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## Original article

## An annotated catalogue of the subfamily Orthotyliinae (Hemiptera: Heteroptera: Miridae) from the Korean Peninsula

Q7 Sunghoon Jung<sup>a,\*,1</sup>, Junggon Kim<sup>a,1</sup>, Ram Keshari Duwal<sup>b</sup><sup>a</sup>Laboratory of Systematic Entomology, Department of Applied Biology, College of Agriculture and Life Sciences, Chungnam National University, Daejeon, South KoreaQ1 <sup>b</sup>Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan

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## ABSTRACT

This paper provides an annotated catalogue of the plant bugs, subfamily Orthotyliinae (Heteroptera: Miridae) from the Korean Peninsula. In this study, a total of 41 species are enumerated, including four new records from the Korean Peninsula: *Heterocordylus alutaceus* Kulik 1965, *Malacocorisella endoi*, *Orthotylus interpositus*, and *Strongylocoris leucocephalus*. Distribution data and bibliographical references of each taxon are included. Biological notes (e.g. host and/or habitat) based on the local specimens of the Korean Peninsula are also presented.

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## Introduction

The family Miridae (Hemiptera: Heteroptera) is the most diverse group of true bugs, with currently more than 11,000 described species belonging to 1,200 genera worldwide (Schuh 1995). The Korean Miridae fauna was investigated and described in the late 1900s by heteropteran taxonomists Josifov (1976, 1977, 1983, 1987, 1992), Josifov and Kerzhner (1972, 1984), and Kerzhner (1988a,b).

A few studies have been accomplished to clarify fauna of the subfamily Orthotyliinae recently from the Korean Peninsula [e.g., Kwon et al (2001), Jung et al (2010), Kim and Jung (2016a,b)]. Among the orthotyliines, some phytophagous species are reported as insect pests of fruits and grasses (Wheeler 2000a), while some are known as zoophagous; *Cyrtorhinus lividipennis* preys on eggs, nymphs, or adults of planthoppers, aphids, etc. (Yasunaga 1999; Wheeler 2000b).

In this paper, the subfamily Orthotyliinae from the Korean Peninsula are catalogued and updated. A total of 41 species are listed, including four newly recorded species from the Korean

Peninsula and three species reported from South Korea for the first time. In addition, distributional data, bibliographical references, and some biological notes for each species are provided.

## Materials and methods

Most specimens observed in this study were collected by the authors. Additionally, North Korean specimens including type materials collected by the late Dr Josifov and the late Dr Kerzhner were also observed for reference, which are now deposited at Chungnam National University, Daejeon, Korea (Jung et al 2015). Most taxa listed in this study were identified using morphological external key characters and male genitalia. The genital examinations were performed as detailed in Jung et al (2011).

Examined specimens are deposited at Insect Collections in Chungnam National University. Distribution and host plants with an asterisk (\*) indicate a new record of that region and/or a new host plant.

For each species, synonyms with their bibliographical data and distribution are provided. Biological data based on the Korean specimens (mostly direct observations by authors) and the relevant documents are also presented. Information on type specimens is detailed in the Catalogue of Palaearctic Heteroptera (Kerzhner and Josifov 1999). Detailed references regarding faunal records of the Korean Peninsula (before 2000) are presented in Kwon et al (2001).

\* Corresponding author.

E-mail address: [jung@cnu.ac.kr](mailto:jung@cnu.ac.kr) (S. Jung).

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**Taxonomic accounts**

Subfamily Orthotylinae Van Duzee 1916

**Remarks.** The recent molecular phylogenetic study indicated that the subfamily Orthotylinae is not a monophyletic group [see Jung and Lee (2012) for details].

Tribe Coridromiini Tatarnic and Cassis 2012

Genus *Coridromius* V. Signoret 1862

1. ***Coridromius chinensis*** Liu and Zhao 1999

*Coridromius chinensis* Liu and Zhao 1999: 57; Kim and Jung 2016b: 253.

*Coridromius bufo* Miyamoto and Yasunaga 1999: 33.

**Specimen examined.** 2♂♂3♀♀, Jocheon-eub, Jeju-si, Jeju-do, South Korea, 5 ix 2015, on *Mallotus japonicus* (JG Kim).

**Distribution.** Korea (Jeju Is.), China (South Eastern), Japan, Taiwan, Indomalaya, Australia.

**Hosts.** *Macaranga* sp. (Euphorbiaceae), *Mallotus japonicus* (Euphorbiaceae) (Tatarnic and Cassis 2008; Kim and Jung 2016c).

Tribe Halticini A. Costa 1853

Genus *Ectmetopterus* Reuter 1906

2. ***Ectmetopterus comitans*** (Josifov and Kerzhner 1972)

*Halticus comitans* Josifov and Kerzhner 1972: 167.

**Specimens examined.** 5♂♂7♀♀, Gung-dong, Yuseong-gu, Chungcheongnam-do, South Korea 11 vi 2014 (JG Kim).

**Distribution.** Korea, China (Central, North), Russia (Far East).

**Hosts.** Unknown.

**Remarks.** This species might be related to *Chenopodium* spp. (Amaranthaceae), as most materials were collected from random sweepings on those plants.

3. ***Ectmetopterus micantulus*** (Horváth 1905)

*Halticus micantulus* Horváth 1905: 422.

*Ectmetopterus angusticeps* Reuter 1906: 60.

**Specimen examined.** 9♂♂11♀♀, Gung-dong, Yuseong-gu, Chungcheongnam-do, South Korea 23 ix 2014, (JG Kim); 2♂♂4♀♀, Yanggu-gun, Gangwon-do, South Korea 17 vii 2015 (JG Kim).

**Distribution.** Korea, China (Central, North, South Eastern, South Western), Japan.

**Hosts.** *Cucumis* spp. (Cucurbitaceae), *Glycine* spp. (Fabaceae) [for details see Kwon et al (2001)].

Genus *Halticus* Hahn 1833

4. ***Halticus apterus koreanus*** Josifov 1987

*Halticus apterus koreanus* Josifov 1987: 115.

**Specimen examined.** 1♂ (Holotype), Samjiyon, Ryanggan-do, North Korea 28 viii 1977 (M Josifov); 2♂♂1♀ (Paratypes), same data as holotype.

**Distribution.** Korea (North), Russia (Far East).

**Hosts.** Unknown.

5. ***Halticus bicoloratus*** Kulik 1965

*Halticus bicoloratus* Kulik 1965: 1504.

**Specimen examined.** 3♀♀, Seoguipo-si, Jeju-do, South Korea 11 v 2007, on *Setaris* sp. (SH Jung).

**Distribution.** Korea (South), Japan, Russia (Far East).

**Hosts.** Unknown.

6. ***Halticus insularis*** Usinger 1946

*Halticus insularis* Usinger 1946: 85.

**Specimen examined.** 2♂♂, Jungmun-dong, Seoguipo-si, Jeju-do, South Korea, 3 ix 2015 (JG Kim).

**Distribution.** Korea, Japan, Taiwan, Micronesia (Oriental Region).

**Hosts.** Various plants [e.g. Convolvulaceae, Cucurbitaceae and Fabaceae; for details see Kwon et al (2001)].

Genus *Labops* Burmeister 1835

7. ***Labops sahlbergi*** (Fallén 1829)

*Capsus sahlbergi* Fallén 1829: 116.

*Labops diopsis* Burmeister 1835: 279.

**Specimen examined.** 1♂3♀♀, Mt. Baekdu (alt. 1900m), Samjiyeon, Yanggang-do, North Korea 26 viii 1977 (M Josifov).

**Distribution.** Korea, China (North Eastern, North), Russia (East Siberia, Far East, West Siberia), Kazakhstan, Europe.

**Hosts.** Unknown.

Genus *Orthocephalus* Fieber 1858

8. ***Orthocephalus funestus*** Jakovlev 1881

*Orthocephalus funestus* Jakovlev 1881: 195.

*Orthocephalus beresovskii* Reuter 1906: 57.

**Specimen examined.** 6♂♂11♀♀, Manak-ri, Jinsan-myeon, Geumsan-gun, Chungcheongnam-do, South

Korea 2 v 2014 (JG Kim); 3♂♂7♀♀, Sinbok-ri, Okcheon-myeon, Yangpyeong-gun, Gyeonggi-do, South Korea 16 v 2015 (JG Kim).

More than 2,000 specimens from South Korea (whole region) were observed.

**Distribution.** Korea, China (Central, North Eastern, North, South Western), Japan, Mongolia, Russia (Far East).

**Hosts.** *Artemisia gigantea*, *Artemisia stelleriana*, *Artemisia vulgaris* (Asteraceae) (Kerzhner 1978; Kwon et al 2001).

**Remarks.** Our collection data indicated that all the male specimens are macropterous. Most females are brachypterous, a few of which are macropterous.

Genus *Strongylocoris* Blanchard 1840

9. ***Strongylocoris leucocephalus*** (Linnaeus 1758)

*Cimex leucocephalus* Linnaeus 1758: 446.

*Cimex decrepitus* Fabricius 1794: 125.

*Strongylocoris leucocephalus* var. *sibiricus* Reuter 1891: 28.

**Specimen examined.** 1♂, Dopyeong-ri, Idong-myeon, Pocheon-si, Gyeonggi-do, South Korea, 4 vi 2016 (WG Kim).

**Distribution.** Korea (South)\*, Japan, China (North), Russia (East Siberia, Far East, West Siberia), Mongolia, Armenia, Azerbaijan,

Georgia, Kazakhstan, Turkey, Iran, Europe.

**Hosts.** *Asperula involuocrata* (Rubiaceae), *Campanula* sp. (Campanulaceae) (Hoberlandt 1956; Gollner-Scheiding 1972).

Tribe Orthotylini Van Duzee 1916

Genus *Bagionocoris* Josifov 1992

10. ***Bagionocoris alienae*** Josifov 1992

*Bagionocoris alienae* Josifov 1992: 113.

**Specimen examined.** 4♂♂1♀ (Paratypes), Mt. Pagon 20 km NE of Kaesong-si, North Korea 28 v 1987 (M Josifov).

**Distribution.** Korea (North).

**Hosts.** *Quercus aliena* (Fagaceae) (Josifov 1992).

Genus *Blepharidopterus* Kolenati 1845

11. ***Blepharidopterus diaphanus*** (Kirschbaum 1856)

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