



## First report of the occurrence of the genus *Pantolyta* Foerster, 1856 (Hymenoptera: Diapriidae) from Iran

Mohammad Izadizadeh<sup>1</sup>, Ali Asghar Talebi<sup>1\*</sup>, Victor Kolyada<sup>2</sup>, Samira Farahani<sup>3</sup>, Farzaneh Kazerani<sup>3</sup> & Ali Ameri<sup>4</sup>

1 Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran. [mohammad.izadizadeh@modares.ac.ir](mailto:mohammad.izadizadeh@modares.ac.ir); [talebia@modares.ac.ir](mailto:talebia@modares.ac.ir)

2 Paleontological Institute, Russian Academy of Sciences, 123 Profsoyuznaya Str., Moscow, 117997, Russia. [proctos@gmail.com](mailto:proctos@gmail.com)

3 Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization, Tehran, Iran. [s.farahani@rifr-ac.ir](mailto:s.farahani@rifr-ac.ir); [farzane.kazerani@gmail.com](mailto:farzane.kazerani@gmail.com)

4 Insect Taxonomy Research Department, Iranian Research Institute of Plant Protection, Agricultural Research, Tehran, Iran. [ameri@iripp.ir](mailto:ameri@iripp.ir)

**ABSTRACT.** During our studies on the family Diapriidae, two species of the genus *Pantolyta* Foerster, 1856 were collected and identified for the first time from Iran: *Pantolyta pallida* Kieffer, 1908 and *Pantolyta nixonii* Macek, 1993. A key to the Iranian species of the genus *Pantolyta* and diagnostic characters for both newly recorded species are provided along with illustrations. In addition, distribution map of the two species in the Palearctic region is presented.

**Received:**

03 August, 2020

**Accepted:**

20 October, 2020

**Published:**

24 October, 2020

**Subject Editor:**

Vasilisa Chemyreva

**Key words:** Pantolytini, *Pantolyta pallida*, *Pantolyta nixonii*, key, description, distribution

**Citation:** Izadizadeh, M., Talebi, A.A., Kolyada, V., Farahani, S., Kazerani, F. & Ameri, A. (2021) First report of the occurrence of the genus *Pantolyta* Foerster, 1856 (Hymenoptera: Diapriidae) from Iran. *Journal of Insect Biodiversity and Systematics*, 7 (1), 51–58.

### Introduction

Diapriidae is a large family of Diaprioidea Haliday, 1833 with more than 2100 species and worldwide distribution. This family includes three subfamilies: Ambositrinae Masner, 1961, Belytinae Foerster, 1856 and Diapriinae Haliday, 1833 (Sharkey et al., 2012). The subfamily Belytinae with more than 50 genera and about 700 species is cosmopolite and prefer wet and shady habitats such as forests, marshlands, peatbogs and wet meadows (Quadros & Brandao, 2017). Biology and host association of the subfamily Belytinae is poorly known. As far as is known, species of the subfamily Belytinae are larval and pupal endoparasitoids of Mycetophilidae and Sciaridae (Diptera) (Nixon, 1957; Huggert, 1979; Yoder, 2007) with exclusion of some *Synacra* species on *Musca domestica* (Muscidae) (Floate et al., 1999), but according to Hellqvist (1994), larval instars are the preferred host stages for parasitism by members of Belytinae. In addition, some species have been reported in association with ant

Corresponding author: Ali Asghar Talebi, E-mail: [talebia@modares.ac.ir](mailto:talebia@modares.ac.ir)

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nests (Nixon, 1957; Huggert, 1979). Members of this subfamily are classified in three tribes: Belytini Foerster, 1856, Oxylabini Kozlov, 1978 and Pantolytini Hellen, 1964 (Kozlov, 1978). In the next studies, Macek (1989) and Chemyreva (2019) reexamined the subfamily Belytinae and reclassified this subfamily into three tribes (e.g., Belytini Foerster, 1856, Cinetini Macek, 1989 and Pantolytini Hellen, 1964). The tribe Pantolytini includes 11 genera in Palaearctic region: *Acanopsilus* Kieffer, 1908, *Acanosema* Kieffer, 1908, *Acropiesta* Foerster, 1856, *Anommatium* Foerster, 1856, *Cardiopsilus* Kieffer, 1908, *Opazon* Haliday, 1857, *Pantolyta* Foerster, 1856, *Polypeza* Foerster, 1856, *Psilomma* Foerster, 1856, *Psilommacra* Macek, 1990, and *Synacra* Foerster, 1856 (Macek, 1989, 1990).

The genus *Pantolyta* Foerster, 1856 includes eight species in the world (Chemyreva & Kolyada, 2019). All known species are distributed in Palaearctic region (Macek, 1993; Chemyreva & Kolyada, 2019). The first revision of this genus was prepared by Macek (1993), who listed seven species in Europe and provided identification key to European species. Chemyreva & Kolyada (2019) described a new species from Russia and Japan and provided identification key to Palaearctic species. Prior to this study, there were no records of the subfamily Belytinae from Iran. Recently, six genera and eight species from subfamily Diapriinae including *Aneuropria* Kieffer, 1905 (1 species), *Coptera* Say, 1836 (2 species), *Diapria* Latreille, 1796 (1 species), *Entomacis* foerster, 1856 (1 species), *Spilomicrus* Westwood, 1832 (1 species) and *Trichopria* Ashmead 1893 (2 species) are reported from Iran (Izadzadeh et al., 2020). This research is a part of our ongoing research on the superfamily Diaprioidea Haliday, 1833 in Iran.

## Material and methods

Material for this study was collected from northern Iran using Malaise traps. The specimens were extracted from the traps and sorted monthly, transferred to 70% ethylalcohol, and then stored in a freezer for further studies. For the preparation of samples, specimen placed on a piece of absorbing paper for drying. The dried specimens were card-mounted and labelled. Illustrations were done using an Olympus AX70 microscope and Olympus SZX9 stereomicroscope equipped with a BMZ-04-DZ digital imaging system (Behin Pajouhesh Co., Iran). A series of four or five captured images were merged into a single in-focus image using the image-stacking software Combine ZP1.0. Morphological terminology follows Nixon (1957), Masner & García (2002), Quadros & Brandao (2017) and Chemyreva & Kolyada (2019). Map of the distribution of species is created using SimpleMappr (Shorthouse, 2010). Specimens are deposited in the insect collection of the Department of Entomology, Tarbiat Modares University, Tehran (TMUC) and the Research Institute of Forests and Rangelands, Tehran (RIFR).

The following abbreviations are used: A1–A15 = Antennomeres: segments of the antenna; they are numbered from the scape (A1) to the apical segment (A15), OOL = ocular ocellar line: the shortest distance between the posterior ocellus and the eye, POL = posterior ocellar line: the shortest distance between the posterior ocelli.

## Results

Two species of the genus *Pantolyta* were collected and identified, *Pantolyta pallida* Kieffer, 1908 and *Pantolyta nixonii* Macek, 1993. This is the first record of the genus *Pantolyta* for the fauna of Iran.

**Family Diapriidae Haliday, 1833****Subfamily Belytinae Foerster 1856****Tribe Pantolytini Hellen, 1964****Genus *Pantolyta* Foerster, 1856****Type Species: *Pantolyta atrata* Foerster, 1861**

**Morphological characters:** Body length 1.5-2.5 mm; head subglobose with hypognathous mouthparts; clypeus moderately convex; eyes pubescent; male antenna 14 segmented with A3 modified at base, female antenna 15 segmented, mesosoma wider than high; epomia present; mesonotum convex, notauli well developed, scutellum slightly convex, with large subrectangular fovea anteriorly; metanotum with distinct dorsellum; propodeum a little transverse with simple median and lateral keels; fore wing well developed, (some specimens of *Pantolyta atrata* Foerster, 1861, *P. pallida* Kieffer, 1908 and *P. stylata* Kieffer, 1908 are brachypterous), costal, subcostal veins tubular, basal vein sclerotized to nebulous, radial cell developed or obliterate, marginal vein longer than parastigma; petiole short, not more than 1.5 times as long as wide, with coarse longitudinal rugosity.

**Key to species of the genus *Pantolyta* in Iran**

- Radial cell open; axillar depression with verriculate tubercle. .... *Pantolyta pallida*
- Radial cell closed; axillar depression without verriculate tubercle. .... *Pantolyta nixonii*

***Pantolyta nixonii* Macek, 1993**

**Material examined:** Iran: Mazandaran, Kheyroud Kenar (36°34'36.23" N, 51°34'37.94" E, 722 m a.s.l), 26.VI.2018, 1♂ (RIFR), Leg.: F. Kazerani.

**Morphological characters:** Male (Fig. 1A). Body length 1.7 mm; colour brown; fore wing length 1.6 mm; head not nasiform; antennal shelf slightly prominent (Fig. 1B), A1 longer than half of head width, with apical flanges, A3-A14 with pubescence nearly as long as width of antennomeres (Fig. 1D); POL 0.6 times as long as OOL (Fig. 1C); pronotal collar and pronotal shoulders smooth, epomia obsolete; axillar depression without verriculate tubercle (Fig. 1C); radial cell 0.52 times as long as marginal vein (Fig. 1E); medial propodeal keel narrowly forked, dorsal area of propodeum with sparse setae; petiole 1.35 times as long as wide in dorsal view, with four longitudinal carinae (Fig. 1C).

**Distribution in Iran:** Mazandaran province (current study). New record for Iran.

**General distribution:** (Fig. 3) Germany, Sweden, Czech Republic, Hungary, Poland, Russia, Azerbaijan (Macek, 1993; Chemyreva & Kolyada, 2019).

***Pantolyta pallida* Kieffer, 1908**

**Material examined:** Iran: Gilan province, Astara, Lavandvil forest (38°18'19" N, 48°42'57" E, 873m a.s.l.), 06.VI.2017, 1♀ (TMUC), Leg.: S. Farahani.

**Morphological characters:** Female (Fig. 2A). Body length 2.8 mm (with ovipositor sheath); fore wing length 2.1 mm; head not nasiform (Fig. 2C), in dorsal view wider than mesosoma; POL 0.6 times as long as OOL; antennal shelf weakly prominent, A1 with apical flanges, antennae slender (Fig. 2D); genae in frontal view moderately convex (Fig. 2B); pronotal collar and pronotal shoulders smooth; axillar depression with verriculate tubercle (Fig. 2E);

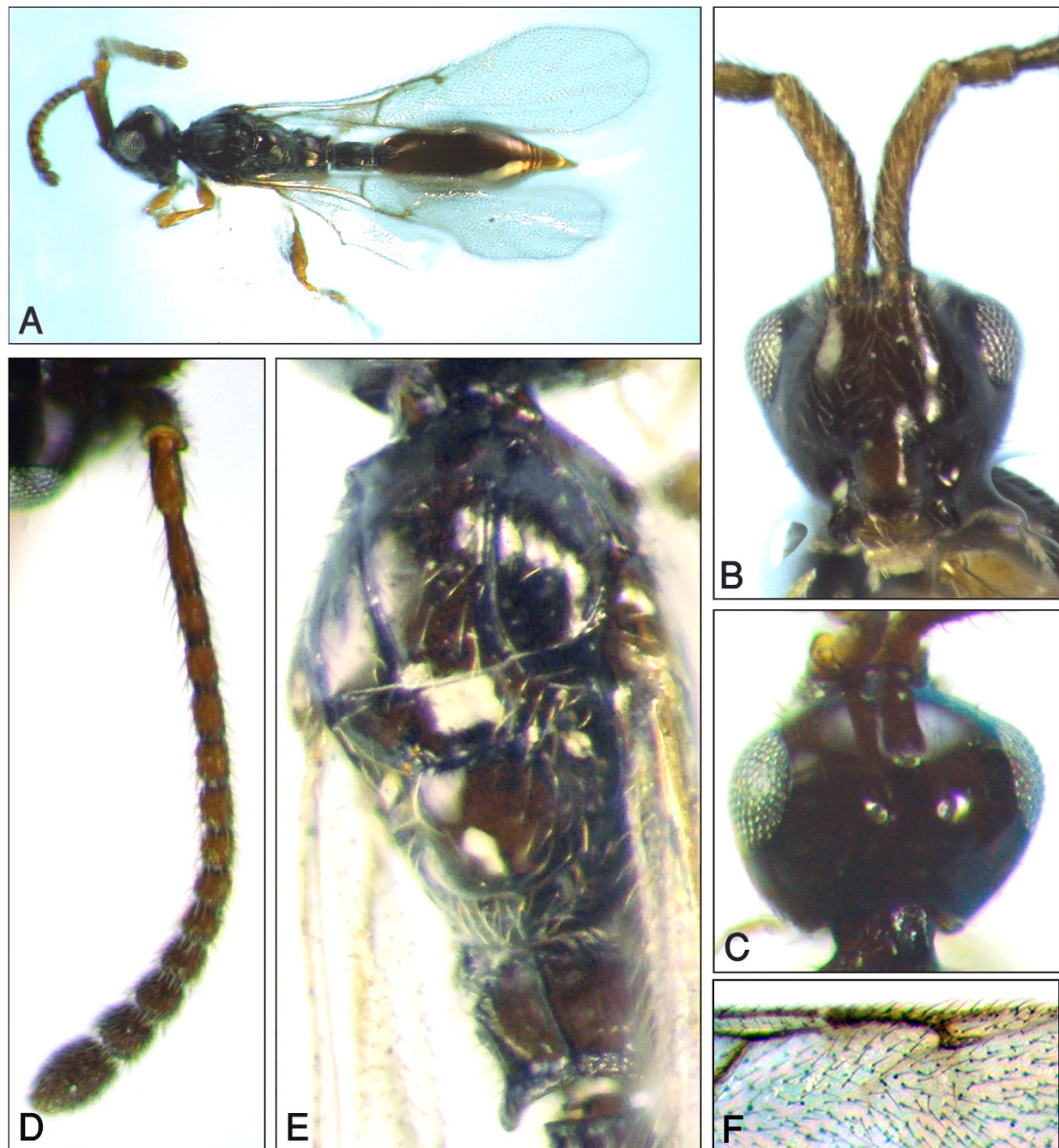
radial cell open (Fig. 2F); marginal vein 1.6 times as long as parastigma; dorsal area of propodeum bare (Fig. 2E); petiole 1.35 times as long as wide in dorsal view.

**Distribution in Iran:** Gilan province (current study). New record for Iran.

**General distribution:** (Fig. 3) England, Germany, Sweden, Czech Republic, Hungary, Poland, Ukraine, Russia, Georgia, Armenia, Kazakhstan, Turkmenistan, Tajikistan, Mongolia, North Korea, South Korea, Japan (Macek, 1993; Chemyreva & Kolyada, 2019).



**Figure 1A-E.** *Pantolyta nixonii* Macek, 1993, male; **A.** general habitus, lateral view; **B.** head, frontal view; **C.** head and mesosoma, dorsal view; **D.** antenna; **E.** fore wing venation.

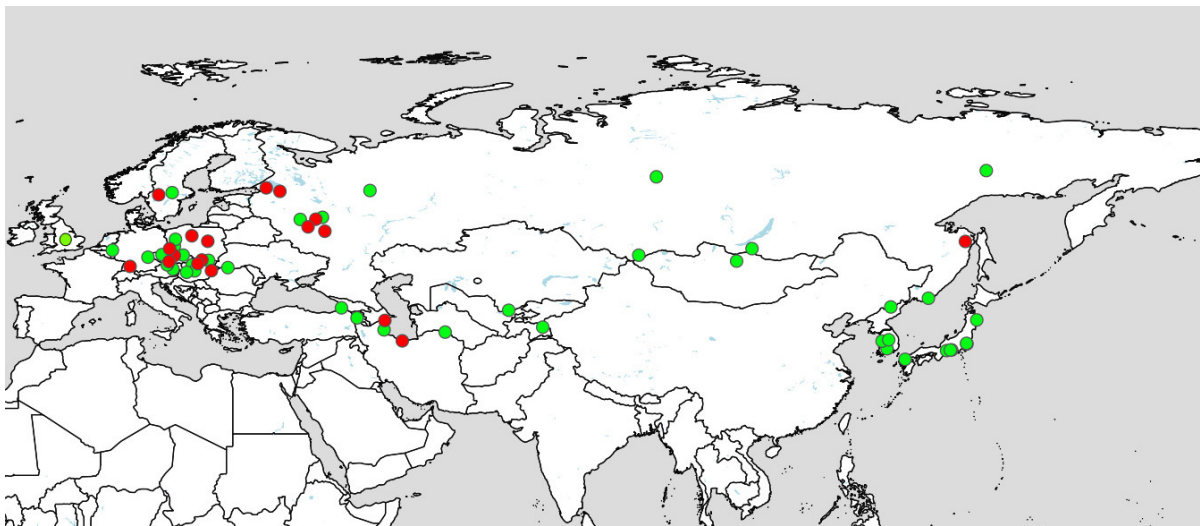


**Figure 2A-F.** *Pantolyta pallida* Kieffer, 1908, female; **A.** general habitus, dorsal view; **B.** head, frontal view; **C.** head, dorsal view; **D.** antenna; **E.** mesosoma, dorsal view; **F.** fore wing venation.

### Discussion

The genus *Pantolyta* and two species *P. nixonii* and *P. pallida* are reported from Iran for the first time based on two specimens that have been collected from Gilan and Mazandaran provinces in northern Iran. Specimens were collected using Malaise traps, therefore, the biology of the recorded species is unknown. Members of the genus *Pantolyta* are rarely collected in this study using Malaise traps, but at least some of the Palearctic species of this

genus are very common (Macek, 1993; Chemyreva & Kolyada, 2019). In this study, we provided the morphological characters based on the two Iranian specimens, and it should be noted that some features may be variable in the population of each species. The *Pantolyta* species prefer the humid and shady forest habitats (Macek, 1993). North Central of Iran, adjacent to Caspian Sea, includes Golestan, Mazandaran and Gilan provinces with high to semi humid climate and for the diverse forests is convenient region for *Pantolyta* species. Biology and hosts of the *Pantolyta* species are unknown (Macek, 1993; Chemyreva & Kolyada, 2019). The number of species recorded in Iran is still low (two species) in comparison to the known Palaearctic fauna (eight species). The number of species of *Pantolyta* in the adjacent countries of Iran is recorded as: seven species in Russia (Chemyreva & Kolyada, 2019), one species in Armenia, Azerbaijan, Turkmenistan and Tajikistan (Chemyreva & Kolyada, 2019), and none yet recorded from Afghanistan and Turkey. As many areas of Iran have not yet been explored, it is expected that the species number of the genus *Pantolyta* in Iran will be substantially increased in future.



**Figure 3.** Distribution map of *Pantolyta nixonii* Macek, 1993 (red) and *Pantolyta pallida* Kieffer, 1908 (green) in Palaearctic region.

### Acknowledgments

We would like to thank the Department of Entomology, Tarbiat Modares University and Research Institute of Forests and Rangelands for providing financial support. We cordially thank Dr. Jan Macek (National Museum, Czech Republic) and Dr. Vasilisa G. Chemyreva (Zoological Institute, Russian Academy of Sciences, Russia) for their critical review and constructive comments, which significantly helped the improvement of the manuscript.

### Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

### ORCID

Mohammad Izadizadeh: <http://orcid.org/0000-0002-8724-0132>

Ali Asghar Talebi: <https://orcid.org/0000-0001-5749-6391>

Victor Kolyada: <https://orcid.org/0000-0001-5459-0796>

Samira Farahani: <https://orcid.org/0000-0002-6897-0631>

Farzaneh Kazerani: <https://orcid.org/0000-0003-1968-3350>

Ali Ameri: <https://orcid.org/0000-0003-2372-8494>

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## اولین گزارش از حضور جنس *Pantolyta* Foerster, 1856 (Hymenoptera: Diapriidae) در ایران

محمد ایزدی زاده<sup>۱</sup>، علی اصغر طالبی<sup>۱\*</sup>، ویکتور کولیادا<sup>۲</sup>، سمیرا فراهانی<sup>۳</sup>، فرزانه کازرانی<sup>۳</sup> و علی عامری<sup>۴</sup>

۱ گروه حشره‌شناسی، دانشکده کشاورزی، دانشگاه تربیت مدرس، تهران، ایران.

۲ مؤسسه دیرینه‌شناسی، آکادمی علوم روسیه، خیابان پروف سویوزنیا، مسکو، روسیه.

۳ مؤسسه تحقیقات جنگل‌ها و مراتع، سازمان تحقیقات، آموزش و ترویج کشاورزی، تهران، ایران.

۴ بخش تحقیقات رده‌بندی، مؤسسه تحقیقات گیاهپزشکی کشور، سازمان تحقیقات، آموزش و ترویج کشاورزی، تهران، ایران.

\* پست الکترونیکی نویسنده مسئول مکاتبه: [talebia@modares.ac.ir](mailto:talebia@modares.ac.ir)

| تاریخ دریافت: ۱۳ مرداد ۱۳۹۹ | تاریخ پذیرش: ۲۹ مهر ۱۳۹۹ | تاریخ انتشار: ۰۳ آبان ۱۳۹۹ |

**چکیده:** طی مطالعه خانواده Diapriidae در ایران، دو گونه از جنس *Pantolyta* Foerster, 1856 شامل *Pantolyta pallida* Kieffer, 1908 و *Pantolyta nixonii* Macek, 1993 برای اولین بار از ایران جمع‌آوری و شناسایی شد. کلید شناسایی گونه‌های جنس *Pantolyta* در ایران و ویژگی‌های شناسایی به همراه تصاویر آنها ارائه شده است. علاوه بر این، نقشه پراکنش دو گونه شناسایی شده در منطقه پالئارکتیک ارائه شده است.

**واژگان کلیدی:** *Pantolytini*، *Pantolyta pallida*، *Pantolyta nixonii*، کلید شناسایی، توصیف، پراکنش