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Research Article

## Two newly recorded species of the tribe Platylabini (Hymenoptera: Ichneumonidae, Ichneumoninae) from Iran

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**Abstract:** The tribe Platylabini (Hymenoptera: Ichneumonidae, Ichneumoninae) of Alborz, Guilan and Tehran provinces (North central Iran) was taxonomically studied. The specimens were collected using Malaise traps during March to November 2010–2011. Four species were identified including: *Apaeticus bellicosus* Wesmael, 1845, *Platylabus iridipennis* Gravenhorst, 1829, *Apaeticus inimicus* (Gravenhorst, 1820) and *Linyctus exhortator* (Fabricius, 1787) of which *A. inimicus* and *L. exhortator* are recorded for the first time from Iran. An updated checklist of Platylabini in Iran, as well as diagnostic characters of the newly recorded species is presented.

**Keywords:** New record, Ichneumoninae, Platylabini, Taxonomy, Iran

### Introduction

The Ichneumonidae Latreille, 1802 is the largest family of insects with an estimated number of 60000 species in the world (Aguiar *et al.*, 2013). The Ichneumoninae with almost 4300 known species is the second largest subfamily in the Ichneumonidae (after Cryptinae), and has a worldwide distribution. This subfamily is divided into 15 tribes (Yu *et al.*, 2012), of which tribe Platylabini Berthoumieu, 1904 includes 38 genera worldwide and 16 genera have been recorded from the western Palaearctic region (Tereshkin, 2009; Yu *et al.*, 2012). The species of Platylabini are mainly parasitoids of the Lepidopteran families, Geometridae and Drepanidae. The female parasitoid lays its eggs into the body of lepidopteran larvae (Perkins, 1960; Tereshkin, 2009). Morphological terminology follows Tereshkin (2009). Members of the tribe Platylabini

are recognizable by having convex clypeus, widened and dorsally flattened petiolus and amblypygous abdomen (Riedel, 2008; Tereshkin, 2009). In recent years, considerable progress has been made in understanding the taxonomy of different subfamilies of Ichneumonidae in Iran (Barahoei *et al.*, 2012, 2013; Mohammadi-Khoramabadi *et al.*, 2011; 2013a, b; Amiri *et al.*, 2015a, b; 2016 a, b; 2017; Mohebban *et al.*, 2015, 2016). Prior to this study, 10 species of the tribe Platylabini were recorded from Iran (Kolarov and Ghahari, 2008; Ghahari and Jussila, 2010, 2011, 2012; Ghahari and Schwarz, 2012; Ghahari 2014; Ghahari and Gadallah, 2015; Mohebban *et al.*, 2015, 2016). However, many more species presumably exist in Iran to be discovered. The objective of this study as a part of our ongoing research on the Ichneumoninae fauna of Iran is to improve our knowledge of the tribe Platylabini. The results may be useful for future biological control of insect pests and ecological studies.

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### Materials and Methods

Malaise traps were used in different places including Ghazichak, Eshman Kamachal, Orkom,

Ziaz located in Guilan province and Arangeh, Sarziarat, Shahrestanak, Karaj in Alborz province and Shahriar in Tehran province during March to November 2010 and 2011. The specimens were treated with a mixture of Alcohol (60%) /Xylene (40%) for two days and with Amyl acetate for the next two days (AXA) and finally placed on the filter paper for drying (van Achterberg, 2009). The dried specimens were then mounted on triangular point cards. Morphological terminology predominantly follows Tereshkin (2009). Relevant literature were used for the identification of the specimens (Perkins, 1960; Tereshkin, 2009; Riedel, 2008). Illustrations were made using an Olympus™ AX70 microscope and Olympus™ SZX9 stereomicroscope equipped with a Sony™ digital camera. A series of 10–15 captured images were merged into a single in-focus image using the image-stacking software ZereneStacker version 1.04. The specimens are deposited at the Collection of Department of Entomology, Tarbiat Modares University (TMUC), Tehran, Iran, and the personal collection of M. Riedel.

## Results

Four species belonging to three genera of the tribe Platylabini were collected and identified, of which two species, e.g. *Apaeticus inimicus* (Gravenhorst, 1820) and *Linytus exhortator* (Fabricius, 1787) are new records for the Iranian fauna. The results of this study and review of the previously recorded taxa documented the existence of 12 species of the tribe Platylabini in Iran.

### *Apaeticus bellicosus* Wesmael, 1845

**Material examined:** Iran, Alborz province, Shahrestanak, (35°58'12" N, 51°21'24" E, 2225 m a.s.l.), Malaise trap, 09.VIII.2010, 2♀, leg.: M. Khayrandish.

**General distribution:** Palaearctic (Yu *et al.*, 2012), Iran (Ghahari and Gadallah, 2015, 2016; Mohebban *et al.*, 2015, 2016).

### *Apaeticus inimicus* (Gravenhorst, 1820) (Figs. 1 A–I)

**Material examined:** Iran, Alborz province, Arangeh (35°55'06" N, 51°05'12" E, 1891 m

a.s.l.), Malaise trap, 09.VIII.2010, 1♀, 18.VIII.2010, 1♀, 22.IX.2010, 1♀; Shahrestanak (35°58'12" N, 51°21'24" E, 2225 m a.s.l.), Malaise trap, 09.VIII.2010, 2♀, 18.VIII.2010, 2♀, 24. VIII.2010, 1♀, 22.IX.2010, 1♀; Guilan province, Eshamn Kamchal (37°22'06" N, 49° 57' 54" E, 1 m a.s.l.), Malaise trap, 06.IX.2010, 1♀; Ziaz (36°52'30" N, 50° 13' 24" E, 490 m a.s.l.), Malaise trap, 17.V.2010, 1♀, Leg.: M. Khayrandish.

**General distribution:** Western Palaearctic, Iran (new record).

**Morphological characters (female):** Body length 5–6mm; vertex from lateral view sharply sloping just after the ocelli (Fig. 1D); temples moderately long, sinuously narrowed behind eyes (Fig. 1A); occipital carina meeting with hypostomal carina at base of mandible (Fig. 1C); face strongly protruding, narrow, in middle narrower than lateral area (Fig. 1B), clypeus transverse, convex and rounded lateral corners; mandibles gradually narrowed to apex; malar space 0.1 times as long as basal width of mandibles; flagellum with 30 segments, white semiannulus on segments 6–10 (11), basal flagellomere 2.3 times longer than width at apex; mesonotum moderately convex and scarcely punctuated (Fig. 1A); scutellum slightly convex, laterally carinated up to middle, dorsal surface densely punctured, without microsculpture (Fig. 1E); transverse furrow of pronotum shallow; mesonotum moderately convex, 0.73 times wider than length; notauli distinct almost to middle (Figs. 1A, F); mesopleura very densely punctured, without microsculpture (Fig. 1F); area superomedia hexagonal, 1.4 times wider than length; costulae present; dentiparal area with tooth at apex; propodeal spiracle small, roundish, 2 times longer than width (Fig. 1E); fore wing with pentagonal areolet, rather symmetrical, narrow in front; first tergite without dorsal carinae, its surface punctured (Fig. 1G); gastrocoeli deep; thyridia distinct, very slightly oblique and close to base of tergite, interval wider than thyridia width (Fig. 1G); surface of second and third tergites, densely punctured (Fig. 1I); tergites 6 and 7 hidden extended under 5<sup>th</sup> tergite and thus

abdomen from above truncated; ovipositor sheath short, almost pointed apically (Fig. 1H).

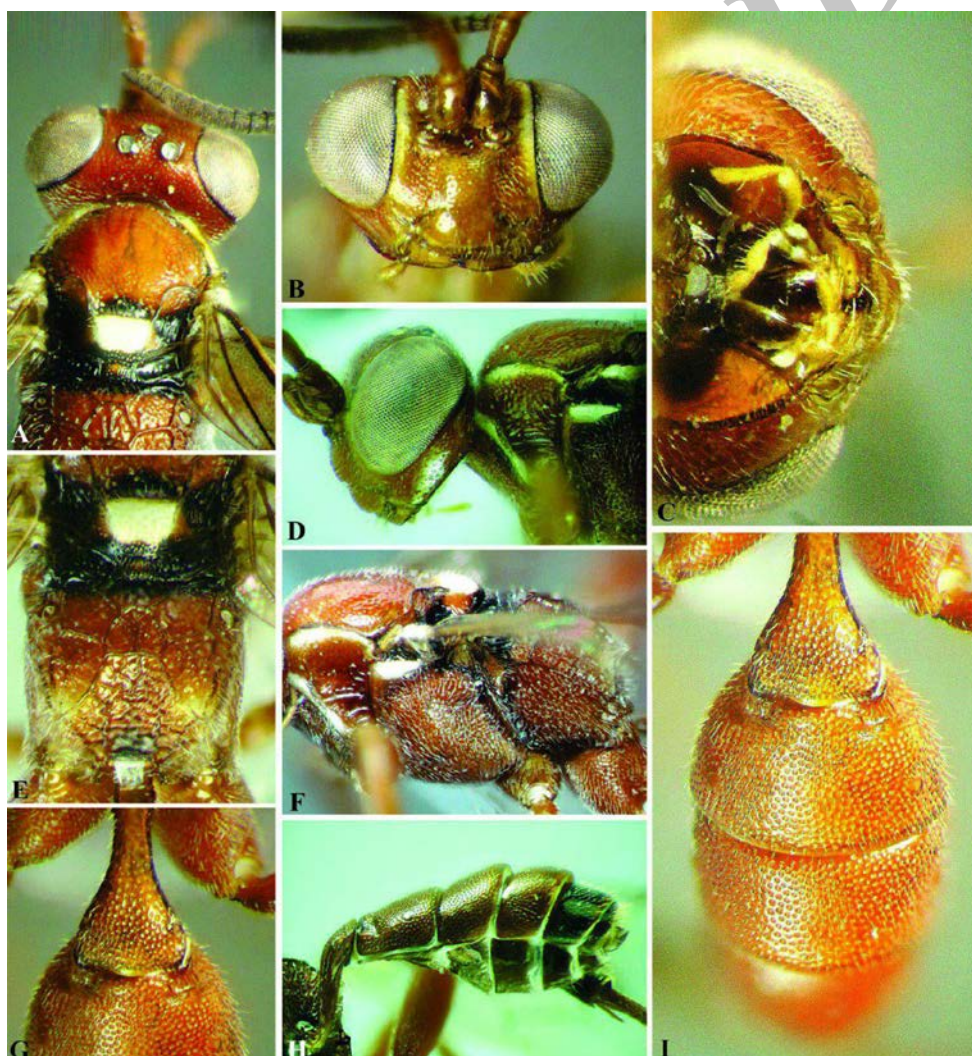
**Coloration:** Body reddish with ivory pattern; posterior margins of pronotum, spots on propodeum, subalarum and tegula red; post scutellum black; all legs red; tergites 5 and 6 black.

**General distribution:** Western Palaearctic (Yu et al., 2012), Iran (**new record**).

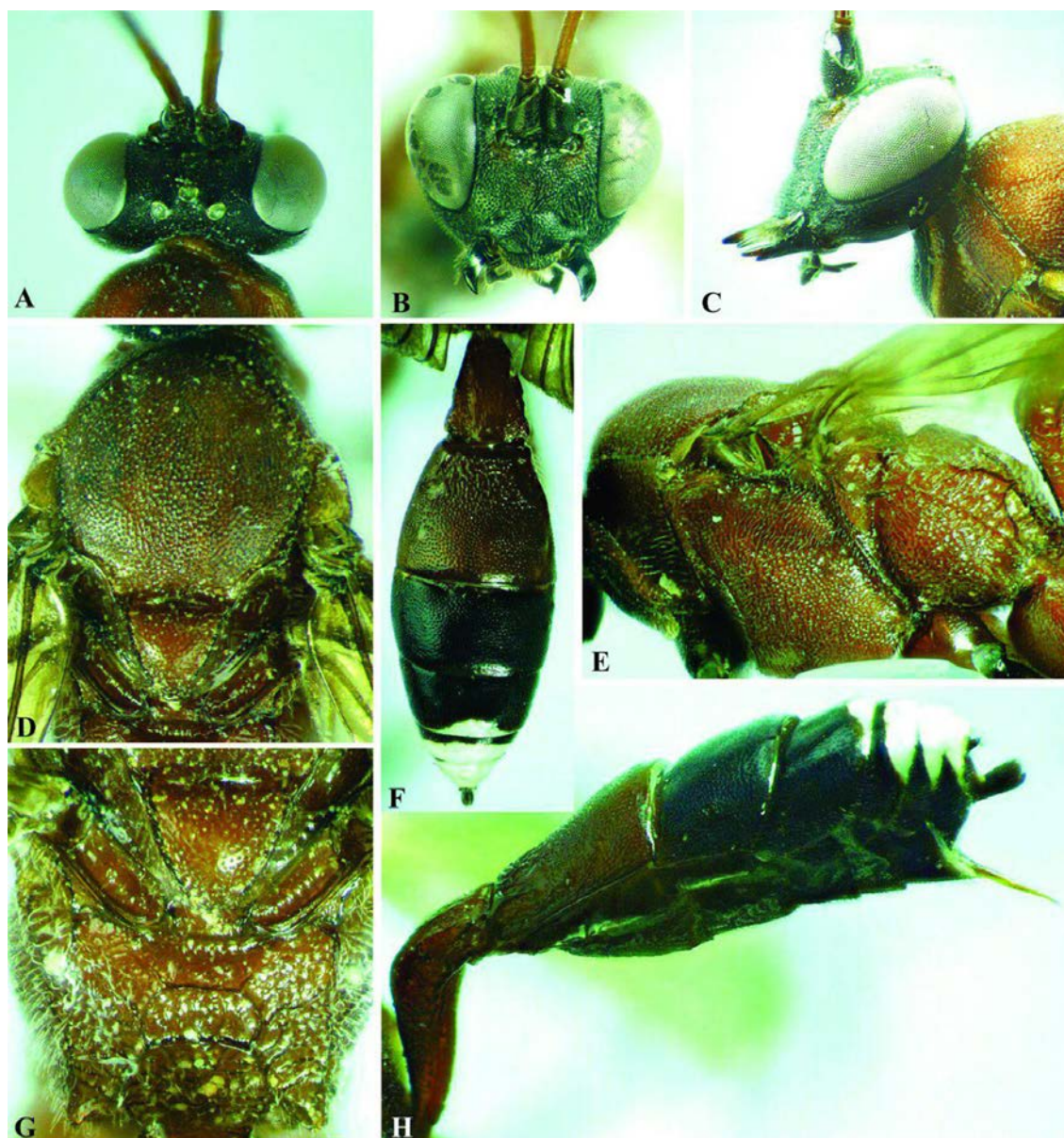
***Linyces exhortator* (Fabricius, 1787) (Figs. 2A–H)**

**Material examined:** Iran, Alborz province, Arangeh (35°55'06" N, 51°05'12" E, 1891 m a.s.l.), Malaise trap, 01.VI.2010, 1♂; Sarziar

(35°55'12" N, 51°06'54" E, 1980 m a.s.l.), Malaise trap, 08.VI.2010, 1♀, 18.VIII.2010, 3♂; Shahrestanak, Malaise trap (35°57'36" N, 51°22'18" E, 2301 m a.s.l.), Malaise trap, 17.V.2010, 2♂; Guilan province, Ghazichak (36°45'54" N, 50° 19' 36" E, 1803 m a.s.l.), Malaise trap, 10.V.2010, 1♂, 24.V.2010, 1♀, 2♂; Orkom (36°45'42" N, 50° 18' 12" E, 1235 m a.s.l.), Malaise trap, 12.IV.2010, 1♂, 24.V.2010, 1♀, 21.VI.2010, 1♀, 19.VII.2010, 1♀; Tehran province, Shahriar (35°40'06" N, 50°56'54" E, 1168 m a.s.l.), Malaise trap, 04.V.2010, 1♀, leg.: M. Khayrandish.



**Figure 1** *Apaeleticus inimicus* (Gravenhorst, 1820), A) head, dorsal view; B) head, frontal view; C) head, ventral view; D) head, lateral view; E) propodeum, dorsal view; F) mesosoma, lateral view; G) first metasomal tergite, dorsal view; H) metasomal tergites, lateral view; I) metasomal tergites, dorsal view.



**Figure 2** *Linyces exhortator* (Fabricius, 1787), A) head, dorsal view; B) head, frontal view; C) head, lateral view; D) mesonotum and scutellum; E) mesosoma, lateral view; F) propodeum, dorsal view; G) metasomal tergite, dorsal view; H) metasomal tergite, lateral view.

**Morphological characters (female):** Body length 7.1–7.5 mm; middle field of face distinctly, but slightly elevated, narrow, medially 1.5 times narrower than lateral area (Fig. 2B); clypeus with straight front margin, strongly transversal, 2.7 times wider than length, distinctly separated from middle field of face; mandibles gradually and strongly narrowed behind base (Figs. 2B, 2C);

temples from above, very strongly roundly narrowed behind eyes (Fig. 2A); malar space approximately 1.5 times shorter than mandible base width; flagellum with 33 segments, strongly and gradually attenuated toward apex, with white semiannulus on segments 5–9; mesonotum strongly convex, of equal length and breadth, notauli sharp, extend behind middle of

mesonotum; (Fig. 2D); scutellum strongly convex, from above triangular, laterally sharply carinated up to apex (Fig. 2D), transverse furrow of pronotum narrow and deep (Fig. 2A); lower part of mesopleura smoothly longitudinally wrinkly-punctured, shining, without microsculpture (Fig. 2E); area superomedia transversal, rounded in front; costulae approximately at its middle (Fig. 2F), propodeal spiracle small, circular; areolet distinctly pentagonal, slightly asymmetrical; hind femur length 3.2 times its maximum width; form of abdomen from above rhomboidal (Fig. 2G); gastrocoeli shallow, distance between gastrocoeli at base equal to width of middle field of postpetiolus; thyridia well developed.

**Coloration:** Head black; most part of body mainly ferruginous; tergites 3–7 darkened, tergites 4-7 with white membranous apex; apices of hind femora, tibiae and tarsi darkened.

**General distribution:** Palaearctic (Yu *et al.*, 2012), Iran (**new record**).

***Platylabus iridipennis* (Gravenhorst, 1829)**

**Material examined:** Iran, Tehran province, Shahriar (35°40'06" N, 50°56'54" E, 1168 m a.s.l.), Malaise trap, 04.V.2010, 1♀, leg.: M. Khayrandish.

**General distribution:** Palaearctic, (Yu *et al.*, 2012); Iran (Ghahari and Schwarz, 2012; Mohebban *et al.*, 2016).

## Discussion

Iran is located in the eastern border of western Palaearctic region, at the crossroads between the Palaearctic, Oriental and Afrotropical regions (Firouz, 2005), and thus its fauna includes elements of all three regions. All species that have been recorded in this study have previously been reported from the Palaearctic region. Previous taxonomic studies on other subfamilies of Ichneumonidae in southern Iran has shown that some species found in Iran are same as those distributed in Afrotropical and Oriental regions (Amiri *et al.*, 2015b, 2016a). The distribution and biology of the majority of Iranian Ichneumoninae wasps are not well known (Masnadi-Yazdinejad *et al.*, 2010). The results of this study and review of the previously recorded Platylabini revealed the existence of 12 species belonging to six genera in Iran (Table 1), which comprise a very small record, comparing more than 212 species in the western Palaearctic region (Yu *et al.*, 2012). The number of species of the tribe Platylabini in the adjacent countries of Iran is recorded as: 74 species in former USSR, nine species in Turkey, and one species in Tajikistan. There is no species recorded in Turkmenistan, Armenia and Afghanistan (Yu *et al.*, 2012). Since many areas of Iran remain unexplored, we expect that the Platylabini fauna of Iran will be substantially increased by further research.

**Table 1** Updated checklist of the tribe Platylabini species known in Iran.

Species	Distribution in Iran (provinces)	References
<i>Apaeticus bellicosus</i>	Lorestan, Kerman, Alborz	Ghahari and Gadallah (2015), Mohebban <i>et al.</i> , (2015, 2016), Current study
<i>Apaeticus inimicus</i> *	Alborz, Guilan	Current study
<i>Cyclolabus nigricollis</i>	Ardabil, Guilan	Kolarov and Ghahari (2008), Ghahari and Jussila (2010)
<i>Cyclolabus pactor</i>	Mazandaran	Kolarov and Ghahari (2008)
<i>Ectopius rubellus</i>	Mazandaran, West Azarbaijan	Kolarov and Ghahari (2008), Ghahari and Jussila (2011)
<i>Hypomecus quadriannulatus</i>	Khuzestan	Kolarov and Ghahari (2008)
<i>Linyx exhortator</i> *	Alborz, Guilan, Tehran	Current study
<i>Platylabus cornicula</i>	Semnan	Kolarov and Ghahari (2008)
<i>Platylabus heteromallus</i>	East Azarbaijan	Ghahari and Jussila (2010)
<i>Platylabus iridipennis</i>	Lorestan, Kerman, Qazvin, Tehran	Mohebban <i>et al.</i> (2016), Ghahari and Schwarz (2012), Current study
<i>Platylabus rufus</i>	Mazandaran	Kolarov and Ghahari (2008)
<i>Platylabus tricingulatus</i>	Golestan	Kolarov and Ghahari (2008), Tehran (Ghahari, 2014)

\* New records for the Iranian insect fauna.

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## گزارش جدید دو گونه از قبیله *Platylabini* (Hymenoptera, Ichneumonidae, Ichneumoninae) از ایران

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**چکیده:** زنبورهای قبیله (*Platylabini* (Hymenoptera, Ichneumonidae, Ichneumoninae) در استان‌های البرز، گیلان و تهران مورد مطالعه قرار گرفت. نمونه‌ها با استفاده از تله مالیز در طی ماه‌های اسفند تا آبان سال‌های ۱۳۸۹ و ۱۳۹۰ جمع‌آوری شدند. چهار گونه شامل *Apaeleticus bellicosus* Wesmael, 1845 *Platylabus iridipennis* Gravenhorst, 1829 *Apaeleticus inimicus* (Gravenhorst, 1820) و *Linyctus exhortator* (Fabricius, 1787) شناسایی شد که از بین آنها دو گونه *A. inimicus* و *L. exhortator* برای اولین بار از ایران گزارش می‌شوند. لیست به‌روز شده قبیله *Platylabini* به‌همراه خصوصیات افتراقی گزارش‌های جدید از ایران ارائه شده است.

**واژگان کلیدی:** گزارش جدید، *Platylabini*, *Ichneumoninae*, تاکسونومی، ایران

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