiptera: Heteroptera) familiaren barruan, eskualde mailako ikerketa faunistiko bat dela eta. «Faunistika» atalean, 17 espezie aurkezten dira, horietako 13 aipu berriak izanik Euskal Autonomia Erkidegorako (Iberiar Penintsularen iparraldean). Haien artean, eta «Taxonomia» atalean, *Phytocoris* (*Exophytocoris*) *buxi* Ribaut, 1928 eta *P. (E.) fieberi* Bolívar, 1881 sakonki ikertu dira eta *Brachynotocoris* Reuter, 1880 generoa berraztertu. Proposatzen dira: (a) *Phytocoris* (*Exophytocoris*) *pseudobscuratus* Rieger & Pagola-Carte, 2009 **n. comb.** (konbinazio subgeneriko berria); (b) *Brachynotocoris puncticornis* Reuter, 1880 = *Orthotylus parvintum* Lindberg, 1940 **n. syn.**; (c) *Brachynotocoris cyprius eduardwagneri* **n. ssp.**

Gako-hitzak: Heteroptera, Miridae, *Phytocoris*, *Brachynotocoris*, faunistika, taxonomia, Euskal Herria, Iberiar Penintsularen iparraldean.

Introduction

The fauna of Miridae (Hemiptera: Heteroptera) of the peninsular Basque Country (northern Iberian Peninsula) has received little attention until recently. Concerning the Spanish administrative region of the Basque Autonomous Community (abbreviated EAE/CAV), the present paper is a continuation of several contributions (Pagola-Carte *et al.*, 2004, 2005, 2006; Pagola-Carte, 2006, in press; Pagola-Carte and Zabalegui, 2006, 2007; Pagola-Carte and J. Ribes, 2007) in which a total of 148 species were added to the scarce previous records (see comments on the ancient literature in the author's papers mentioned). New collectings in the period 2007-2010 as well as the examination of previously undetermined material has led me to gathering the most relevant information and preparing the present paper, which basically consists of two sections dealing with faunistics and taxonomy, respectively.

In the «Faunistics» section, 17 faunistically interesting species are presented and commented. Most of them (13 species) are new records for the EAE/CAV; these are indicated by an asterisk (*). Unless otherwise stated, all the specimens have been collected and determined by the author. The taxonomic and nomenclatural criteria of Kerzhner and Josifov (1999) are followed. Every record is internally arranged in the same way: «Number of specimens: PROVINCE: Municipality: Specific toponym; Altitude; UTM coordinates (10 x 10 km); date». A few extra-EAE/CAV records are also included in square brackets only when they crucially complement the information given.

In the «Taxonomy» section, some taxonomic matters (those arised during the determinations) are dealt with. The involved taxa are *Phytocoris (Exophytocoris) buxi* Ribaut, 1928, *P. (E.) fieberi* Bolívar, 1881 and the genus *Brachynotocoris* Reuter, 1880. A major emphasis has been placed upon this orthotyline genus, in an attempt to work out the problem of Iberian-Maghrebian species.

Faunistics

MIRINAE MIRINI

* *Phytocoris (Compsocorocoris) juniperi* Frey-Gessner, 1865

Material studied: 1 ex.: ARABA: Biasteri-Laguardia: El Es-

peral (Lapuebla de Labarca); 400 m; 30TWN30; 08/06/2007; 3 exx.: ARABA: Eltziego: Lapuebla de Labarca – Eltziego; 500 m; 30TWN30; 12/06/2007; 2 exx.: ARABA: Arraia-Maeztu: Areatza – Ibisate (Entzia); 900 m; 30TWN43; 11/08/2007.

Known from about ten countries of the western Mediterranean (Kerzhner and Josifov, 1999). Although it is mainly (or traditionally) linked to the genus *Juniperus* (Cupressaceae), all the specimens from Biasteri-Laguardia and Eltziego were collected on *Rosmarinus officinalis* (Lamiaceae), which is the host plant typical of *P. (C.) rosmarini* Wagner, 1976, and those from Arraia-Maeztu were collected on *Buxus sempervirens* (Buxaceae), which is assumed to be the main host plant of *P. (Exophytocoris) buxi* Ribaut, 1928. According to the most recent literature on the subgenus (J. Ribes and E. Ribes, 2000, 2002; J. Ribes and Heiss, 2001), and particularly by examining the male genitalia, there is no doubt about the specific ascription of the specimens studied.

* *Phytocoris (Exophytocoris) buxi* Ribaut, 1928

Material studied: 3 exx.: ARABA: Arraia-Maeztu: Areatza – Ibisate (Entzia); 900 m; 30TWN43; 11/08/2007; 2 exx.: ARABA: Iruña Oka: Las Campas de Gabo (Nanclares); 605 m; 30TWN14; 21/07/2009; 1 ex.: idem, 7/08/2010.

J. Ribes (1982) recorded the species from the Iberian Peninsula for the first time, providing one specific record from Vidrà (Ripollès, Girona, Catalonia) and another general record from the province of Huesca, Aragon. Previously it was only known from Andorra and southern France (Wagner, 1974a), from where it was described. It can be considered as a restricted western Mediterranean species, since nowadays the known distribution remains circumscribed to that area (Kerzhner and Josifov, 1999). In the Iberian Peninsula, the published records are all from Catalonia (Goula and J. Ribes, 1995; J. Ribes *et al.*, 2004) and Aragon (J. Ribes and Goula, 1997; J. Ribes *et al.*, 1997) together with a recent report from northern Castile (Casaseca Delgado, 2003).

Traditionally linked to *Buxus sempervirens* (Buxaceae), the specimens from Iruña Oka have been collected, however, on *Quercus ilex ballota* (Fagaceae) and *Phillyrea latifolia* (Oleaceae) in the absence of *B. sempervirens*. J. Ribes *et al.* (1997), in Los Monegros, Aragon, collected it on *Rhamnus lycioides* (Rhamnaceae) and pointed out two possible hypotheses: whether *R. lycioides* is also a host plant for this mirid or the single specimen collected by them had been transported there passively, for instance by wind. Given the increasing amount of data, it seems obvious that *B. sempervirens*

should not be regarded as the exclusive (or even main) host plant for *P. (E.) buxi*. On the contrary, rather than such a tight trophic link, a preference for some kind of Mediterranean biotopes (those dominated by shrubs, sometimes open forests, and generally on calcareous soils) could be viewed as the limiting ecological requirement of the species (Ehanno, 1987; J. Ribes *et al.*, 1997; own data).

See also under «Taxonomy» section.

*** *Phytocoris (Exophytocoris) fieberi* Bolívar, 1881**

Material studied: 3 exx.: ARABA: Iruña Oka: Las Campas de Gabo (Nanclares); 605 m; 30TWN14; 26/07/2009. [EXTRA-EAE/CAV: 9 exx.: MURCIA: Totana: Parque Natural Sierra de Espuña: Monte Pedro López; 1500 m; 30SXG29; 07/08/2008].

Iberian-Maghrebian element; the records from Bosnia Hercegovina and Italy refer to *P. (E.) parvulus* Reuter, 1880 (Kerzhner and Josifov, 1999). The original description by Bolívar (1881) was based on a single specimen from Brunete, Madrid, collected on *Quercus ilex* (Fagaceae). J. Ribes (1990) found it in Catalonia and northern Castile living on *Quercus* spp. and J. Ribes *et al.* (1997) collected it in Aragon on both *Juniperus phoenicea* and *J. thurifera* (Cupressaceae) and gained one record from Morocco (A. Pardo *leg.*, Seidenstücker *det.*). In the Palaearctic catalogue Morocco is not included yet (Kerzhner and Josifov, 1999).

In Araba, up to three specimens have been collected by beating *Juniperus communis* in a Mediterranean habitat dominated by *Q. ilex ballota*. Moreover, in Murcia region, southeastern Spain, the species was abundantly found on *J. phoenicea* and *J. oxycedrus*. No individual was obtained by beating *Quercus* spp. or other shrubs and trees. In my opinion, *Juniperus* spp. are the real or main host plants for this *Phytocoris* species.

See also under «Taxonomy» section.

ORTHOTYLINAE ORTHOTYLINI

*** *Brachynotocoris cyprius eduardwagneri* n. ssp.**

Material studied: 1 ex.: ARABA: Iruña Oka: Las Campas de Gabo (Nanclares); 605 m; 30TWN14; 21/07/2009; 1 ex.: idem, 26/07/2009; 6 exx.: idem, 7/08/2010.

On *Phillyrea latifolia* (Oleaceae) in the midst of a Mediterranean landscape and plant community of holm-oak forest dominated by *Quercus ilex ballota* (Fagaceae). A very low-density population. Only one

out of the eight specimens was probably collected after beating a tree of *Q. ilex ballota* adjacent to *P. latifolia*.

See description and discussion under «Taxonomy» section.

*** *Hypsitylus prasinus* Fieber, 1861**

Material studied: 9 exx.: ARABA: Eltziego: Lapuebla de Labarca – Eltziego: 500 m; 30TWN30; 12/06/2007.

A dense population on *Daphne gnidium* (Thymelaeaceae). Morphological and biological differences between this species and the recently described *H. arberlaitzi* Pagola-Carte, 2006 have been reexamined and corroborated.

***Orthotylus (Orthotylus) verticatus* Wagner, 1958**

Material studied: 1 ex.: ARABA: Gobiaran: Valderejo Parke Naturala: Lalastra – Ribera; 910 m; 30TVN84; 05/07/2005; 2 exx.: ARABA: Eltziego: Lapuebla de Labarca – Eltziego; 500 m; 30TWN30; 12/06/2007; 4 exx.: ARABA: Zabrana: Bergantzu; 550 m; 30TWN12; 12/06/2007. [EXTRA-EAE/CAV: 3 exx.: LEÓN: Cistierna: Vidanes; 920 m; 30TUN23; 13/06/2009].

An interesting species only recently detected, although seemingly widespread, in the Iberian Peninsula: Córdoba (Andalusia) and Cuenca (northeastern Castile) (Baena and Susín, 1999); Lleida (Catalonia) (E. Ribes and J. Ribes, 2000); Araba and Nafarroa (Basque Country) (Pagola-Carte *et al.*, 2004; Pagola-Carte and J. Ribes, 2007). As with the previous records from the Basque Country, in the new localities of Eltziego and Zabrana also collected on *Genista scorpius* (Fabaceae); occurring together with *Orthotylus (Pachylops) jordii* Pagola-Carte & Zabalegui, 2006. In León (northwestern Castile) it has been found living on *Cytisus* sp. (Fabaceae) together with *O. (P.) virescens* (Douglas & Scott, 1865).

Most of the present specimens being females: (a) The study of the female genitalia (Pagola-Carte and J. Ribes, 2007) has turned out crucial for correct identification; (b) It is confirmed that the period in which adults live rarely exceeds the first half of June, as suggested by Pagola-Carte *et al.* (2004). (The late record from Gobiaran corresponds to the occasional capture of a single female on *Pinus sylvestris*.)

***Orthotylus (Pachylops) jordii* Pagola-Carte & Zabalegui, 2006**

Material studied: 21 exx.: ARABA: Eltziego: Lapuebla de Labarca – Eltziego; 500 m; 30TWN30; 12/06/2007;

2 exx.: ARABA: Zanbrana: Bergantzu; 550 m; 30TWN12; 12/06/2007.

Two further localities to be added to the known distribution (see Pagola-Carte and Zabalegui, 2006). In both localities, occurring together with the previous species (*O. (O.) verticatus* Wagner, 1958) and some other mirids, in a similar fashion as detailed in the original description.

PHYLINAE PHYLINI

* *Atractotomus magnicornis* (Fallén, 1807)

Material studied: 2 exx.: GIPUZKOA: Oiartzun: Aiako Harria Parke Naturala: Kausoro – Ibañarri; 650 m; 30TWN98; 16 exx.: GIPUZKOA: Oiartzun: Aiako Harria Parke Naturala: Ibañarri (Bunanagirre); 690 m; 30TWN98; 10/07/2010.

Widely distributed in the western Palaearctic and introduced in North America (Stonedahl, 1990; Kerzhner and Josifov, 1999). In the Iberian Peninsula it has only been recorded in a few localities of Pallars Sobirà, Lleida, Catalonia (J. Ribes, 1984; Stonedahl, 1990; J. Ribes *et al.*, 2004).

The specimens from Oiartzun were abundantly found on a plantation of non-native conifer *Picea abies* (Pinaceae). This is an *Atractotomus* species typical from conifers (particularly Pinaceae) of several genera. According to Stonedahl (1990), in the Palaearctic Region it is most commonly collected on *Abies alba* and *Picea excelsa*, but also recorded from other species or even genera such as *Larix*, *Pinus* or *Thuja*. Wachmann *et al.* (2004) regard *Picea abies* as the most frequent host plant in central Europe. In Catalonia, it was collected on *Pinus sylvestris* (J. Ribes, 1984). It is likely that the discovered population had been imported and established when the trees were planted some decades ago.

* *Compsidolon (Apsinthophylus) pumilum* (Jakovlev, 1876)

Material studied: 6 exx.: ARABA: Biasteri-Laguardia: El Esperal (Lapuebla de Labarca); 400 m; 30TWN30; 08/06/2007.

According to Kerzhner and Josifov (1999), the records from Spain (and some other countries) require confirmation because of possible confusion between this species and *C. (A.) balachowskyi* (Wagner, 1958). In the Iberian Peninsula, besides some previous records (see Wagner, 1975), Goula and J. Ribes (1995) more recently

provided the only known record from northern Catalonia, specifically from Ripollès, Girona. J. Ribes *et al.* (2004), however, remember that it could belong to *C. (A.) balachowskyi*.

The specimens from Biasteri-Laguardia were collected on *Artemisia herba-alba* (Asteraceae) and their external morphology and male genitalia have been examined following the discussion and drawings by Konstantinov (2006). Now we can confirm that *C. (A.) pumilum* belongs to the Iberian fauna.

* *Macrotylus (Alloeonycha) atricapillus* (Scott, 1872)

Material studied: 4 exx.: ARABA: Bastida: Buradon Gatzaga; 530 m; 30TWN12; 10/06/2005; 1 ex.: ARABA: Biasteri-Laguardia: El Esperal (Lapuebla de Labarca); 400 m; 30TWN30; 08/06/2007; 1 ex.: ARABA: Zanbrana: Bergantzu; 550 m; 30TWN12; 12/06/2007.

A Mediterranean species frequently found on *Dittrichia viscosa* (Asteraceae). This was also the host plant of the present records. Carapezza (1997) studied in detail the homogeneous group formed by this species, *M. (A.) nasutus* Wagner, 1959 and *M. (A.) paykullii* (Fallén, 1807).

* *Macrotylus (Alloeonycha) bipunctatus* Reuter, 1879

Material studied: 30 exx.: ARABA: Barrundia: Audikana – Etura; 600 m; 30TWN44; 23/06/2007.

A Mediterranean species living on *Fumana thymifolia* (Cistaceae) (Carapezza, 1997), this being also the plant on (and particularly under) which it was abundantly collected in Araba.

* *Macrotylus (Alloeonycha) elevatus* (Fieber, 1858)

Material studied: 12 exx.: ARABA: Eltziego: Lapuebla de Labarca – Eltziego; 500 m; 30TWN30; 08/06/2007.

A mostly European species known from a limited number of countries and extending to Kazakhstan (Carapezza, 1997; Kerzhner and Josifov, 1999). In Araba, abundantly collected on *Anthemis* sp. (Asteraceae), together with the next species and bearing a certain resemblance to it.

* *Megalocoleus lunula* (Fieber, 1861)

Material studied: 2 exx.: ARABA: Eltziego: Lapuebla de Labarca – Eltziego; 500 m; 30TWN30; 08/06/2007.

A common Mediterranean species living on several Asteraceae, such as *Anthemis* sp. (Matocq, 2004), where

it was collected in Araba (together with the previous species, but less abundant than it).

*** *Phoenicocoris obscurellus* (Fallén, 1829)**

Material studied: 1 ex.: ARABA: Erriberagoitia: Biloria; 800 m; 30TWN03; 23/07/2004; 6 exx.: ARABA: Kuartango: Villamanca – Marinda; 625 m; 30TWN04; 17/06/2005; 5 exx.: ARABA: Gobiaran: Valderejo Parke Naturala: Lalas-tra – Ribera; 910 m; 30TVN84; 05/07/2005, 12/07/2005.

Widely distributed in the Palearctic Region, including the Iberian Peninsula (Kerzhner and Josifov, 1999; Schwartz and Stonedahl, 2004). In Catalonia, a relatively well-prospected Iberian area, recorded from a number of localities (Goula and J. Ribes, 1995; J. Ribes *et al.*, 2004) since the first finding by Goula (1988). All the present records from Araba were made on *Pinus sylvestris* (Pinaceae), its main host plant (Schwartz and Stonedahl, 2004).

*** *Plagiognathus (Plagiognathus) fusciloris* Reuter, 1878**

Material studied: 7 exx.: ARABA: Iruña Oka: Las Campas de Gabo (Nanclares); 605 m; 30TWN14; 17/06/2005; 12 exx.: ARABA: Zanbrana: Bergantzu; 550 m; 30TWN12; 12/06/2007.

Dense populations on *Thymus vulgaris* (Lamiaceae).

The *fusciloris*-group of species was studied by J. Ribes *et al.* (1997), who recorded *P. (P.) bipunctatus* Reuter, 1883 and *P. (P.) fusciloris* (the latter with doubt) from Los Monegros, Zaragoza, Aragon, compared the characters of both species and show the need for a revision of the group. J. Ribes (1978) had previously studied *P. (P.) albus* Reuter, 1894 in detail on the basis of material from Soria, northern Castile. Carapezza (1998) has described a fourth species in this group (*P. (P.) tamaninii*) from Cyprus.

In spite of a certain degree of variability among the specimens now studied (particularly the colouration of the membrane: pale grey with almost concolor veins in most specimens from Iruña Oka whereas dark grey with pale veins in most specimens from Zanbrana), all of them undoubtedly belong to the same species and can be ascribed to *P. (P.) fusciloris*. Even when they present very slight differences with respect to Wagner's (1955, 1975) concept of the species (enlargement of some morphometric ranges: $\sigma\sigma$ up to 3.3 mm long, $\text{♀}\text{♀}$ up to 2.9 mm long and ocular index 1.26–1.67 in $\sigma\sigma$ and 1.90–2.00 in $\text{♀}\text{♀}$), the characters of external morphology and of the genitalia are according to it.

Concerning the male genitalia, it is noteworthy that *P. (P.) fusciloris* and *P. (P.) tamaninii* share the character of the left paramere with a prominent, triangular lobe near the base of the sensory lobe (see: Wagner's (1955) Fig. 30; Wagner's (1975) Fig. 643a; Carapezza's (1998) Fig. 2d). The specimens from the Basque Country also show it.

***Psallus (Hylopsallus) wagneri* Ossiannilsson, 1953**

Material studied: 3 exx.: GIPUZKOA: Oiartzun: Aiako Harria Parke Naturala: Kausoro – Ibañarri; 650 m; 30TWN98; 15/05/2006; 2 exx.: ARABA: Asparren: Araia – Zaldondo; 650 m; 30TWN55; 21/06/2008.

This is the second time that the species is recorded from the Iberian Peninsula, after the first findings in Aiako Harria Parke Naturala (Pagola-Carte *et al.*, 2005). The interest of the present records is twofold:

- (1) On the one hand, the first record out of Gipuzkoa is presented.
- (2) On the other hand, new host plants are added for the Basque Country: *Acer pseudoplatanus* in Oiartzun and *A. campestre* (Aceraceae) in Asparren. Although it is regarded as an oak-associated species (*Quercus* spp., Fagaceae) by many authors (see references in Pagola-Carte *et al.*, 2005), Ehanno (1987) mentioned also some trees of the genera *Salix*, *Betula*, *Corylus* and *Malus* as host plants. According to Bacchi and Rizzotti Vlach (1994), its occurrence in plants other than *Quercus* may be only accidental. More recently, Wachmann *et al.* (2004) only accept *Quercus* spp. as host plants in central Europe. Concerning the new Basque records, at least two specimens at each locality were collected in the mentioned *Acer* species.

***Solenoxyphus lepidus* (Puton, 1874)**

Material studied: 3 exx.: ARABA: Biasteri-Laguardia: El Esperal (Lapuebla de Labarca); 400 m; 30TWN30; 08/06/2007.

On *Camphorosma monspeliaca* (Chenopodiaceae) growing on the subarid slopes of the Ebro river. This record has been compiled by Goula and J. Ribes (in press) for the Spanish atlas of threatened invertebrates, in which the species is considered as «vulnerable».

Until recently, the Spanish and French specimens were considered as belonging to a separate species (*S. minor* Wagner, 1969; synonymy by Konstantinov, 2008).

Taxonomy

1. On two insufficiently known species of *Phytocoris* (*Exophytocoris*) (MIRINAE)

1.1. Introduction

The large genus *Phytocoris* Fallén, 1814 (more than 700 species known; Schuh, 1995) is in urgent need of a world scale revision. No comprehensive studies have been made of species relationships and the currently accepted infrageneric groups are useful only at the regional level (Stonedahl, 1988). Moreover, although Palaearctic subgenera (see Wagner, 1974a) are considered to reflect phylogeny better than other regional infrageneric groups (Stonedahl, 1988), many problems arise when ascribing some species to any known subgenus. This may be due to: (a) The weakness of some of those subgenera (for example the superfluous separation between *Exophytocoris* Wagner, 1961 and

Ribautomiris Wagner & Weber, 1964, which were synonymized by Rieger (1989)); (b) The occurrence of species bearing sets of characters intermediate (for example, between *Exophytocoris* and *Compsocerochoris* Reuter, 1876 (Linnavuori, 1999a)); and/or (c) The deep divergences between the possible external-morphology-based and male-genitalia-based groupings of species and, as a consequence, the presumably high weight that convergence phenomena and independent evolution of similar characters have on our inability to understand the internal arrangement of the genus and the relationships among its species.

Thus, there is a great work to be done regionally, too. For instance, Iberian species of *Phytocoris* would benefit from a thorough revisionary study (M. Baena, H. Günther, J. Ribes, Ch. Rieger, pers. comm.). Such study being beyond the aim of the present paper, however, a little contribution is now presented concerning two insufficiently known species of the subgenus *Exophytocoris*. Firstly, some basic notes on morphology are provided (subsections 1.2 and 1.3). In the framework of the «subgenera problem», a brief discussion follows posteriorly (subsection 1.4).

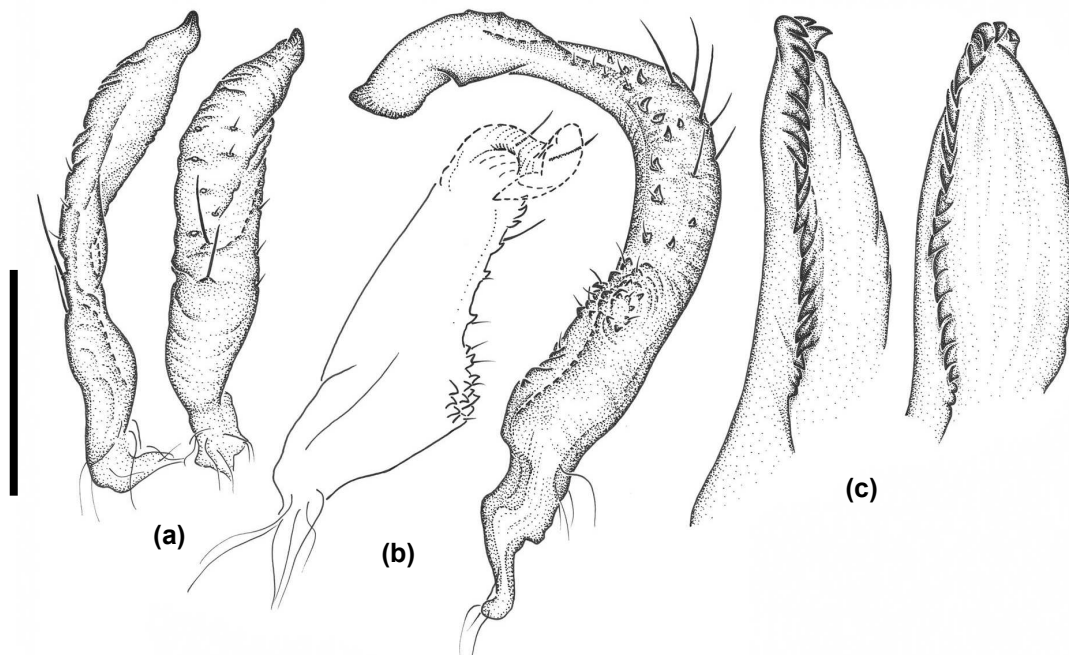


FIGURE 1. *Phytocoris* (*Exophytocoris*) *busci* Ribaut, 1928: Male genitalia, different views and specimens: (a) Right paramere; (b) Left paramere; (c) Apical comb of the endophallus (Scale bar = 0.2 mm).

1.2. *Phytocoris (Exophytocoris) buxi* Ribaut, 1928

Besides the material reported from the Basque Country (see «Faunistics» section), some specimens from Catalonia (J. Ribes *leg.* and coll.) have also been examined, concluding that they all fit the morphological diagnosis given by Wagner (1974a) on the basis of the detailed original description (Ribaut, 1928) and his own research. Minor exceptions are the following:

- One ♀ from Araba smaller (4.2 mm) than Wagner's range (4.5–5.0 mm).
- Ocular index in the examined ♂♂: 1.60–1.70 (Wagner: 1.50–1.60); in the examined ♀♀: 1.65–2.00 (Wagner: 1.80–1.90).
- Antennal segment I slightly shorter than diatone in the examined ♂♂ (0.95–1.00), but not in the examined ♀♀ (1.05–1.10).
- Tibia of all three pairs of legs with three dark rings, even when the metatibiae are sometimes more faintly coloured, in accordance with the general body colouration. (The colouration is highly variable even among individuals of the same population; on the contrary, the dorsal pattern of spots and patches is quite constant.)

No drawing or picture of the male genitalia has been found in the literature for this species. The right paramere (Fig. 1a), left paramere (Fig. 1b) and apical comb of the endophallus (Fig. 1c) are now illustrated for the first time.

1.3. *Phytocoris (Exophytocoris) fieberi* Bolívar, 1881 (Fig. 2)

Besides the specimens reported from the province of Araba, additional material from J. Ribes collection has also been studied, from Aragon (Los Monegros, Zaragoza, Blasco *leg.*; Albarracín, Teruel, J. Ribes *leg.*), Castile (Calatañazor, Soria, J. Ribes *leg.*) and Catalonia (Calella de Palafrugell, Girona, Vallhonrat *leg.*), as well as a series recently collected by the author in Sierra de Espuña, Murcia, as mentioned in the «Faunistics» section.

All the specimens examined undoubtedly belong to a single species, which clearly matches with the original description of *Phytocoris fieberi* by Bolívar (1881) and the posterior diagnosis by Wagner (1974a). A few minor clarifications should be made, as follows:

- Total length: 3.98–4.47 mm (♂♂); 4.00–4.63 mm (♀♀) (Bolívar, 1881: 4.5 mm; Wagner and Weber, 1964: 4.5–5 mm; Wagner, 1974a: nothing).



FIGURE 2. *Phytocoris (Exophytocoris) fieberi* Bolívar, 1881: Habitus, male. (Photograph by Jon Maguregi Arenaza.)

- Ocular index in the examined ♂♂: 1.09–1.40 (Wagner: 1.52); in the examined ♀♀: 1.48–1.62 (Wagner: 1.67).
- Antennal segment I shorter than diatone, as stated by Wagner. Specifically, in the examined specimens: 0.83–0.94, and generally the lowest ratios measured in ♂♂ and the highest in ♀♀.
- Ratio antennal segment II / width of pronotum: 1.20–1.40 (Wagner: 1.20–1.30), without sexual dimorphism.
- Colour pattern of tibiae (rings and/or spots) not as in the single specimen reported by Bolívar (1881) (*i.e.* protibiae with brownish-grey rings not much distinct, mesotibiae yellow with the apex brownish-grey, and metatibiae bearing some, almost undistinct, spots), but protibiae with three dark and three pale rings very distinct, mesotibiae with three dark

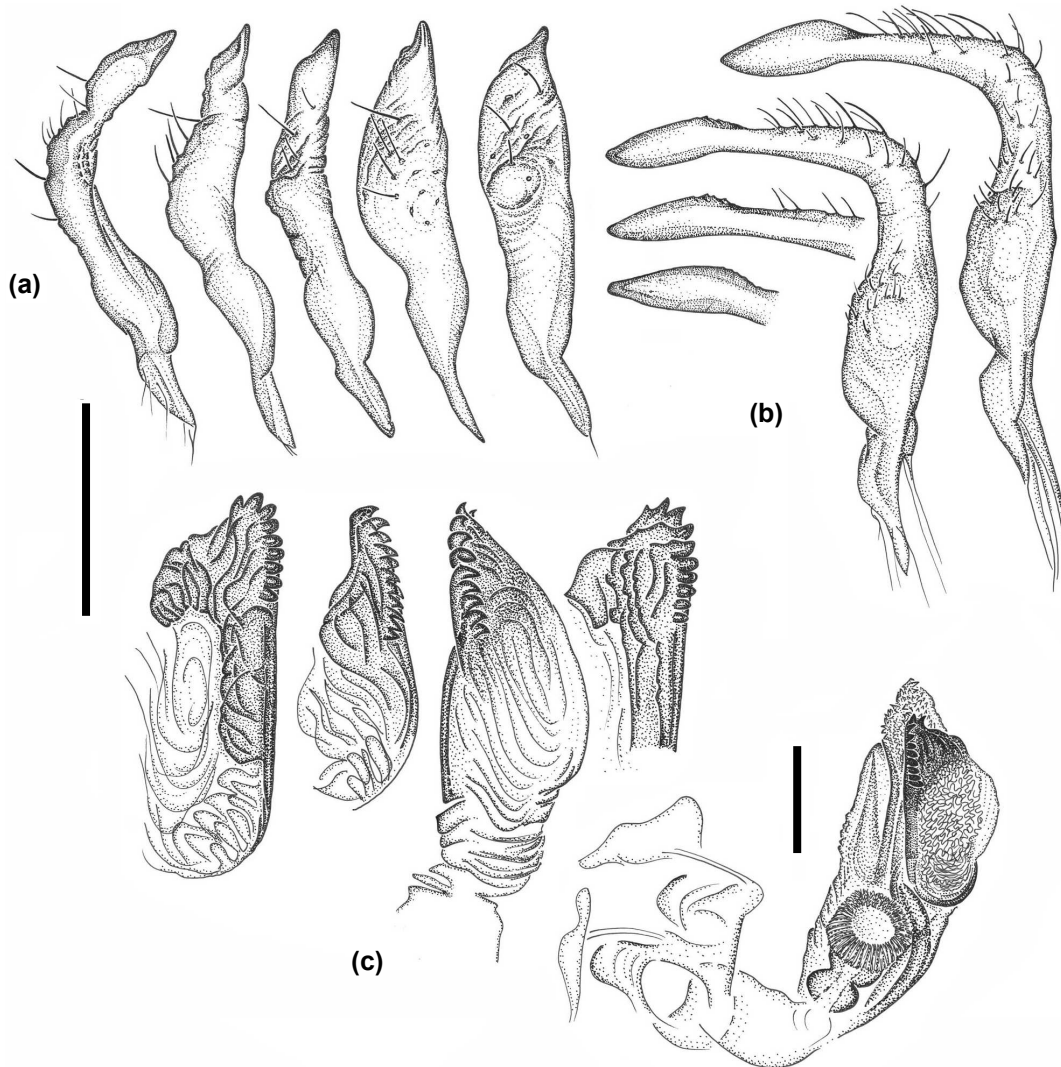


FIGURE 3. *Phytocoris* (*Exophytocoris*) *fieberi* Bolívar, 1881: Male genitalia, different views and specimens: (a) Right paramere; (b) Left paramere; (c) Apical comb of the endophallus (Scale bar = 0.2 mm).

and four pale rings not so distinct, and metatibiae with, at least, a basal dark region or ring (see Fig. 2). (Such incongruences for tibial colouration are frequently found between existing descriptions and some specimens of many *Phytocoris* species, due to individual variability of pigmentation levels).

As Bolívar (1881) stated, *P. fieberi* (now included in the subgenus *Exophytocoris*) strongly resembles *P. juniperi* (now included in the subgenus *Compsocorocoris*). Taking into account the similarities between both species

concerning external appearance, together with their similar host plant preferences (*Juniperus* spp.; see under «Faunistics» section), on the one hand, and the obvious morphological differences which separate them (genitalia, subgeneric placement, etc.), on the other hand, this is most probably a case of convergence or even mimetism within the vast genus *Phytocoris*.

Concerning male genitalic structures, only the drawings by Wagner (1974a: Fig. 116a-c) have been found

in the literature. However, they are not correct. In fact, as Tamanini (1982) revealed, Wagner's (1974a: p. 158) redescription of the species was based on Italian specimens belonging to *P. (E.) parvulus* Reuter, 1880 incorrectly ascribed to *P. (E.) fieberi*. Tamanini (1982) presented accurate and fine drawings of the genitalia of *P. (E.) parvulus* but that of *P. (E.) fieberi* remains unillustrated. The right paramere (Fig. 3a), left paramere (Fig. 3b) and apical comb of the endophallus (Fig. 3c) are now illustrated for the first time.

Moreover, *P. (E.) fieberi* has been compared to *P. (E.) parvulus* and to the remaining *Phytocoris (Exophytocoris)* species (by using the descriptions and pictures from the bibliography or by examining specimens in J. Ribes collection and author's collection), assuring of the validity of *P. (E.) fieberi*.

In order to check the conspecificity between this concept of the species and the type material, the holotype has been examined⁽¹⁾. All the characters of external morphology are similar to the «contemporary» specimens examined. Being a male, the genitalia has been also examined; all three structures (left and right parameres and apical comb of the endophallus) are also in total agreement, excluding a stronger twist of some parts.

1.4. Subgeneric discussion

According to Linnavuori (1999a), differences between the subgenera *Exophytocoris* and *Compsocorocoris* are not clear, as shown by some intermediate species. According to him, apart from the characters of external morphology given by Wagner (1974a) (total size, length of antennal segment I and shape of the frons), «in *Exophytocoris* the hypophysis of the left style is blade-like and the vesica is provided with a shorter spiculum and finely dentate lamellae. In *Compsoc-*

⁽¹⁾Despite the question mark («MNMS?») of the Palaeartic Catalogue (Kerzhner and Josifov, 1999), the holotype is indeed deposited at the Museo de Ciencias Naturales de Madrid (MNCN or MNMS). From the Natural History Museum of Vienna (NHMW) they have informed me that there is a single specimen in a very poor condition, which is a syntype according to the label by Kerzhner. The specimen in Madrid, also in a rather poor condition, is the single specimen studied and described by Bolívar (1881), as shown by its first three labels (Fig. 4). Concerning the lectotype label by Baena, such designation (incorrect, after the present research) has not been published (M. Baena, pers. comm., 22/09/2008). In my visit to the MNMS, the need to clarify this matter was recognized and demanded to me by the curators.

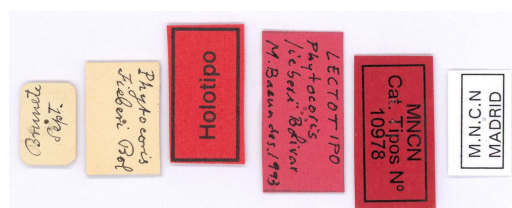


FIGURE 4. *Phytocoris (Exophytocoris) fieberi* Bolívar, 1881: Labels pinned under the holotype. Shown from left to right in the photograph according to their vertical position (from top to bottom) and displayed according to an imaginary horizontal line connecting the pin holes of the labels.

corocoris the left style is dentate and provided with an apically expanded hypophysis, and the vesica has a strongly sclerified dentate or edentate spiculum».

Having examined the male genitalia of *P. (E.) buxi* (Fig. 1), a strong similarity to the recently described *P. (s. str.) pseudobscuratus* Rieger & Pagola-Carte, 2009 has been revealed. Differences between both species are obvious (pattern of antennal segment II, ocular index, dorsal colouration and pattern, details of the left paramere, etc.) but undoubtedly they are two closely related species. Which single subgenus should they be included into?

- (1) According to the current placement of *P. (E.) buxi*, in *Exophytocoris*.
- (2) Following Rieger and Pagola-Carte's (2009) discussion, in *Phytocoris s. str.* (specifically within the *dimidiatus*-group, due to the apical arc of teeth in the apical comb of the endophallus).
- (3) According to the separation *Exophytocoris/ Compsocorocoris*, in *Compsocorocoris* (particularly on the basis of the left paramere (Linnavuori, 1999a)).
- (4) Or even in a new subgenus? (Not prudent, given the current state of knowledge; hence discarded.)

In *P. (E.) fieberi*, the male genital structures (Fig. 3) agree with Linnavuori's (1999a) statement, at least concerning the left paramere. Moreover, the great similarity to *P. (E.) parvulus* (see Tamanini, 1982) has been revealed. The main difference is the apical comb of the endophallus, which in *P. (E.) fieberi* bears an apical arc of teeth, suggesting the connection to the pair *buxi + pseudobscuratus*.

In conclusion, we should admit for the moment the high morphological diversity existing in the male genitalia within *Exophytocoris*, not only concerning the apical comb of the endophallus (see also in Pagola-Carte and Rieger (2008) the case of *P. (E.) minor* Kirsch-

baum, 1856) but also concerning the left paramere. In accordance to it all, the following new subgeneric combination is proposed:

Phytocoris (*Exophytocoris*) *pseudobscuratus* Rieger & Pagola-Carte, 2009 n. comb. [instead of *Phytocoris* (s. str.) *pseudobscuratus* Rieger & Pagola-Carte, 2009]

2. A revision of the genus *Brachynotocoris* Reuter, 1880 (ORTHOTYLINAE)

2.1. Introduction to the problem of Iberian-Maghrebian *Brachynotocoris*

The type species of this Palaearctic genus is *Brachynotocoris puncticornis* Reuter, 1880, which is distributed in more than a dozen of countries in Europe, northern Africa and the Caucasus (Kerzhner and Josifov, 1999; Hradil *et al.*, 2002). It generally lives on *Fraxinus* spp. (Oleaceae), particularly on *F. excelsior* (e.g. Wagner, 1974b; Wachmann *et al.*, 2004), but also on *F. angustifolia* (Carapezza, 1997) and *F. ornus* (Göllner-Scheiding, 1992; Aukema, 1993).

Between 1940 and 1965 three further species and one subspecies, all of them with more limited distributions, were described and/or assigned to *Brachynotocoris* Reuter, 1880 in the western Palaearctic Region ⁽²⁾:

- *B. parvinotum* (Lindberg, 1940), originally described from Morocco in *Orthotylus* and transferred to *Brachynotocoris* by Wagner (1959), who studied a longer series of males and females from Algeria, Morocco and Spain, giving them the status of «*hypotyloides*». Further Catalan specimens assigned to this species were reported by Wagner (1960), Goula and J. Ribes (1995) and Gessé and Goula (2003, 2006). According to different authors, its host plants are: *Fraxinus angustifolia* (= *oxyphylla*) (some Maghrebian individuals), although it is also collected on *Quercus ilex* (Iberian individuals) (Wagner, 1960, 1974b); and *Phillyrea latifolia* (Oleaceae) (Gessé and Goula, 2006).
- *B. viticinus* Seidenstücker, 1954, described from Syria and recorded also from Turkey (Hoberlandt, 1956; Linnavuori, 1965), Israel (Linnavuori, 1961),

Iraq (Linnavuori, 1992b) and Iran (Linnavuori, 2009). Always found on *Vitex agnus-castus* (Verbenaceae).

- *B. cyprius cyprius* Wagner, 1961, described from Cyprus and recorded also from Israel (Linnavuori, 1961), Iraq (Linnavuori, 1992b), Greece (Linnavuori, 1999b; Rieger, 2007), Jordan (Kerzhner and Josifov, 1999) and Crete (Kment *et al.*, 2005). Always found on *Olea europaea* (Oleaceae).
- *B. cyprius inermis* Linnavuori, 1965, described from Libya (Linnavuori's record is compiled by Eckerlein and Wagner (1969)) and also recorded from Tunisia (Wagner, 1974b; Carapezza, 1997). Always found on *Olea europaea* (Oleaceae).

Some specimens collected by the author in the Basque Country (see «Faunistics» section) were found to be very similar to *B. cyprius*, at least their male genitalia. As they were collected on *Phillyrea latifolia*, it was decided to examine the Iberian material of *B. parvinotum*, as a consequence of which the problem of Iberian-Maghrebian *Brachynotocoris* was revealed. It will be explained and tried to solve in the next subsections 2.2 and 2.3. Subsections 2.4, 2.5 and 2.6 are collateral results of the research.

Apart from the author's collection, the following private or public collections have been consulted:

- Francesc Gessé, Castelldefels (SP)
- Armand Matocq, Paris (FR).
- Jordi Ribes, Barcelona (SP).
- Christian Rieger, Nürtingen (GE).
- Museo Nacional de Ciencias Naturales / National Museum of Natural History of Madrid (MNCN = MNMS) (SP).
- Naturhistorisches Museum Wien / Natural History Museum Vienna (NHMW) (AU).
- Zoological Museum, University of Helsinki (MZHF) (FI).
- Zoologisches Museum, Universität Hamburg (ZMUH) (GE).

2.2. What is *Brachynotocoris parvinotum* (Lindberg, 1940)?

Lindberg (1940) described *Orthotylus parvinotum* on seven specimens from several Moroccan localities, some of them collected on *Fraxinus angustifolia* (= *oxyphylla*). His statement that only females were known («Nur Weibchen sind vorhanden») is false according to Seidenstücker (1954), who found an immature male lacking the abdomen among the paratypes, and presumed that it could be the result of an unsuccessful genitalic dissection («das Abdomende fehlt und dürfte einer ergebnislosen Genital-Untersuchung gedient haben»). My own examination of the type series (see

⁽²⁾In the Nearctic Region, where *B. puncticornis* is now considered introduced with imported ash nursery stock (Wheeler and Henry, 1992), a few synonyms can be found in the literature (see Wheeler and Henry, 1992; Kerzhner and Josifov, 1999).

below) would reveal a further, unexpected result at this respect (marked «!»).

Wagner (1959) transferred the species to *Brachynotocoris* Reuter, 1880 after the examination of males (including the genitalia) and females from Algeria (3 ♂♂, 4 ♀♀) and Morocco (1 ♂, 1 ♀) collected by several entomologists between 1939 and 1941 and also from the Iberian Peninsula (1 ♂, 1 ♀) collected by J. Ribes in Catalonia (El Papiol and Valldoreix, respectively; both in Barcelona province) in 1957. This series of specimens contains the «hypotypoids» designated by Wagner and preserved in the ZMUH (see J. Ribes and Goula, 1986). Five of them have been now reexamined (see Appendix 1), together with two further Iberian specimens also kept at ZMUH as part of Wagner's collection: one ♂ from Algeciras, Cádiz (collected by Lindberg in 1926) and one ♀ from Valldoreix, Barcelona (collected by Wagner in 1959); the last one corresponding to the record published by Wagner (1960) in which *B. parvinotum* was associated to *Quercus ilex*.

Apart from the specimen from Algeciras, Cádiz, all the remaining Iberian records of *B. parvinotum* are from Catalonia. Posteriorly to Wagner's publications, Goula and J. Ribes (1995) and Gessé and Goula (2003, 2006) have added new Catalan localities. The series of eight specimens collected in Garraf Natural Park, Barcelona, is of special relevance, since they were undoubtedly associated to *Phillyrea latifolia*, a tree typical of the Mediterranean plant community of holm-oak forest («encinar» in Spanish; «alzinar» in Catalan) (Gessé and Goula, 2006).

Among the Iberian specimens examined by the author, only three are ♂♂: one from Algeciras, one from El Papiol and one from Garraf Natural Park. The study of their genitalia has revealed that the specimen from Algeciras belongs to *Hypsitylus prasinus* Fieber, 1861 and that the specimens from Catalonia are conspecific with the specimens collected by myself in the Basque Country, all them with the male genitalia very similar to that of *B. cyprius* Wagner, 1961. Nevertheless, both Catalan and Basque specimens are greater than the previously known subspecies of *B. cyprius* (*cyprius* Wagner, 1961 and *inermis* Linnavuori, 1965), among other morphological and biological differences. As a result, a new subspecific taxon is described in the subsection 2.3.

Among the remaining «hypotypoids» of *B. parvinotum*, the only ♂ (Boufarik, Algeria) had the genitalia displayed on the specimen's card, most probably being the same which was examined and illustrated by Wag-

ner in 1959 (Figs. 15-18) and later in 1974b (Fig. 458c) (reproduced here in Figs. 5a and 5b, respectively). My examination of external morphology and genitalia reveals that this specimen undoubtedly belongs to *B. puncticornis*. Its left paramere lacks the sensorial lobe because this is broken (Fig. 5c), and could have been interpreted by Wagner as belonging to a different species... precisely to Lindberg's Maghrebian *Brachynotocoris* species at that time «waiting» for ♂♂ to be found. Curiously, an «evolution» of the left paramere for *B. parvinotum* is noticeable in Wagner's drawings from 1959 to 1974b (see Figs. 5a-b), reflecting either the need for a better «justification» of Lindberg's species or the simultaneous examination by Wagner of Iberian ♂♂ belonging to *B. cyprius*. However, the only Iberian ♂♂ determined as *B. parvinotum* in Wagner's collection (Algeciras and El Papiol; see previous paragraph) have been dissected for the first time by myself. On the other hand, no male specimen determined as *B. parvinotum* has been found in J. Ribes collection.

Finally, the specimens of the type series of *B. parvinotum* preserved in the MZHF (holotype + 5 paratypes) have been examined, in order to know if they really belong to a different species, as proposed and described by Lindberg (1940), or if they also belong to other species of the genus (or even different genera), as happens with all posterior records. External morphology and male and female genitalia have been studied and compared with the help of the knowledge acquired during the whole investigation (see subsections 2.3, 2.4 and 2.5). These are the results:

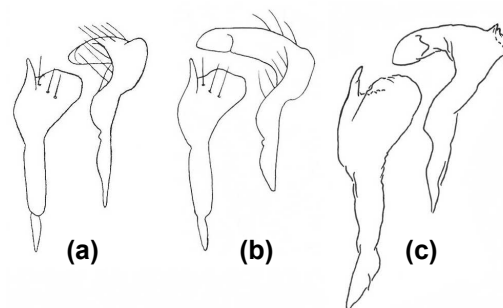


FIGURE 5. *Brachynotocoris* «*parvinotum*» (Lindberg, 1940): Right and left paramere: (a) Drawing by Wagner (1959) (reproduced); (b) Drawing by Wagner (1974b) (reproduced); (c) Drawing by the author, of the (most probably) same specimen, in fact belonging to *B. puncticornis* Reuter, 1880 (hairs omitted).

- (a) The holotype female (from Atlas mai., Reraia) belongs to *B. puncticornis*.
- (b) One paratype male (same collecting data as holotype) is in a very bad condition and lacks the pygophore, as commented by Seidenstücker (1954). Although accurate identification is not possible, it undoubtedly does not belong to the genus *Brachynotocoris*.
- (c) The other paratype from the same collecting data as holotype (as reported in Lindberg's description) has not been found at MZHF. Since all three specimens were collected on *Fraxinus oxyphylla*, it can be assumed as belonging to *B. puncticornis* in the case that it really is a *Brachynotocoris*.
- (d) There exists a further male specimen (!) among the paratypes (from Fès), which also belongs to *B. puncticornis*.
- (e) Two female paratypes (from Lalla Mimouna and Djebel Amsitten) also belong to *B. puncticornis*.
- (f) One female paratype (from Sebou) belongs to *B. viticinus*.

(See Appendix 1 for details of specimens' labels.)

(A new label with the correct identification has been added to each specimen of the type series.)

Taking into account that the female holotype (from Atlas mai. [= High Atlas], Reraia; see Huldén *et al.*, 1996; Kerzhner and Josifov, 1999) undoubtedly belongs to *B. puncticornis* and the holotype is the name-bearing type according to Article 72 of the ICZN (ICZN, 1999), the following synonymy is proposed:

Brachynotocoris puncticornis Reuter, 1880 = *Orthotylus parvnotum* Lindberg, 1940 **n. syn.**

2.3. *Brachynotocoris cyprius* Wagner, 1961: A Mediterranean «Rassenkreis»

Apart from the widespread *B. puncticornis*, only *B. cyprius* occurs in the Iberian Peninsula. Definitively, *B. cyprius* is a species composed of several subspecies. It can be viewed as another case of circummediterranean «ring species» or «Rassenkreis», similarly to some other Orthotylini, such as *Orthotylus* (*Parapachylops*) *junipericola* Linnavuori, 1965 (see, for example: Ehanno and Matocq, 1990; Carapezza, 1997; and the most recently described subspecies by J. Ribes and Borges, 2001) or *Orthotylus* (*Litocoris*) *ericetorum* (Fallén, 1807) (see, for example, Kožišková, 1967; Wagner, 1970; Tamanini, 1976; Linnavuori, 1992a).

Accordingly, the following subspecies of *B. cyprius* is described:

Brachynotocoris cyprius eduardwagneri n. ssp.

Type material:

Holotype: ♂, mounted on card, labelled: «ARABA: Iruña Oka: / Las Campas de Gabo (Nanclares) / 605 m 30TWN1541 / *Phillyrea latifolia* / 7-08-2010 / S. Pagola Carte *leg.*» [white, printed label] // «HOLOTYPE / *Brachynotocoris cyprius* / *eduardwagneri* n. ssp. / Pagola-Carte, 2010» [red, printed label]. Deposited in the Museu de Ciències Naturals, Zoologia, Barcelona (Spain).

Paratypes: 3 ♂♂, 4 ♀♀, mounted on card, similarly labelled except the date for one ♂ (21-07-2009) and one ♀ (26-07-2009) and the reference to «PARATYPE». Deposited in Pagola-Zabalegui collection except one ♀ in A. Matocq collection.

Additional material studied: See Appendix 1.

Description:

A green Orthotylini of the genus *Brachynotocoris*, belonging to the species *B. cyprius* (particularly on the basis of the almost identical male genitalia) and with the following characters:

Length: 4.45 (4.32–4.65) mm (♂♂); 4.37 (4.32–4.46) mm (♀♀) in the type series; some specimens from Catalonia down to 4.00 mm (both sexes). Body elongate, subparallel hemelytra or slightly pear-shaped (particularly in ♂♂), with the maximum width frequently beyond the middle of their length, even at the cuneus level. Ratio total length / maximum width: 3.16 (3.06–3.24) (♂♂); 3.04 (2.92–3.20) (♀♀).

General colouration green, quite matt. Legs pale, femora greenish, tibiae yellowish. Apex of rostrum and of third tarsomeres darkened. Colouration of antennae: Segment I green and ventrally spotless, segment II pale (yellowish) with the apex darkened, segments III and IV brownish with the basis of III paler (like segment II). Hemelytral membrane grey, with veins and cells green; in some individuals leaving a concentric grey space inside each cell; in most individuals an additional, eyebrow-shaped, green strip is outlined exteriorly to the veins (Fig. 6a).

Rostrum short, reaching or slightly surpassing anterior coxae.

Ocular index: 1.91 (1.63–2.00) (♂♂); 2.42 (2.32–2.60) (♀♀).

Ratio antennal segment I / synthlipsis: 1.23 (1.17–1.32) (♂♂); 1.23 (1.19–1.27) (♀♀). Ratio antennal segment II / diatone: 1.84 (1.75–1.92) (♂♂); 1.78 (1.75–1.79) (♀♀) in the type series; some specimens from Catalonia down to 1.67 (both sexes).

Pronotum very small: short (≤ 0.5 x scutellum length) and narrow (≤ 0.6 x maximum hemelytral width). Ratio antennal segment II / pronotum width: 1.67 (1.59–1.74) ($\sigma\sigma$); 1.51 (1.46–1.56) ($\text{♀}\text{♀}$).

Male genitalia as in Figs. 7-8: Right paramere (Fig. 7a-f), left paramere (Fig. 7g-i) and sclerotized processes of the vesica (Fig. 8a-c).

Female genitalia as in Fig. 13a-b: Gynatrial complex: its dorsal wall (Fig. 13a) and the K structure of its posterior wall (Fig. 13b).

Etymology: It is a great pleasure to me (and I feel the need) to dedicate this subspecies to the great heteropterist who provided the Palaearctic miridology with its most precious backbone in the 20th century: Eduard Wagner. I am sure we will never manage to understand how one person can do such a huge work.

Biology and distribution: On *Phillyrea latifolia* (Oleaceae) and most probably also on *P. angustifolia*, according to some Catalan specimens (see Appendix 1). Up to now only known from the Iberian Peninsula (Basque Country and Catalonia).

Discussion: On the basis of the male genitalia (Figs. 7-8), the new taxon belongs to *B. cyprius* (see Fig. 9). Characters of external morphology allow an easy separation from the nominal subspecies (and therefore from the subspecies *inermis*; see also subsection 2.4): Green colouration not shiny but matt, greater size (> 4 mm) and general shape less fusiform (elongate rather than ovate); greater ocular index; greater ratio antennal segment II / diatone. As far as known, there is also an important biological difference: its host plant is not *Olea europaea* but another Oleaceae, *Phillyrea latifolia*. This fact could be related to the subspeciation process.

2.4. Diagnosing each species and subspecies⁽³⁾

• *Brachynotocoris cyprius cyprius* Wagner, 1961

TOTAL LENGTH:

3.20–4.00 mm ($\sigma\sigma$); 3.59–3.80 mm ($\text{♀}\text{♀}$).

OCULAR INDEX: 1.38–1.54 ($\sigma\sigma$); 1.92–2.10 ($\text{♀}\text{♀}$).

ANTENNAL SEGMENT I / SYNTHLIPSIS:

1.10 ($\sigma\sigma$); 0.92–1.10 ($\text{♀}\text{♀}$).

⁽³⁾ Morphometry is based both on previous authors' works and on the own examination of specimens, thus providing as wide as possible ranges of measurements.

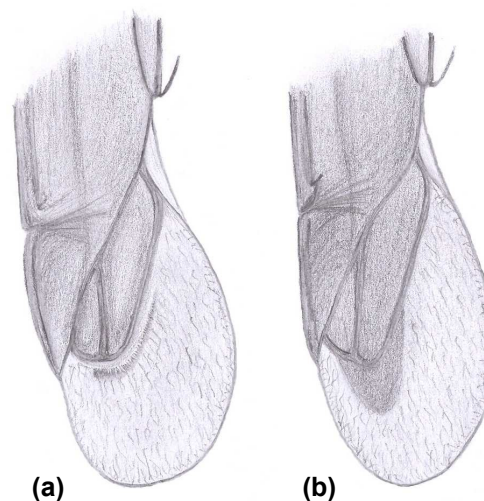


FIGURE 6. Hemelytral membrane in *Brachynotocoris*: (a) *B. cyprius eduardwagneri* n. ssp.; (b) *B. viticinus* Seidenstücker, 1954.

ANTENNAL SEGMENT II / DIATONE:

1.50–1.57 ($\sigma\sigma$); 1.42–1.51 ($\text{♀}\text{♀}$).

BODY SHAPE: Ovate rather than elongate, fusiform.

GENERAL COLOURATION: Green shiny.

ANTENNAL SEGMENT I: Without apical dark spot on ventral surface.

MEMBRANE CELLS AND VEINS: Green (cells sometimes not).

MALE GENITALIA: Fig. 9.

FEMALE GENITALIA: Fig. 13c-d.

HOST PLANT: *Olea europaea* (Oleaceae).

• *Brachynotocoris cyprius eduardwagneri* n. ssp.

TOTAL LENGTH:

4.00–4.65 mm ($\sigma\sigma$); 4.00–4.46 mm ($\text{♀}\text{♀}$).

OCULAR INDEX: 1.63–2.00 ($\sigma\sigma$); 2.32–2.60 ($\text{♀}\text{♀}$).

ANTENNAL SEGMENT I / SYNTHLIPSIS:

1.17–1.32 ($\sigma\sigma$); 1.19–1.27 ($\text{♀}\text{♀}$).

ANTENNAL SEGMENT II / DIATONE:

1.75–1.92 ($\sigma\sigma$); 1.75–1.79 ($\text{♀}\text{♀}$).

BODY SHAPE: Elongate rather than ovate ($\sigma\sigma$ particularly parallel-sided or pear-shaped).

GENERAL COLOURATION: Green matt.

ANTENNAL SEGMENT I: Without apical dark spot on ventral surface.

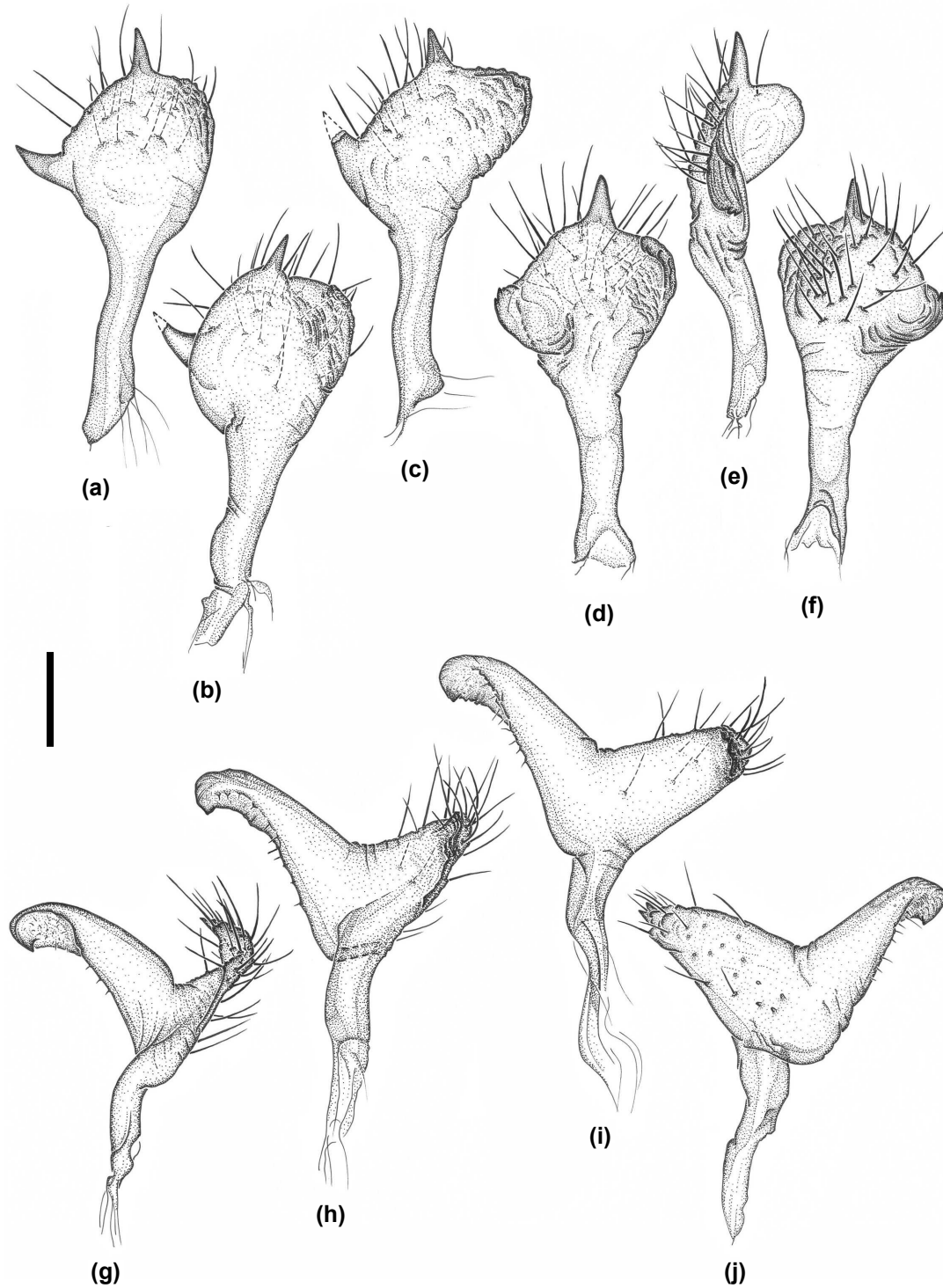


FIGURE 7. *Brachynotocoris cyprius eduardwagneri* n. ssp.: Male genitalia: (a)-(f) Right paramere, different views and specimens: (a) Iruña Oka, Basque Country; (b) Garraf, Catalonia; (c) El Papiol, Catalonia; (d)-(f) Malformation in one specimen from Iruña Oka, Basque Country; (g)-(j) Left paramere, different views and specimens: (g)-(h) Iruña Oka, Basque Country; (i) Garraf, Catalonia; (j) El Papiol, Catalonia (Scale bar = 0.1 mm).

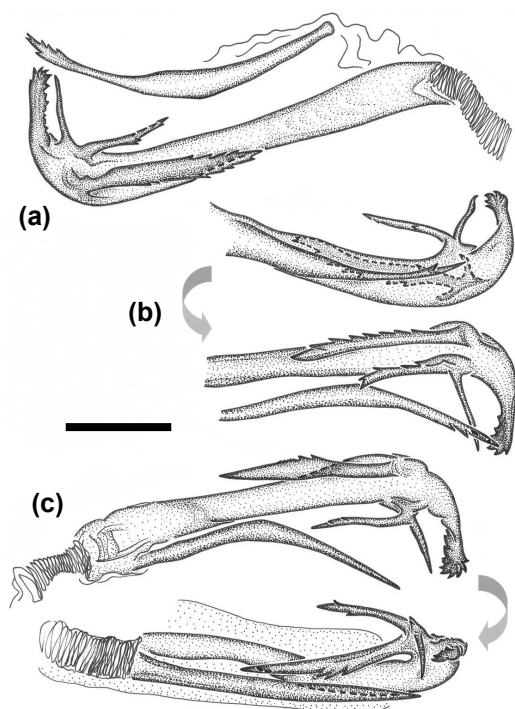


FIGURE 8. *Brachynotocoris cyprius eduardwagneri* n. ssp.: Male genitalia: Sclerotized processes of the vesica, different views and specimens: (a) Iruña Oka, Basque Country; (b) Garraf, Catalonia; (c) El Papiol, Catalonia; (Scale bar = 0.1 mm).

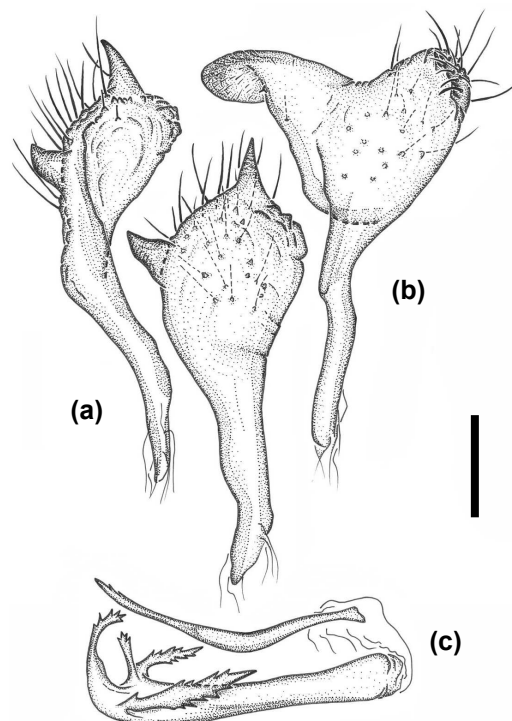


FIGURE 9. *Brachynotocoris cyprius cyprius* Wagner, 1961: Male genitalia, different views and specimens: (a) Right paramere; (b) Left paramere; (c) Sclerotized processes of the vesica (Scale bar = 0.1 mm).

MEMBRANE CELLS AND VEINS: Green (cells sometimes not) + frequently an eyebrow-shaped, green strip (Fig. 6a).

MALE GENITALIA: Figs. 7-8.

FEMALE GENITALIA: Fig. 13a-b.

HOST PLANT: *Phillyrea latifolia* (Oleaceae).

• *Brachynotocoris cyprius inermis* Linnavuori, 1965

MORPHOLOGY (from Linnavuori's description): «As nominate form, but styli of ♂ different: Right stylus (fig. 1 k [in fact 1 l]) bearing only one strong tooth, while the apex of the stylus is provided with only a very faint tooth (well developed in the nominate form); the left stylus (fig. 1 l [in fact 1 k]) has a more produced sensory lobe and the upper margin of the stylus (broad aspect) is strongly insinuated.» (See Fig. 10 with arrows indicating important features.)

Although Wagner (1974a) had his doubts about this subspecies («jedoch scheint es sich hier um ein ab-

normes ♂ zu handeln»), Carapezza (1997) has identified a large series of new specimens without reflecting any doubt.

HOST PLANT: *Olea europaea* (Oleaceae).

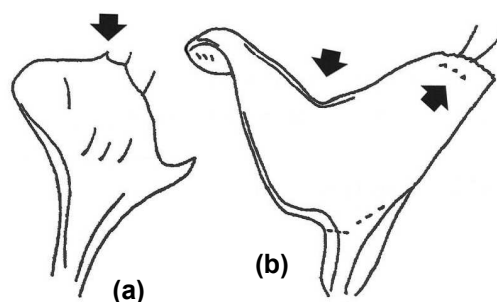


FIGURE 10. *Brachynotocoris cyprius inermis* Linnavuori, 1965: Male genitalia: (a) Right paramere; (b) Left paramere. (Reproduced from Linnavuori, 1965, with slight modifications.)

• *Brachynotocoris puncticornis* Reuter, 1880

TOTAL LENGTH:

4.05–4.73 mm (♂♂); 4.28–4.80 mm (♀♀).

OCULAR INDEX: 1.18–1.85 (♂♂); 1.75–2.00 (♀♀).

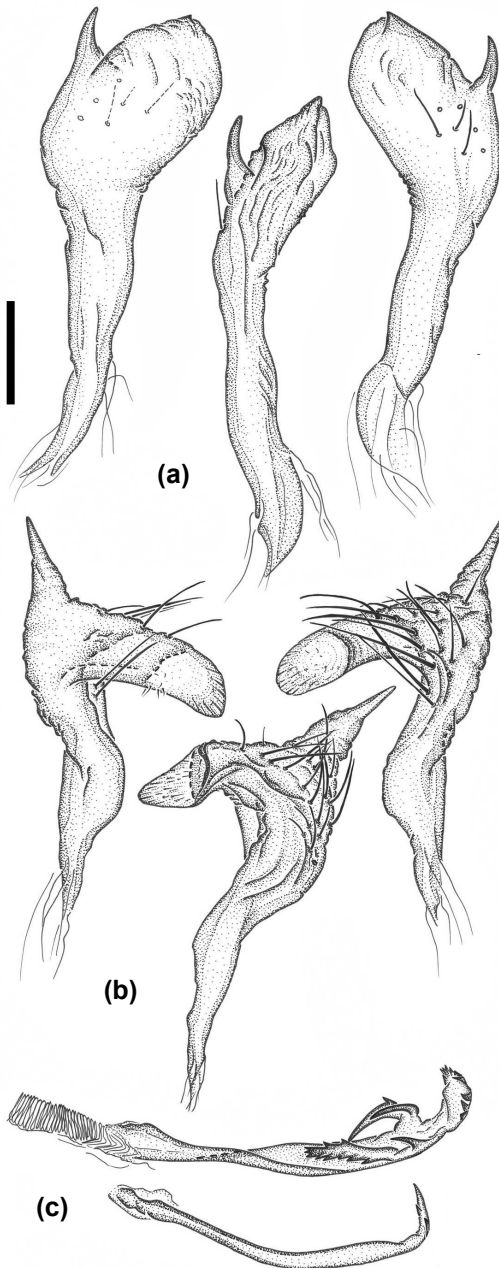


FIGURE 11. *Brachynotocoris puncticornis* Reuter, 1880: Male genitalia, different views and specimens: (a) Right paramere; (b) Left paramere; (c) Sclerotized processes of the vesica (Scale bar = 0.1 mm).

ANTENNAL SEGMENT I / SYNTHLIPSIS:

1.52–1.82 (♂♂); 1.38–1.44 (♀♀).

ANTENNAL SEGMENT II / DIATONE:

1.58–1.85 (♂♂); 1.62–1.65 (♀♀).

BODY SHAPE: Ovate-elongate, fusiform.

GENERAL COLOURATION: Green shiny.

ANTENNAL SEGMENT I: With apical dark spot on ventral surface, sometimes faintly marked (drawings by Seidenstücker, 1954: Figs. 9-11).

MEMBRANE CELLS AND VEINS: Green.

MALE GENITALIA: Fig. 11.

FEMALE GENITALIA: Fig. 13e-f.

HOST PLANT: *Fraxinus* spp. (Oleaceae).

• *Brachynotocoris viticinus* Seidenstücker, 1954

TOTAL LENGTH:

4.09–4.36 mm (♂♂); 4.14–4.58 mm (♀♀).

OCULAR INDEX: 1.84–2.40 (♂♂); 2.60–3.41 (♀♀).

ANTENNAL SEGMENT I / SYNTHLIPSIS:

1.22–1.25 (♂♂); 1.03–1.15 (♀♀).

ANTENNAL SEGMENT II / DIATONE:

1.75–1.87 (♂♂); 1.74–1.91 (♀♀).

BODY SHAPE: Elongate rather than ovate.

GENERAL COLOURATION: Green, quite matt, sometimes with a bluish tinge.

ANTENNAL SEGMENT I: With apical dark spot on ventral surface (drawings by Seidenstücker, 1954: Figs. 12-13).

MEMBRANE CELLS AND VEINS: Green with an additional («supernumerary») false cell posteriorly to true cells (Fig. 6b).

MALE GENITALIA: Fig. 12.

FEMALE GENITALIA: Fig. 13g-h.

HOST PLANT: *Vitex agnus-castus* (Verbenaceae).

2.5. Comments on male and female genitalia

• Males:

The right and left parameres have been studied and illustrated for *B. cyprius eduardwagneri* n. ssp. (Fig. 7), *B. cyprius cyprius* (Fig. 9a-b), *B. puncticornis* (Fig. 11a-b) and *B. viticinus* (Fig. 12a-b). Previous drawings of the parameres (chronologically) are those by:

- Seidenstücker (1954) for *B. puncticornis* and *B. viticinus*.
- Wagner (1959) for *B. sparinotum*.
- Wagner (1961) for *B. cyprius cyprius*.

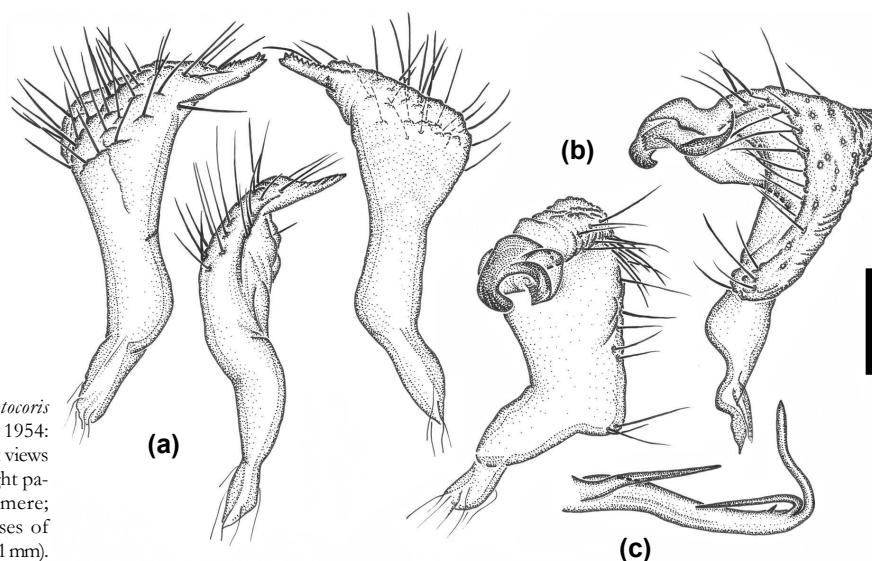


FIGURE 12. *Brachynotocoris viticinus* Seidenstücker, 1954: Male genitalia, different views and specimens: (a) Right paramere; (b) Left paramere; (c) Sclerotized processes of the vesica (Scale bar = 0.1 mm).

- Linnavuori (1961) for *B. cyprius cyprius*.
- Wagner and Weber (1964) for *B. puncticornis*.
- Linnavuori (1965) for *B. cyprius inermis*.
- Wagner (1974b) for *B. cyprius cyprius*, *B. «parvinotum»*, *B. puncticornis* and *B. viticinus*.

The sclerotized appendages of the vesica of *B. cyprius eduardwagneri* n. ssp. (Fig. 8), *B. cyprius cyprius* (Fig. 9c), *B. puncticornis* (Fig. 11c) and *B. viticinus* (Fig. 12c) have also been studied and illustrated. In the literature consulted, these structures have only been illustrated for *B. «parvinotum»* by Wagner (1959) and for *B. cyprius cyprius* by Wagner (1961). However, Wagner's drawings are too rough as to be useful for between-species comparison purposes.

In summary, the male genitalia, particularly the parameres, have revealed to be taxonomically very useful in this genus. Care must be taken with the fragility of the several processes of the parameres (sensorial lobe, tip of the hypophysis, etc.): In some individuals they could be lost and lead into error (for example, Wagner's mistake; see subsection 2.2 and Fig. 5) or they show extreme cases of variability or even malformations (see, for example, Fig. 7d-f).

• Females:

The dorsal wall of the gynatrial complex and the *K* structures (= interramal lobes) of its posterior wall have been studied and illustrated for *B. cyprius eduard-*

wagneri n. ssp. (Fig. 13a-b), *B. cyprius cyprius* (Fig. 13c-d), *B. puncticornis* (Fig. 13e-f) and *B. viticinus* (Fig. 13g-h). As far as known, they have not been previously illustrated.

The *K* structures have a quite uniform shape within the genus (a deep, broad concavity between two narrow, elongate projections), not being very useful for specific identification purposes. Variability in the shape of the piece and in the number of spines is great, not only due to the position of the piece as illustrated in the pair of drawings of Fig. 13b for *B. cyprius eduardwagneri* n. ssp., but *per se* for all taxa. The most clear difference is between *B. viticinus* (Fig. 13h: capital «U» shape) and the remaining species and subspecies (Fig. 13b,d,f: small «u» shape).

According to the literature consulted, at least the orthotyline genera *Labops* Burmeister, 1835 and *Lopidea* Uhler, 1872 share a rather similar shape of the *K* structures with *Brachynotocoris* (Slater, 1950; Davis, 1955).

The dorsal wall is of the type found in other orthotyline genera (see, for example, a few *Orthotylius* species in Ehanno and Matocq, 1990; Pagola-Carte and J. Ribes, 2007). In the author's opinion, from a purely taxonomic point of view, the most interesting parts are not the sclerotized rings, lateral oviducts or other relatively known structures, but the abundant, unnamed pieces of tissue which form a variety of lobes, ridges, axes, columns, archs, strips, etc., in a strictly dorsal position (see also Pagola-Carte and J. Ribes,

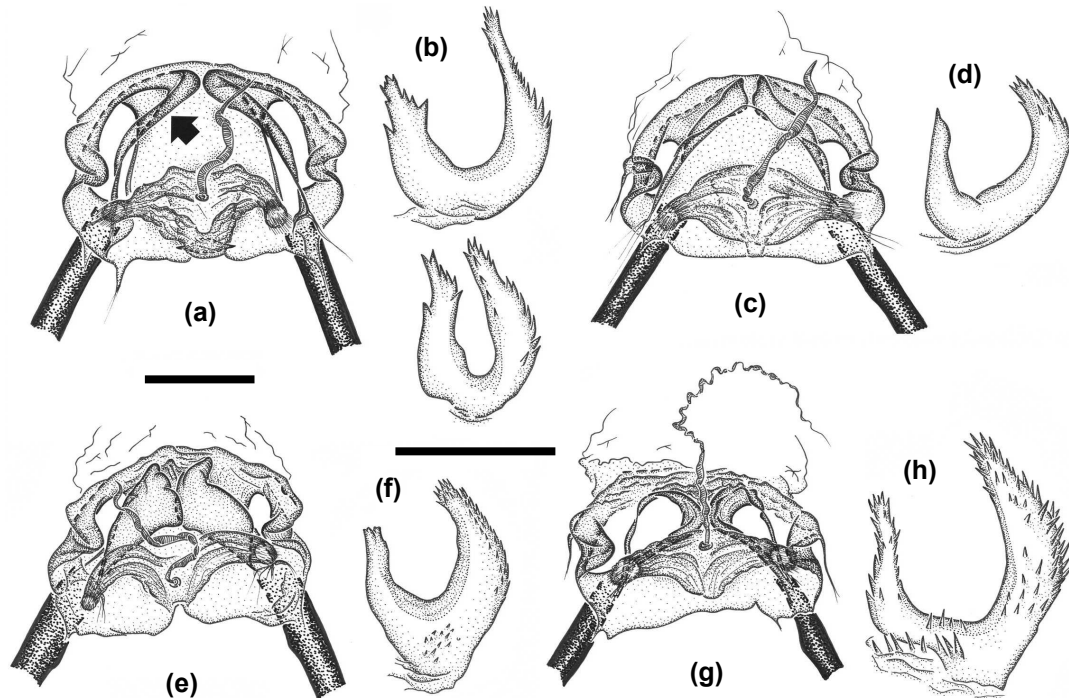


FIGURE 13. Gynatrial complex (female genitalia) in *Brachynotocoris*: (a)-(b) *B. cyprius eduardwagneri* n. ssp.; (c)-(d) *Brachynotocoris cyprius cyprius* Wagner, 1961; (e)-(f) *Brachynotocoris puncticornis* Reuter, 1880; (g)-(h) *Brachynotocoris viticinus* Seidenstücker, 1954; (a), (c), (e), (g) Dorsal wall (Scale bar = 0.2 mm); (b), (d), (f), (h) K structure of the posterior wall («b» illustrates the same single piece viewed in different positions) (Scale bar = 0.1 mm).

2007). In *Brachynotocoris*, a strip-like, paired structure has been found in all cases (Figs. 13a,c,e,g; indicated by an arrow only in Fig. 13a). Interesting differences can be seen among taxa, even when it is likely that some differences are partly due to different levels of hydration of the sample.

2.6. Updating of the Palearctic Catalogue

On the basis of the material studied (Appendix 1) and the conclusions reached, the following additions, deletions and corrections should be made to the Catalogue of Palearctic Heteroptera (Kerzhner and Josifov, 1999):

Brachynotocoris cyprius cyprius Wagner, 1961

- Add country: GR (Greece).

Brachynotocoris cyprius eduardwagneri Pagola-Carte, 2010 [n. ssp. in the present paper]

- Add subspecies with country: SP (Spain).

Brachynotocoris parvinotum (Lindberg, 1940)

- Delete species.

Brachynotocoris puncticornis Reuter, 1880

- Add synonymy: *Orthotylus parvinotum* Lindberg, 1940 [n. syn. in the present paper].
- Add countries: ALG (Algeria), IN (Iran).

Brachynotocoris viticinus Seidenstücker, 1954

- Add country: MO (Morocco).

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Appendix 1

Relevant specimens of *Brachynotocoris* studied, excluding the type series of *Brachynotocoris cyprius eduardwagneri* **n. ssp.** (see description, subsection 2.3) and including some specimens wrongly identified as *Brachynotocoris*.

• Coll. Francesc Gessé, Castelldefels (SP)

Brachynotocoris cyprius eduardwagneri **n. ssp.** ♂

Garraf alzinar3 [printed] / P. latifolia / 17.VII.00 [handwritten] / Gessé leg. [printed] // *Brachynotocoris* / parvotum / (Lindberg) ♂ [handwritten] / Gessé det. [printed]

• Coll. Armand Matocq, Paris (FR)

Brachynotocoris cyprius cyprius Wagner, 1961 ♂

GRECE : ATTIQUE / Cap Ireo ; 10-VII-1987 ; / A. Matocq leg. [printed] // BRACHYNOTOCORIS / cyprius E. Wagner [handwritten]

Brachynotocoris cyprius cyprius Wagner, 1961 ♀

GRECE : LACONIE ; Plage / 5 km sud de Githion / (Mavrovouni) ; 13-VII-1987 ; / A. Matocq leg. [printed]

Brachynotocoris cyprius cyprius Wagner, 1961 ♀

GRECE : LACONIE ; Plage / 5 km sud de Githion / (Mavrovouni) ; 13-VII-1987 ; / A. Matocq leg. [printed]

Brachynotocoris puncticornis Reuter, 1880 ♂

PARIS 28° PIÉGE UV / 30-8-93 21-234 / H INGLEBERT [handwritten] // *puncticornis* [handwritten]

Brachynotocoris puncticornis Reuter, 1880 ♀+♀+♀ (same pin)

Hérault: Maguio, La / Couarche Bord de l'étang, / 20-VII-1995 A Matocq leg. [printed]

Brachynotocoris puncticornis Reuter, 1880 ♀

Iran : Karaj, Station / Alborz, 21-VI-2002 / A. Matocq leg. [printed] // sp. [handwritten]

Brachynotocoris puncticornis Reuter, 1880 ♀

Iran : Karaj, Station / Alborz, 21-VI-2002 / A. Matocq leg. [printed]

Brachynotocoris viticinus Seidenstücker, 1954 ♂+♂+♂ (same pin)

Maroc : Aoufour, Oued Asif / Tifroute[?], N 30° 43 631, W 8°05 737 Alt. 797 m, / 8-V-2009, A. Matocq leg. [printed] // *viticinus* [handwritten]

Brachynotocoris viticinus Seidenstücker, 1954 ♀+♀+♀ (same pin)

Maroc: Rte 7002, 5,1 Km / de la P8 vers Immouzzèr- / des-Ida-Outanane, 28-IV- / 2000 A. Matocq leg. - [printed]

• Coll. Jordi Ribes, Barcelona (SP)

Brachynotocoris cyprius eduardwagneri **n. ssp.** ♀

Valldoreix / (Vallès Occid.) / 30-VIII-65 Ribes [handwritten] // *Phillyrea* / *angustifolia* [handwritten]

Brachynotocoris puncticornis Reuter, 1880 ♂

Reinosa / (Cantabria) / 10-VIII-84 Ribes [handwritten] //

Brachynotocoris puncticornis [handwritten]

[+ other specimens of both species not studied in detail]

• **Coll. Christian Rieger, Nürtingen (GE)**

Brachynotocoris cyprius cyprius Wagner, 1961 ♀

GR, (Korinthia) / Alepohori / UTM FH 71 / 3.7.82, leg. Rieger [printed] // *cyprius* / E.W. [handwritten] / Chr. Rieger det. [printed] 85 [handwritten]

Brachynotocoris cyprius cyprius Wagner, 1961 ♀

GR, (Korinthia) / Alepohori / UTM FH 71 / 3.7.82, leg. Rieger [printed] // *cyprius* / E.W. [handwritten] / Chr. Rieger det. [printed] 85 [handwritten]

Brachynotocoris cyprius cyprius Wagner, 1961 ♀

Graecia (UTM FF 86) / 5 km S Monemvasia / Lichtfang / 14.-26.7.86, Rieger [printed] // *cyprius* / E.W. [handwritten] / Chr. Rieger det. [printed] 86 [handwritten]

Brachynotocoris cyprius cyprius Wagner, 1961 ♂

Hellas, Lakonia / 5 km S Monemvasia / 15.6.1988 / leg. G. Christensen [date partly handwritten] // *cyprius* / E.W. [handwritten] / Chr. Rieger det. [printed] 88 [handwritten]

• **Coll. Zoological Museum, University of Helsinki (MZHF) (FI)**

[Type series of *Brachynotocoris parvnotum* Lindberg, 1940]

Brachynotocoris puncticornis Reuter, 1880 ♀

Atlas mai.. Reraia / 29. 5-15. 6. 26 / Lindberg [printed] / [REVERSE, in pencil: «52»] // Mus. Zool. H:fors [printed] / Spec. Typ. No [printed] 7730 / Orthotylus / parvnotum Lindb [handwritten] // Mus.Zool.Helsinki / Loan No. / HE 2010 - 20 [printed] [yellow]

? (bad condition; not *Brachynotocoris*) ♂

Atlas mai.. Reraia / 29 5-15 6. 26 / Lindberg [printed] / [REVERSE, in pencil: «52»] // Spec. typ. [printed] / Orthotylus / parvnotum [handwritten] / Lindberg [printed] [red] // Coll. / Lindberg [printed] // Mus.Zool.Helsinki / Loan No. / HE 2010 - 25 [printed] [yellow]

Brachynotocoris puncticornis Reuter, 1880 ♂

Fès lumière / 1.7.37-Otin // Spec. typ. [printed] / Orthotylus / parvnotum [handwritten] / Lindberg [printed] [red] // Coll. / Lindberg [printed] // Mus.Zool.Helsinki / Loan No. / HE 2010 - 21 [printed] [yellow]

Brachynotocoris puncticornis Reuter, 1880 ♀

Marocco. Lalla / Mimouna.6-7 7 26 / Lindberg [printed] //

Paratypus [printed] / Orthotylus / parvnotum / Lb. [handwritten] [red] // *Brachynotocoris* / parvnotum / Ldbg [handwritten] / Ed.Wagner det.1954 [printed, except last number] // Coll. / Lindberg [printed] // Mus.Zool.Helsinki / Loan No. / HE 2010 - 22 [printed] [yellow]

Brachynotocoris puncticornis Reuter, 1880 ♀

Marocco. Dj. Amsit- / ten. 16-18 5 26 / Lindberg / [REVERSE, in pencil: «38»] // Spec. typ. [printed] / Orthotylus / parvnotum [handwritten] / Lindberg [printed] [red] // Coll. / Lindberg [printed] // Mus.Zool.Helsinki / Loan No. / HE 2010 - 24 [printed] [yellow]

Brachynotocoris viticinus Seidenstücker, 1954 ♀

MAROC / SEBOU / A. THERY [printed] // Paratypus [printed] / Orthotylus / parvnotum.Lb. [handwritten] [red] // Coll. / Lindberg [printed] // Mus.Zool.Helsinki / Loan No. / HE 2010 - 23 [printed] [yellow]

• **Coll. Zoologisches Museum, Universität Hamburg (ZMUH) (GE)**

Brachynotocoris cyprius eduardwagneri n. ssp. ♂

El Papiol / Barcelona / 21.6.57 [handwritten] // HYPO-TYPOID [printed] / *Brachynotocoris* / parvnotum / Ldbg [handwritten] / E. Wagner det [printed] [yellowish]

Brachynotocoris cyprius eduardwagneri n. ssp. ♀

Umg Barcelona, / Valldoreix / 12.8.59 [printed] // Hispania or. / E.Wagner leg. [printed] // *Brachynotocoris* / parvnotum / ♀ Ldbg [handwritten = Wagner]

Brachynotocoris puncticornis Reuter, 1880 ♀

Fès lumière / 20.8.41 Otin [printed] // HYPO-TYPOID [printed] / *Brachynotocoris* / parvnotum / Ldbg [handwritten] / E. Wagner det [printed] [yellowish]

Brachynotocoris puncticornis Reuter, 1880 ♀

Talzent [handwritten] / Maroc [printed] // Coll. Vidal [printed] / 1.800 m / 16.VII.39 [handwritten] // HYPO-TYPOID [printed] / *Brachynotocoris* / parvnotum [handwritten] / E. Wagner det [printed] [yellowish]

Brachynotocoris puncticornis Reuter, 1880 ♂+♀ (same pin)

BOUFARIK / ALGÉRIE / A. THERY [printed] // HYPO-TYPOID [printed] / *Brachynotocoris* / parvnotum / Ldbg [handwritten] / E. Wagner det [printed] [yellowish]

Hypsitylus prasinus Fieber, 1861 ♂

Algeciras, Hisp. / austr.. 15-22 4 26 / Lindberg [printed] // *Brachynotocoris* / parvnotum Ldbg [handwritten] / det.Ed.Wagner 1958 [printed, except last number]