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Synopsis of the genus *Empicoris* (Hemiptera: Heteroptera: Reduviidae) in Chile

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Abstract. The species of *Empicoris* Wolff, 1811 recorded from Chile are listed, and an identification key for all four species is provided. Two new distributional records from Chile are added: *E. errabundus* (Say, 1832) and *E. vagabundus* (Linnaeus, 1758); the latter species is recorded from the Andean Region for the first time.

Key words. Heteroptera, Reduviidae, Emesinae, new records, alien species, Chile, Andean Region

Introduction

The study of Chilean Heteroptera began with Spinola & Blanchard's (1852) work in Claudio Gay's Historia Física y Política de Chile, which is the most important founding work of the Chilean natural history on Heteroptera (Faúndez 2010, Faúndez & Carvajal 2010). Later, Signoret (1864) wrote another important work on the Chilean Heteroptera, describing many new taxa. A third work should be considered within the founding works on Chilean Heteroptera: The Synopsis of Reed (1898–1901). Reed's work was strongly questioned by Berg (1900), who wrote a hard criticism and corrections; however, Reed provided much information, which makes his work an important source. After these, little has been published; mainly faunistical works until Prado (2008) who provided a checklist of Chilean Heteroptera.

Reduviidae is one of the largest and morphologically most diverse families within the Heteroptera (Schuh & Slater 1995). In Chile, only a few species of Reduviidae that are well known are found, and much research has been published mainly for those species related to Chagas disease (e.g. species of *Triatoma* Laporte, 1832 and *Mepraia* Mazza, Gajardo & Jörg, 1940).

The subfamily Emesinae is the most diverse in Chile; it includes species of the following tribes: Metapterini, Deliastini, Leistarchini, and Ploiariolini (Prado 2008). The Ploiariolini are poorly represented on generic level with only 15 genera in the Neotropical Region. Three of them are endemic in this region and one genus and species is considered 'incertae sedis': *Lutevopsis chilensis* Porter, 1923 from Chile. Two of the three native Neotropical genera (*Malacopus* Stål, 1860 and *Panamia* Kirkaldy, 1907) range from the Caribbean to southern Brazil; the third Neotropical endemic genus (*Hybomatocoris* Wygodzinsky, 1966) is restricted to the semiarid mediterranean zone of central Chile (Wygodzinsky 1966). The only cosmopolitan genus is *Empicoris* Wolff, 1811 with many native species in Neotropics.

The genus *Empicoris* can be distinguished from all other Ploiariolini by its small size (3–7 mm), dull body surface with short adpressed pubescence, pronotum with a distinct lateral carina, and spotted wing pattern (Wygodzinsky 1966). It includes about 80 species, is known from all zoogeographical regions and is the most common genus of the tribe; in the New World it is represented by 16 species (Gil-Santana et al. 2005). In Chile this genus is currently represented by two species but as these records come from short and incomplete references, their geographic distribution in Chile is poorly known.

In this work we add new distributional data on the *Empicoris* species from Chile, and two more species are recorded for the first time from this country; one of them also represents a new record for the Andean Region. To improve the knowledge of this group an identification key to the Chilean species is also provided.

Materials and methods

We have studied specimens from the Maule and Metropolitan regions of Chile. For the assignation of coordinates to the localities referred by the collectors we followed Riso Patron (1924); these coordinates were corrected with Google Earth v. 5.0.

The material examined is deposited in the Museo Argentino de Ciencias Naturales, Buenos Aires (MACN) and in the collection of Eduardo Faúndez (EIFC).

Results

Empicoris Wolff, 1811

Type species. *Gerris vagabundus* Linnaeus, 1758, by monotypy.

Empicoris errabundus (Say, 1832)

(Figs. 2, 5)

Ploiaria errabunda Say, 1832: 34. USA.
Ploiariola errabunda: Van Duzee (1916: 27).
Ploiariodes errabunda: McAtee & Malloch (1922: 95).
Empicoris errabundus: McAtee & Malloch (1925: 24); Wygodzinsky (1949: 27); Wygodzinsky (1966: 373); Maldonado Capriles (1990: 148); Gil-Santana et al. (2005: 140).
Ploiariodes tuberculata Banks, 1909: 46.

Ploiariola tuberculata: Van Duzee (1916: 27).
Empicoris reticulatus McAtee & Malloch, 1925: 20.
Empicoris orthoneuron McAtee & Malloch, 1925: 18.
Empicoris orthoneuron: Wygodzinsky (1949: 27); Wygodzinsky (1966: 381–382); Maldonado Capriles (1990: 149); Gil-Santana et al. (2005: 140).

Material examined. CHILE: Maule Region: 1 spec. without abdomen, Curicó: Cerro Huela – Huelan, Zapallar [35º03′S 71º06′W], i.1998, Malaise trap, Barriga leg. (MACN); 1 ♂, Zapallar, 15 km E Curicó [35º03′S 71º06′W], Malaise trap, ii.1998, Barriga leg. (MACN).

Distribution. This species is known from Argentina, Brazil, Canada, Guatemala, Jamaica, Mexico, Paraguay, Peru, and southern and western USA (Wygodzinsky 1966, Maldonado Capriles 1990); herein we record it from Chile for the first time.

Remarks. Wygodzinsky (1966) noted that this species showed an extraordinary wide range of variation, so that the study of isolated extreme specimens would have suggested the presence of different taxa. Gil-Santana et al. (2005) observed in one population of *Empicoris* from Brazil specimens with alternated combinations of features of both *E. orthoneuron* and *E. errabundus* species. This made them conclude that the diagnostic characters to separate these species were actually variable and therefore both species are synonyms. After the examination of numerous individuals that are intermediate in various aspects we also believe that there is only one very variable species.

Empicoris rubromaculatus (Blackburn, 1889)

(Figs. 3–4)

Ploiariodes rubromaculatus Blackburn, 1889: 349. Hawaii: Mauna Loa.
Ploiariola vitticollis Horváth, 1914: 88.
Empicoris rubromaculatus: McAtee & Malloch (1925: 16); Wygodzinsky (1966: 383); Montero & Chavarria (1969: 179); Maldonado Capriles (1990: 150); Putshkov & Putshkov (1996: 167); Putshkov et al. (1999: 61); Gil- Santana et al. (2005: 137); Forero (2006: 14); Prado (2008): 38; Ishikawa (2008: 15); Putshkov & Moulet (2010: 189); Tatarnic et al. (2011: 23).
Ploiariola rubromaculata: China (1938: 22).
Empicoris rubromaculatus obsoletus McAtee & Malloch, 1925: 132.
Ploiariodes euryale Kirkaldy, 1908: 372.
Ploiariodes californica Banks, 1909: 46.
Ploiariola sagax Horváth, 1914: 642.
Ploiariola froggatti Horváth, 1914: 643.
Ploiariola scotti Distant, 1913: 163.
Empicoris tingitanus Dispons, 1955: 174.
Empicorella tingitana: Dispons & Stichel (1959: 97).
Empicoris microcephalus Villiers, 1960: 28.
Empicorella barcinonis Dispons, 1965: 53.
Empicorella barcinonis balearicus Dispons, 1965: 55.

Material examined. CHILE: Maule Region: 1 ♂ 2 ♀♀ 1 L?, Curicó: 20 km E Potrero Grande, Fundo El Coihue, 23.v.2004, J. E. Barriga leg., fogging s/ *Podocarpus saligna*, 1035 m a.s.l. (MACN); 2 ♂♂ 1 ♀, 1 spec. without abdomen, same data, 25.v.2004 (MACN); 1 ♀, 5 km E Potrero Grande, camino al Relvo, 29.xii.2003, fogging s/ *N. dombeyi* [35º12′21.7″S 70º57′45.6″W], J. E. Barriga leg. (MACN); 1 ♀ 1 spec. without abdomen, El Relvo, 20 km E Potrero Grande, 3.ii.2004, J. E. Barriga leg., 35º11′13″S–70º56′7″E, fogging s/ *Nothofagus dombeyi* (MACN); 6 ♂♂ 4 ♀♀, 3 L?, El Relvo, 20 km E Potrero Grande, 1100 m a.s.l. [35º11′13″S 70º56′7″W], fogging s/ *Nothofagus*

dombeyi, 3.v.2004, J. E. Barriga leg. (MACN); 6 ♂♂ 4 ♀♀ 5 L?, same data, 24.v.2004 (MACN); 1 ♂, same data, 24.i.2004 (MACN); 1 ♀, same data, 16.i.2004, fogging s/ *N. dombeyi*, *C. hystrix*, *Chusquea culeau* and retamo (MACN); 1 ♂ 1 L?, same data, 14.i.2004, fogging s/ *Lomatia dentata*, *Nothofagus obliqua* (MACN); 1 ♂, 20 km E Potrero Grande, El Relvo, 8.ii.2004, fogging s/ *Nothofagus dombeyi* [35º11.13′S 79º56.7′W], J. E. Barriga leg. (MACN); 2 ♀♀, Cerro Huela – Huelan, 10 km E Curicó, iii.1998, Malaise trap, Barriga leg. (MACN); 3 ♀♀, Potrero Grande [35º11′S 71°05′W], 10.ix.1997, J. E. Barriga leg. (MACN).

Distribution. This species has a Pantropical distribution, although it has also entered subtropical and tempered regions (Putshkov et al. 1999). In America it has been recorded from Argentina, Brazil, Colombia, Cuba, Jamaica, Puerto Rico, Uruguay, Venezuela, and the USA, and it is known also from Hawaiian Island (McAtee & Malloch 1925, Wygodzinsky 1966, Putshkov & Putshkov 1996, Forero 2006).

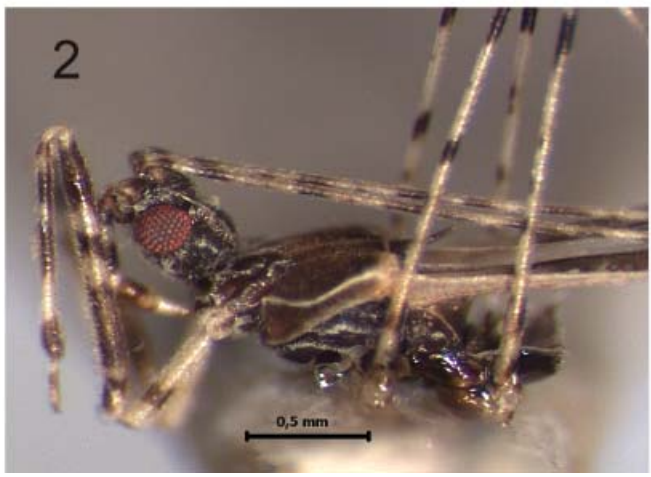
In Chile, *E. rubromaculatus* was recorded from the oceanic Juan Fernandez Islands by Bergroth (1923) and Wygodzinsky (1952, 1966). Prado (2008), following Wygodzinsky (1966), recorded it from continental Chile without more exact data on it. Montero & Chavarria (1969) recorded this species from arboreal flora in central Chile, without more exact data, and later Putshkov et al. (1999) recorded it from Rancagua (Libertador General O'Higgins Region). Herein we provide additional records from continental Chile.

Empicoris culiciformis (De Geer, 1773)

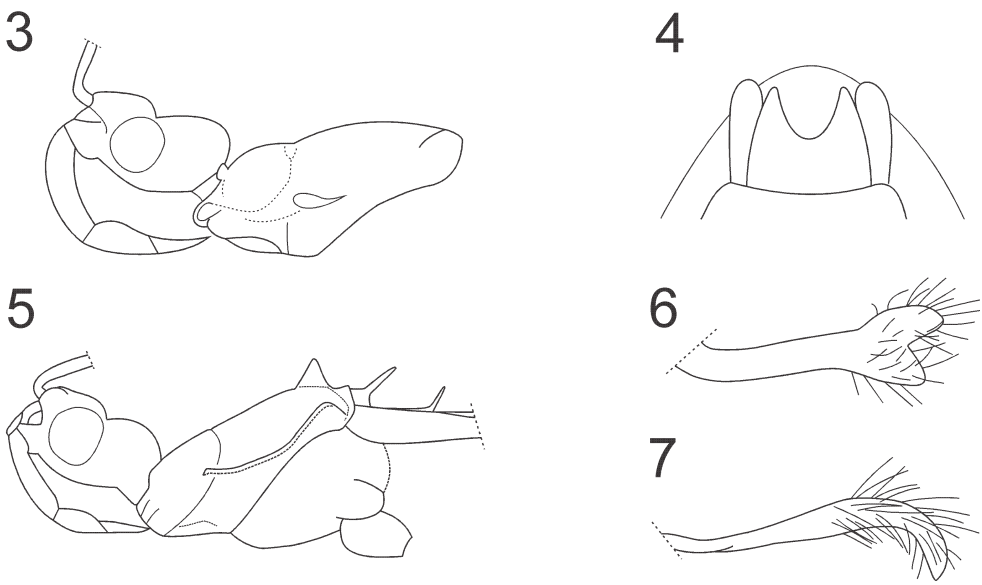
(Fig. 6)

Cimex culiciformis De Geer, 1773: 223. France.
Ploiaria culiciformis: Baerensprung (1860: 21).
Ploiariola culiciformis: Reuter (1888: 713).
Ploiariodes culiciformis: McAtee & Malloch (1922: 95).
Empicoris culiciformis: McAtee & Malloch (1925: 23); Wygodzinsky (1966: 371); Maldonado Capriles (1990: 147); Putshkov & Putshkov (1996: 166); Putshkov et al. (1999: 9); Prado (2008: 38); Putshkov & Moulet (2010: 158).
Ploiaria alata Scopoli, 1786: 51.
Gerris erraticus Fallén, 1807: 117.
Ploiaria erratica: Herrich-Schaeffer (1835: 62).
Ploiaria maculata Haldeman, 1847: 151.
Ploiariola errabunda (misidentification): Banks (1909: 46).
Ploiaria culiciformis var. *noualhieri* Puton, 1887: 101.
Empicoris culiciformis var. *noualhieri*: Dispons & Stichel (1959: 96).
Empicoris thermalis Dispons, 1958: 84.
Empicoris culiciformis italicus Tamanini, 1962: 247.

Distribution. This species shows a cosmopolitan distribution; it is widely distributed in Europe, northern Africa, eastern and middle Asia (Wygodzinsky 1966, Maldonado Capriles 1990, Putshkov & Putshkov 1996, Putshkov et al. 1999). It is quite common in North America (McAtee & Malloch 1925), but in South America it was reported only from Argentina and 'Chile' in general without an exact locality for several times (Wygodzinsky 1966, Maldonado Capriles 1990, Prado 2008). According to Wygodzinsky (1966), it has been probably dispersed worldwide by man.



Figs. 1–2. 1 – *Empicoris vagabundus* (Linnaeus, 1758); 2 – *E. errabundus* (Say, 1832).



Figs. 3–7. 3–4. *Empicoris rubromaculatus* (Blackburn, 1889): 3 – lateral view of head and pronotum; 4 – posterior margin of pygophore. 5 – *E. errabundus* (Say, 1832), lateral view of head and pronotum; 6 – *E. culiciformis* (De Geer, 1773), paramere; 7 – *E. vagabundus* (Linnaeus, 1758), paramere.

Empicoris vagabundus (Linnaeus, 1758)

(Figs. 1, 7)

Cimex vagabundus Linnaeus, 1758: 450. Type locality unknown.
Gerris vagabundus: Fabricius (1794: 192).
Ploiaria vagabundus: Latreille (1802: 249).
[*Empicoris*] *vagabundus*: Wolff (1811: 5).
Ploiariola vagabunda: Reuter (1888: 711).
Empicoris vagabundus: Wygodzinsky (1966: 385); Maldonado Capriles (1990: 151); Putshkov & Putshkov (1996: 169); Putshkov et al. (1999: 57); Putshkov & Moulet (2010: 183).
Empicoris vagabundus var. *vagabundus*: McAtee & Malloch (1923: 163).
Cimex squalidus Gmelin, 1788: 683.
Ploearia erratica: Sahlberg (1848: 149).
Pioiariola canadensis Parshley, 1919: 25.

Material examined. CHILE: Metropolitan Region: 1 ♂ 2 ♀♀, Cajón del Maipo [33º40′S 70′30W], 4.ii.2005, A. Martinez leg. (EIFC). **Maule Region:** 1 ♂, Altos de Vilches [35º30′S 71º10′W], 10.ii.2003, D. Fernández leg. (EIFC); 4 ♀♀, Curicó, El Relvo, 20 km E Potrero Grande, 14.i.2004, J. E. Barriga leg. [35º11′0.8″S 70º55′57.5″W], fogging s/ *Nothofagus dombeyi* (MACN); 1 ♀, same data, fogging s/ *Lomatia dentata*, *Nothofagus obliqua* (MACN); 2 ♀♀, El Relvo, 20 km E Potrero Grande, 3.ii.2004, J. E. Barriga leg. [35º11′13″S 70º56′7″W], fogging s/ *Nothofagus dombeyi* (MACN).

Distribution. This species has a Holarctic distribution (Europe from Scandinavia to the Mediterranean, from England to southern Russia), Siberia, Canada (British Columbia), and the USA (Putshkov & Putshkov 1996, Puthskov et al. 1999). Here we add the first record from the Andean Region in Chile.

Remarks. Considering the geographic distribution of this species, its presence in Chile is rather curious, although the characteristics of the specimens examined match perfectly the diagnostic characters given by Wygodzinsky (1966) and Putshkov et al. (1999). We consider *E. vagabundus* a new alien species of Heteroptera in Chile.

In the last years, several Heteroptera have been cited for the first time in Central Zone of Chile: the reduviids *Zelus renardii* Kolenati, 1857 (Curkovic et al. 2004) and *Zelus cervicalis* Stål, 1872 (Elgueta & Carpintero 2004) [Prado (2008) cited this record as a misidentification of *Z. renardii*]; and the pentatomid *Loxa deducta* Walker, 1867 (Mondaca et al. 2008). Faúndez & Verdejo (2009) explained that some changes in abundance and composition of central Chilean fauna could be due to the extensive use of these territories for crops after 1900. This current scenario (i.e. without native plants) is propitious for the introduction, establishment, and posterior expansion and colonization of exotic species.

Key to the Chilean species of *Empicoris* Wolff, 1811

1 Lateral carina of hind lobe of pronotum distinguishable at anterior portion only (Fig. 3); apex of pterostigma generally reddish; posterior margin of pygophore deeply emarginate (Fig. 4). ..... ***E. rubromaculatus*** (Blackburn, 1889)
– Lateral carina of hind lobe of pronotum complete (Fig. 5); pterostigma only rarely reddish at apex; posterior margin of process of pygophore not deeply emarginate. 2
2 Hind wings conspicuously spotted apically; lateral carina of pronotum in most specimens with a small projecting process; pterostigma more or less extensively darkened. .... ***E. errabundus*** (Say, 1832)
– Hind wings not spotted apically; lateral carina of pronotum lacking anterior projection; pterostigma darkened or not. 3
3 Pterostigma with two or three dark spots; parameres bilobed apically (Fig. 6). .... ***E. culiciformis*** (De Geer, 1773)
– Pterostigma uniformly whitish; parameres pointed apically (Fig. 7). .... ***E. vagabundus*** (Linnaeus, 1758)

Discussion

The genus *Empicoris* is represented in Chile by four species; two of them represent new records for the country: *E. errabundus* and *E. vagabundus*. The latter species also represents the first record for the Andean Region (Morrone 2001). Apparently, several species of *Empicoris* have been distributed by man beyond their original range.

One important thing to highlight is that most of the species of *Empicoris* were found in the same locality and on the same trees. These facts show that in Chile, *Empicoris* species might be found in sympatry. Most of the specimens from Maule Region were caught fogging native trees as *Podocarpus saligna* D. Don. (Podocarpaceae), *Nothofagus oblique* (Mirb.) Oerst., *N. dombeyi* (Mirb.) Oerst. (Nothofagaceae), *Colletia hystrix* Clos (Rhamnaceae), *Chusquea culeou* E. Desv. (Poaceae), *Lomatia dentata* (Ruiz & Pav.) R. Br. (Proteaceae), and 'retamo'. It is well possible that *E. errabundus* and *E. vagabundus* had first arrived in

crop zones because of the permanent human action; and after establishing in those areas they colonized the native ecosystems, but more evidence is needed to explain their appearance in the region. Presence of these two species in Central Chile could affect the native ecosystems, and/or will be beneficial as a pest control; therefore further research on the biology of the species in Chile is needed.

The localities known for *Empicoris* in continental Chile suggest that this genus is probably distributed across the Central Chilean Subregion (Morrone 2001); but more sampling efforts, especially in other regions of the country, and further research are needed to establish a more accurate knowledge of the distribution of the genus in continental Chile.

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