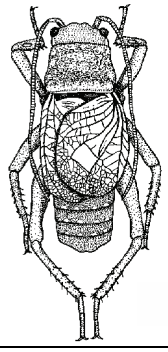


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# NEW DATA ON THE GENUS *BELYTA* JURINE, 1807 (HYMENOPTERA: DIAPRIIDAE, BELYTINAE) FROM IRAN


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**Summary**. The genus *Belyta* Jurine, 1807 (Hymenoptera: Diapriidae) is studied in northern Iran. The specimens were collected using Malaise traps in the Alborz, Golestan, Gilan, Mazandaran and Qazvin Provinces during 2010–2018. The seven species of *Belyta* are recorded from Iran for the first time, *Belyta abrupta* Thomson, 1858, *B. bicolor* Jurine, 1807, *B. depressa* Thomson, 1858, *B. elongata* Thomson, 1858, *B. rugosicollis* Kieffer, 1909, *B. sanguinolenta* Nees, 1834 and *B. validicornis* Thomson, 1858. Diagnostic characters, illustrations, geographical distributions, and a key to Iranian species are provided.



**Key words**: diapriid wasps, Belytini, *Belyta*, distribution, Asia.

**М. Изадизаде, А. А. Талеби, В. Г. Чемырева, С. Фарахани, Ф. Казерани, А. Амери. Новые данные о роде *Belyta* Jurine, 1807 (Hymenoptera: Diapriidae, Belytinae) Ирана // Дальневосточный энтомолог. 2023. N 471. С. 1-18.**

**Резюме**. Род *Belyta* Jurine, 1807 (Hymenoptera: Diapriidae) изучен в северном Иране. Материал был собран с помощью ловушек Малеза в провинциях Альборз, Голестан, Гилян, Мазандаран и Казвин в 2010–2018 гг. Семь видов *Belyta* впервые отмечаются в фауне Ирана: *Belyta abrupta* Thomson, 1858, *B. bicolor* Jurine, 1807, *B. depressa* Thomson, 1858, *B. elongata* Thomson, 1858, *B. rugosicollis* Kieffer, 1909, *B. sanguinolenta* Nees, 1834 и *B. validicornis* Thomson, 1858. Приведены диагнозы, иллюстрации, географическое распространение и определительная таблица для обнаруженных в Иране видов.

## INTRODUCTION

Diapriidae are tiny parasitoid wasps that typically attack larvae and pupae of a wide range of dipteran insects (Yoder, 2007). Diapriidae with 194 genera and about 2100 species in the world, of which 90 genera and about 800 species recorded from the Palaearctic region (Chemyreva, 2019).

The genus *Belyta* Jurine, 1807 (Hymenoptera: Diapriidae) within the subfamily Belytinae and tribe Belytini, is represented in the Palaearctic region with 33 species (Johnsson, 1992; Macek, 1996; Chemyreva, 2019). Biology of this genus is unknown, but the adults predominantly prefer humid habitats such as forests, marshlands and backyards and it is expected that soil-inhabiting nematoceran Diptera are the main hosts of *Belyta* species (Macek, 1996). Kieffer (1916) reported 59 species of *Belyta* in the world. Nixon (1957) provided an identification key for *Belyta* species in Great British. Afterwards, the keys were published for *Belyta* species found in Finland (Hellén, 1964), Switzerland (Wall, 1967), European part of USSR (Kozlov, 1978) and Southwest Germany (Wall, 1993). The first revision of the genus *Belyta* was prepared by Macek (1996), who listed 17 species in Europe and provided identification key to the European species.

There is only little publications on the Iranian fauna of Diapriidae (Izadizadeh et al., 2020, 2021). Up to now, no data are available on the genus *Belyta* in Iran and, consequently, no reliable key to the species is available. This study is a part of our ongoing project on the taxonomy of Belytinae in Iran which aims to improve existing knowledge on the occurrence of the genus *Belyta* in northern Iran.

## MATERIAL AND METHODS

Material for this study was collected from northern Iran (Alborz, Golestan, Gilan, Mazandaran and Qazvin provinces) using Malaise traps. The specimens were extracted from the traps and sorted biweekly, transferred to 70% ethyl-alcohol, and then stored in a freezer for further studies. 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 Masner & García (2002) and Yoder et al. (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 are numbered from the scape (A1) to the apical antennomere (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

### Family Diapriidae Haliday, 1833

### Subfamily Belytinae Förster, 1856

### Genus *Belyta* Jurine, 1807

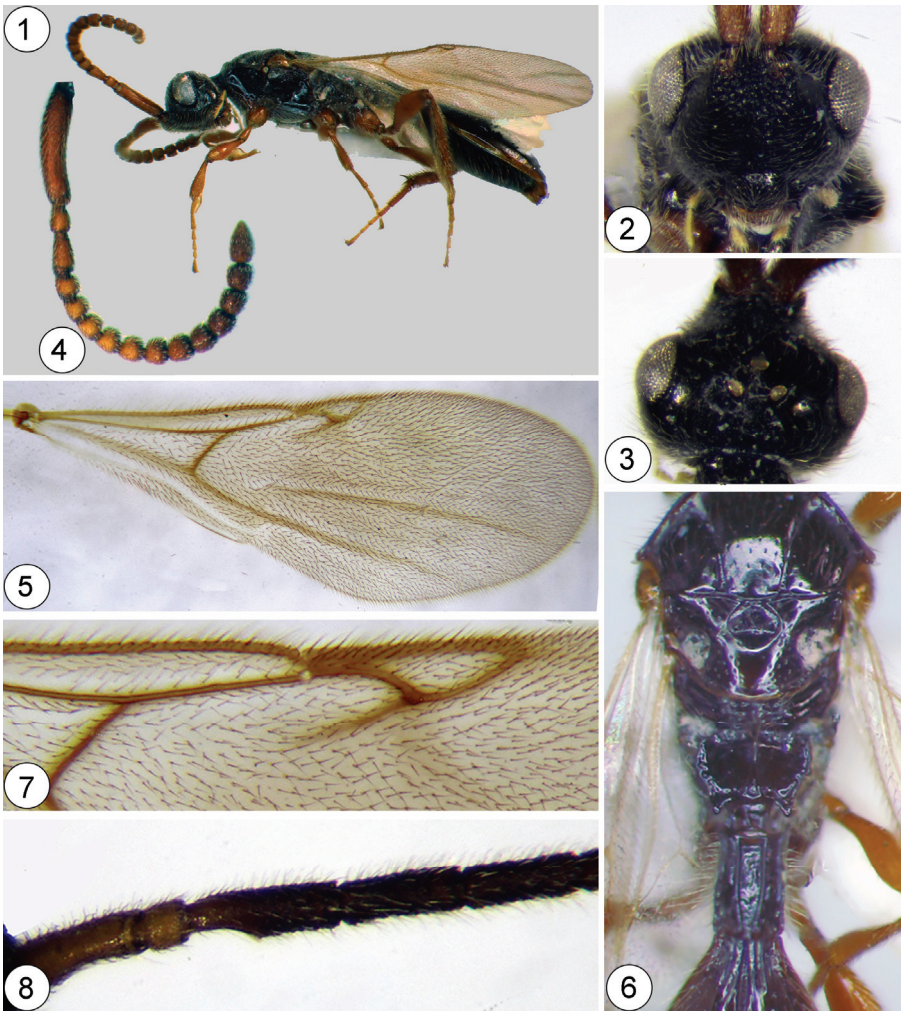
Type species: *Belyta bicolor* Jurine, 1807.

DIAGNOSIS. Body slender, rather flattened (2.0–5.5 mm); head orthognathous to hypognathous with strongly prominent antennal shelf; subantennal grooves distinct or reduced; mandibles short, asymmetrical with slightly overlapping tips; female antennae 15-segmented with transverse to submoniliform flagellomeres of equal width; male antenna 14-segmented with cylindrical flagellomeres and A3 modified; pronotum more or less elongate with wide pronotal collar; pronotal collar rugose, sometimes divided by median pit in two parts; mesoscutum flat in females, rather convex in males; notauli distinct; scutellum smooth along posterior margin, with single scutellar fovea of varying shape and size; fore wings with radial cell closed to open; stigmal vein oblique and form acute angle with the marginal vein; marginal vein shorter than its distance from basal vein; hind wing lanceolate with distinct basal cell; metascutellum with three low longitudinal keels; propodeum with median keel simple or bifurcate; petiole cylindrical, at least slightly longer than wide, on dorsal surface with longitudinal keels, or rugose sculpture (Nixon, 1957; Kozlov, 1978; Macek, 1996).

#### *Belyta abrupta* Thomson, 1858
Figs 1–8

MATERIAL EXAMINED (25 ♀, 611 ♂). Gilan Province: Astara, Lavandevil forest (38°18′19″ N, 48°42′57″ E, 873 m a.s.l.), 06.VI 2017, 2 ♂ (TMUC); 08.VII 2017, 2 ♂ (TMUC); 07.VIII 2017, 3 ♂ (TMUC); 05.IX 2017, 1 ♂, leg. S. Farahani (TMUC); Rezvan Shahr (37°31′00″ N, 49°2′7″ E, 199 m a.s.l), 13.V 2018, 4 ♀, 15 ♂ (TMUC); Shafaroud forest (37°28′18″ N, 48°49′23″ E, 1114 m a.s.l), 25.VI 2018, 2♀,

12 ♂ (TMUC); 26.VIII 2018, 6 ♀, 44 ♂ (RIRF); 19.X 2018, 5 ♀ (TMUC). Mazandaran Province: Kheyroud Kenar (36°34′36.23″ N, 51°34′37.94″ E, 722 m a.s.l), 24.VII 2018, 2 ♂ (TMUC); 21.X 2018, 3 ♂ (TMUC); Galanderoud (36°26′56″ N, 51°51′20″ E, 1407 m a.s.l), 28.VIII 2018, 3 ♂ (TMUC); 21.X 2018, 1 ♂ (TMUC); Neka forest (36°30′00.4″ N, 53°27′14.2″ E, 828 m a.s.l), 16.V 2018, 16 ♂ (TMUC); 24.VII 2018, 133 ♂ (TMUC); 29.VIII 2018, 2 ♀, 36 ♂ (RIRF); 20.X 2018, 54 ♂ (RIRF); Neka forest (36°21′43.03″ N, 53°32′56.7″ E, 1495 m a.s.l), 07.VII 2018,




Figs 1–8. *Belyta abrupta* Thomson, 1858: female (1–6) and male (7, 8). 1 – general habitus; 2 – head in frontal view; 3 – head in dorsal view; 4 – antenna; 5 – fore wing; 6 – propodeum and basal part of metasoma; 7 – fore wing; 8 – base of antenna.

10 ♂ (TMUC); 25.VII 2018, 4♀, 150 ♂ (TMUC); Neka forest (36°34′49.2″ N, 53°27′95.6″ E, 465 m a.s.l), 24.VII 2018, 1 ♀, 10 ♂ (RIRF). Golestan Province: Shast Kola forest (36° 44' 10.83" N, 54° 24' 11.23" E, 754 m a.s.l), 26.VI 2019, 67 ♂ (TMUC); 28.VII 2019, 16 ♂, leg. F. Kazerani (RIRF); Loveh forest (37°20′43″ N, 55°40′40″ E, 753 m a.s.l.), 25.VII 2016, 2 ♂ (TMUC); 03.XII 2016, 1 ♀ (TMUC); Ali Abad, Zarin Gol village (36°48′58″ N, 55°02′13″ E, 694 m a.s.l.), 26.VII 2016, 2 ♂ (TMUC); Shast Kola forest (36°45′29″ N, 54°23′12″ E, 424 m a.s.l.), 12.VI 2016, 12 ♂ (RIRF); 03.VII 2016, 15 ♂, leg. S. Farahani (TMUC).

DIAGNOSIS. **Female** (Fig. 1): body length 3.3–3.5 mm; face with sculpture (Fig. 2); head in dorsal view transverse, 1.4 times as wide as long, pubescent and with punctures (Fig. 3); POL 0.5 times as long as OOL (Fig. 3); flagellomeres subquadrate (Fig. 4); epomia strong; pronotal collar sculptured; mesoscutum flat, pubescent and sparse puncture; anterior scutellar pit small and bare; scutellum pubescent; fore wing length 2.7–3.1 mm; radial cell open (Fig. 5); marginal vein very short, 0.25 times as long as its distance from basal vein (Fig. 5); propodeum smooth and shine, with sparse setae and median propodeal keel strong and forked (Fig. 6); petiole in dorsal view 1.6–1.8 times as long as wide, with longitudinal keels (Fig. 6); T2 anteriorly with a median groove, each side of median groove with short grooves (Fig. 6); metasoma apically truncate. **Male:** A3–A14 cylindrical, A3 basally with emargination, reaching 0.4 of this segment length (Fig. 8), radial cell close (Fig. 7).

DISTRIBUTION. Iran (new record); Austria, Czech Republic, Finland, France (including Corsica), Germany, Italy, Slovakia, Sweden, Switzerland (Nixon, 1957; Hellén, 1964; Wall, 1993; Macek, 1996).

BIOLOGY. Unknown.

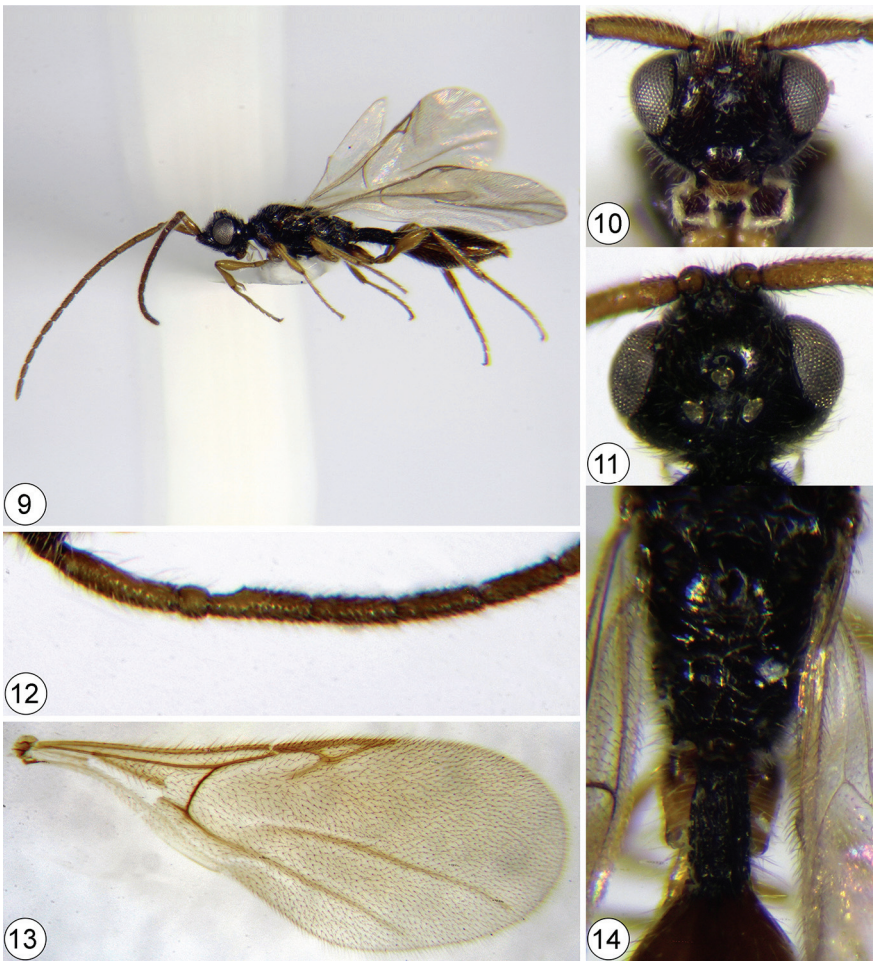
***Belyta bicolor* Jurine, 1807**
Figs 9–14

MATERIAL EXAMINED (6 ♂). Gilan Province: Amlash (36°58′31″ N, 50°07′03.1″ E, 1380 m a.s.l ), 25.VI 2018, 6 ♂, leg. F. Kazerani (TMUC, RIRF).

DIAGNOSIS. **Male** (Fig. 9). Body length 3.2–3.5 mm; face smooth and pubescent (Fig. 10) head in dorsal view transverse, 1.5 times as wide as long, smooth and pubescent (Fig. 11); POL 0.9 times as long as OOL (Fig. 11); antenna slender; A3 basally with emargination, reaching 0.35 of this segment length (Fig. 12); A4 3.0 times as long as wide; epomia strong; mesoscutum, convex and pubescent; anterior scutellar pit subsquare; scutellum convex and pubescent; fore wing length 2.7–3.0 mm; marginal vein 0.8–1.0 times as long as radial cell (Fig. 13); dorsal area of propodeum smooth and with sparse setae; median propodeal keel widely forked (Fig. 14); petiole in dorsal view 1.5–1.8 times as long as wide and with longitudinal keels (Fig. 14); T2 anteriorly with a median groove and laterally with some striations.

DISTRIBUTION. Iran (new record); Czech Republic, England, Germany, Hungary, Sweden, Switzerland (Macek, 1996).

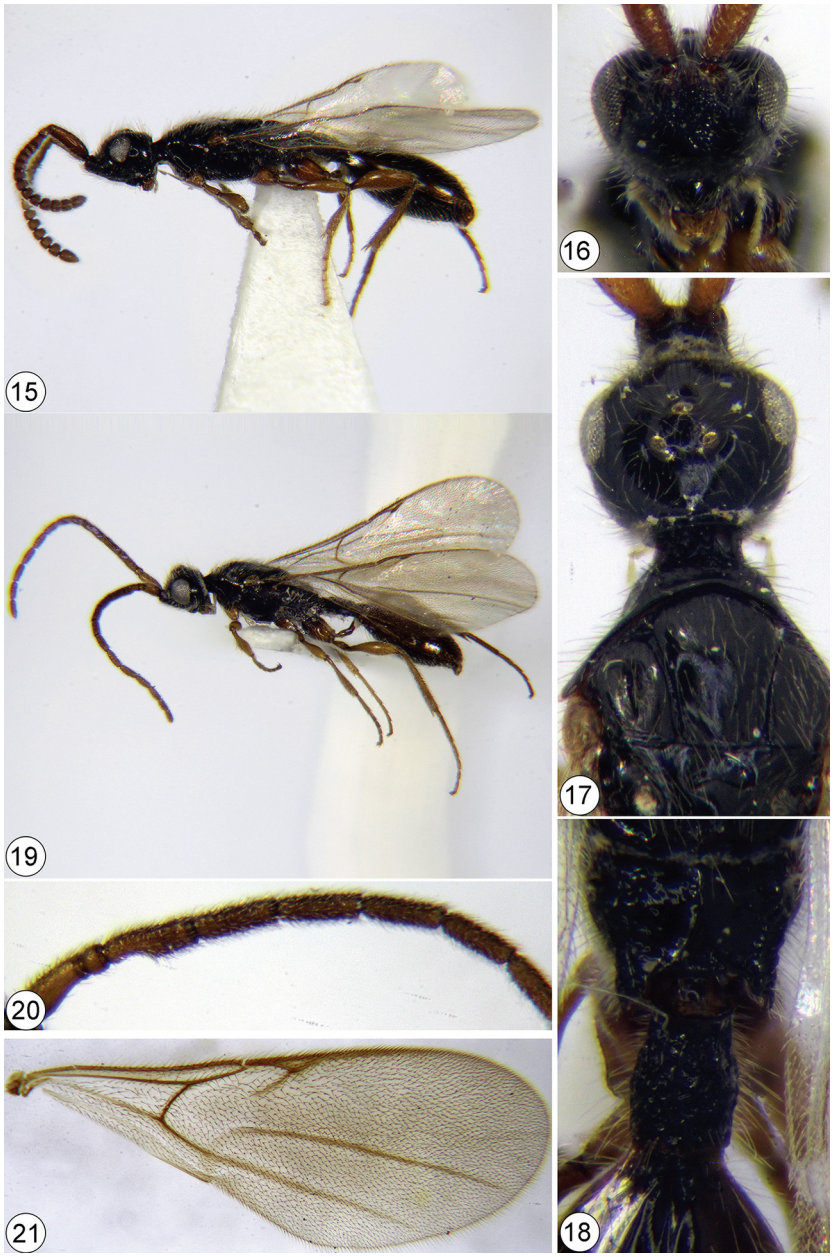
BIOLOGY. Unknown.




Figs 9–14. *Belyta bicolor* Jurine, 1807, male. 9 – general habitus; 10 – head in frontal view; 11 – head in dorsal view; 12 – base of antenna; 13 – fore wing; 14 – propodeum and basal part of metasoma.

***Belyta depressa* Thomson, 1858**
Figs 15–21

MATERIAL EXAMINED (13 ♀, 230 ♂). Alborz Province: Chalous Road, Shahrestanak (35°58′16.26″ N, 51°21′25.80″ E, 2225 m a.s.l.), 06.VII 2010, 1 ♂ (TMUC); 15.VI 2010, 1 ♀, 4 ♂ (TMUC); 22.VI 2020, 2 ♂ (TMUC); 14.VII 2010, 1 ♀ (TMUC); 28.VII 2010, 1 ♂ (TMUC); Chalous Road, Sarziarat (35°55′10.38″ N, 51°06′51.24″ E, 1980 m a.s.l.), 14.VII 2010, 1 ♂ (TMUC); Shahriar (35°40′08.10″ N,




Figs 15–21. *Belyta depressa* Thomson, 1859: female (15–18) and male (19–21). 15 – general habitus; 16 – head in frontal view; 17 – head in dorsal view; 18 – propodeum and basal part of metasoma; 19 – general habitus; 20 – base of antenna; 21 – fore wing.

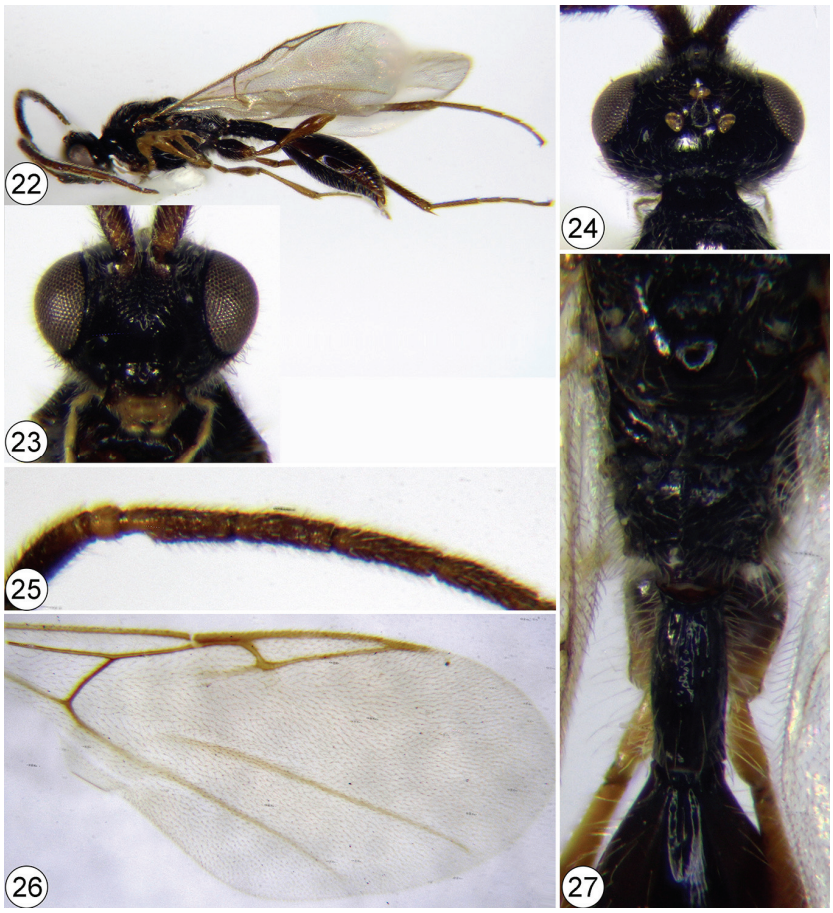
50°56′56.64″ E, 1168 m a.s.l.), 24.VIII 2010, 1 ♂ (TMUC); Chalous Road, Arangeh (35°55′07 20″ N, 51°05′09.24″ E, 1891 m a.s.l.), 31.VIII 2010, 7 ♂ (TMUC). Qazvin Province: Zereshk Road (36°21′39.72″ N, 50°03′55.56″ E, 1541 m a.s.l.), 09.VI 2011, 2 ♂ (TMUC); 06.VII 2011, 2 ♂ (TMUC); Zereshk Road (36°25′39.36″ N, 50°06′36.90″ E, 1997 m a.s.l.), 06.VII 2011, 1 ♀, 5 ♂ (TMUC); 26.VII 2011, 1 ♀, 9 ♂, leg. A. Nadimi (TMUC). Gilan Province: Roudsar, Rahimabad, Orkom (36°45′44.34″ N, 50°18′11.88″ E, 1201 m a.s.l.), 26.IV 2010, 1 ♂ (TMUC); 14.VI 2010, 2 ♂ (TMUC); 06.VII 2010, 4 ♂ (TMUC); 26.VII 2010, 2 ♂ (TMUC); Roudsar, Rahimabad, Ziaz (36°52′27.18″ N, 50°13′24.78″ E, 490 m a.s.l.), 20.IX 2010, 1 ♂ (TMUC); Roudsar, Rahimabad, Ghazichak (36°45′57.54″ N, 50°19′35.22″ E, 1803 m a.s.l.), 13.IX 2010, 1 ♀, 1 ♂ (TMUC); 25.X 2010, 3 ♂ (TMUC); Roudsar, Rahimabad, Ghazichak (36°45′52.62″ N, 50°20′01.08″ E, 1787 m a.s.l.), 19.IV 2010, 1 ♂ (TMUC); 17.V 2010, 2 ♂ (TMUC); 31.V 2010, 4 ♂ (TMUC); 22.VI 2010, 1 ♂ (TMUC); 28.VI 2010, 4 ♂ (TMUC); Astaneh Ashrafiyeh, Eshman kamachal (37°21′10.50″ N, 49°57′56.16″ E, 2 m a.s.l.), 24.V 2010, 1 ♀ (TMUC); Roudsar, Rahimabad, Ziaz (36°52′27.18″ N, 50°13′24.78″ E, 490 m a.s.l.), 31.V 2010, 6 ♂, leg. M. Khayrandish (TMUC); Astara, Lavandevil forest (38°18′19″ N, 48°42′57″ E, 873 m a.s.l.), 06.VI 2017, 4 ♂ (TMUC); 08.VII 2017, 6 ♂ (TMUC); 07.VIII 2017, 2 ♂ (TMUC); 26.XI 2017, 1 ♀, leg. S. Farahani (TMUC); Rezvan Shahr (37°31′00″ N, 49°02′07″ E, 199 m a.s.l), 13.V 2018, 3 ♂ (TMUC); Shafaroud forest (37°28′18″ N, 48°49′23″ E, 1114 m a.s.l), 25.VI 2018, 16 ♂ (RIRF); 26.VIII 2018, 2 ♂ (TMUC); 19.X 2018, 4 ♂, leg. F. Kazerani (TMUC). Mazandaran Province: Noor, Chamestan, Tangehvaz (36°21′55.02″ N, 52°06′10.74″ E, 692 m a.s.l.), 09.V 2011, 5 ♂ (TMUC); 25.V 2011, 1 ♀, 4 ♂ (TMUC); 26.VII 2011, 2 ♂ (TMUC); 26.IX 2011, 3 ♂ (TMUC); Noor, Chamestan, Tangehvaz (36°18′51.42″ N, 52°07′48.00″ E, 1359 m a.s.l.), 25.V 2011, 2 ♂; 13.VII 2011, 3 ♂ (TMUC); 05.IX 2011, 1 ♂ (TMUC); Noor, Chamestan, Joorband (36°26′17.28″ N, 52°07′16.62″ E, 272 m a.s.l.), 04.XI 2011, 2 ♂, leg. M. Khayrandish (TMUC); Alikola (36˚13′14″ N, 53˚39′24″ E, 1626 m a.s.l.), 15.VI 2016, 1 ♂, leg. S. Farahani (TMUC); Neka forest (36°30′00.4″ N, 53°27′14.2″ E, 828 m a.s.l), 24.VII 2018, 3 ♂; 20.X 2018, 11 ♂ (TMUC); Neka forest (36°21′43.03″ N, 53°32′56.7″ E, 1495 m a.s.l), 25.VII 2018, 21 ♂ (TMUC); Neka forest (36°34′49.2″ N, 53°27′95.6″ E, 465 m a.s.l), 16.V 2018, 1 ♀, 1 ♂ (RIRF); 24.VII 2018, 9 ♂ (RIRF); 20.X 2018, 2 ♂ (TMUC); Kheyroud Kenar (36°34′36.23″ N, 51°34′37.94″ E, 722 m a.s.l), 26.VI 2018, 1 ♀, 3 ♂ (RIRF); 24.VII 2018, 4 ♂ (TMUC); 28.VIII 2018, 1 ♂ (TMUC); 21.X 2018, 1 ♂ (TMUC); Galanderoud (36°26′56″ N, 51°51′20″ E, 1407 m a.s.l), 24.VII 2018, 3 ♂ (TMUC). Golestan Province: Shast Kola forest (36°44′10.83″ N, 54°24′11.23″ E, 754 m a.s.l), 26.VI 2019, 1 ♀, 2 ♂ (TMUC); 28.VII 2019, 34 ♂ (TMUC); 12.X 2019, 11 ♂, leg. F. Kazerani (RIRF); Deraz-No (36°40′06″ N, 54°08′03″ E, 2179 m a.s.l), 06.X 2016, 1 ♂, leg. S. Farahani (TMUC).

DIAGNOSIS. **Female** (Fig. 15). Body length 2.8–3.6 mm; face smooth and pubescent (Fig. 16); head in dorsal view as long as wide, smooth and pubescent; POL 0.6–0.7 times as long as OOL (Fig. 17); A4-A14 transverse; epomia moderately prominent; mesoscutum and scutellum flat and pubescent; anterior scutellar pit

reniform (Fig. 17); fore wing length 2.1–2.6 mm; radial cell open (Fig. 21); marginal vein 0.4–0.6 times as long as its distance from basal vein; propodeum bare; median propodeal keel widely bifurcate (Fig. 18); petiole in dorsal view 1.2–1.4 times as long as wide, with coarsely sculpture (Fig. 18); T2 anteriorly with a median groove, grooves and sculpture laterally. **Male** (Fig. 19): flagellomeres cylindrical, A3 basally with emargination reaching 0.5 of this segment length (Fig. 20).

DISTRIBUTION. Iran (new record); Austria, Belgium, Czech Republic, Finland, France, Germany, Italy, Malta, Poland, Scotland, Slovakia, Sweden (Nixon, 1957; Hellén, 1964; Wall, 1993; Macek, 1996; Notton & Mifsud, 2019).

BIOLOGY. Unknown.




Figs 22–27. *Belyta elongata* Thomson, 1859, male. 22 – general habitus; 23 – head in frontal view; 24 – head in dorsal view; 25 – base of antenna; 26 – fore wing; 27 – propodeum and basal part of metasoma.

***Belyta elongata* Thomson, 1858**
Figs 22–27

MATERIAL EXAMINED. Mazandaran Province, Neka forest (36°21′43.03″ N, 53°32′56.7″ E, 1495 m a.s.l), 27.VI 2018, 2 ♂, leg. F. Kazerani (TMUC, RIFR).

DIAGNOSIS. **Male** (Fig. 22). Body length 3.6–3.7 mm; face with fine sculpture (Fig. 23); head in dorsal view transverse, 1.4 times as wide as long, smooth and densely pubescent (Fig. 24); POL 0.8 times as long as OOL; antenna slender; A3 basally with emargination, reaching 0.33 of this segment length; A4 3.5 times as long as wide (Fig. 25); mesoscutum and scutellum convex and pubescent; anterior scutellar pit large, semicircular; epomia strongly prominent; fore wing length 3.1–3.3 mm; marginal vein 0.5 times as long as its distance from basal vein; radial cell long, 2.8 times as long as marginal vein (Fig. 26); propodeum pubescent, median propodeal keel simple (Fig. 27); petiole in dorsal view 2.0–2.1 times as long as wide, with fine longitudinal keels (Fig. 27); T2 anteriorly with a median groove, each side of median groove with two short grooves.

DISTRIBUTION. Iran (new record); Austria, Czech Republic, England, Finland, France, Germany, Ireland, Italy, Slovakia, Sweden (Nixon, 1957; Hellén, 1964; Wall, 1993: Macek, 1996).

BIOLOGY. Unknown.

***Belyta rugosicollis* Kieffer, 1909**
Figs 28–34

MATERIAL EXAMINED (79 ♂). Mazandaran Province: Noor, Chamestan, Tangehvaz (36°18′51.42″ N, 52°07′48.00″ E, 1359 m a.s.l.), 13.VII 2011, 1 ♂ (TMUC); 05.IX 2011, 1 ♂ (TMUC); 26.IX 2011, 2 ♂, leg. M. Khayrandish (TMUC); Kiasar, Haftkhal (36°17′19″ N, 53°23′43″ E, 1624 m a.s.l.), 3 ♂ (TMUC). Gilan Province: Sowme'eh Sara, Gurab Zarmikh, Tanian (37°17′20″ N, 49°05′54″ E, 252 m a.s.l.), 08.VII 2017, 1 ♂ (TMUC); 05.IX 2017, 1 ♂ (TMUC); Lavandevil forest (38°18′19″ N, 48°42′57″ E, 873 m a.s.l.), 06.VI 2017, 2 ♂, leg. S. Farahani (TMUC); Shafaroud forest (37°28′18″ N, 48°49′23″ E, 1114 m a.s.l), 25.VI 2018, 37 ♂ (RIRF); 26.VIII 2018, 14 ♂ (TMUC); 19.X 2018, 12 ♂ (TMUC); Rezvan Shahr (37°31′00″ N, 49°2′7″E, 199 m a.s.l), 13.V 2018, 2 ♂, leg. F. Kazerani (RIRF). Golestan Province: Shamooshak forest (36°43′55″ N, 54°16′53″ E, 492 m a.s.l.), 26.VII 2016, 2 ♂ (TMUC); Tuskestan forest (36°46′33″ N, 54°34′58″ E, 500 m a.s.l.), 26.X 2016, 1 ♂, leg. S. Farahani (TMUC).

DIAGNOSIS. **Male** (Fig. 28). Body length 3.1–3.3 mm; face smooth and pubescent (Fig. 29), head in dorsal view transverse, 1.6 times as wide as long, smooth and pubescent (Fig. 30); POL 0.65 times as long as OOL; antenna slender; A3 basally with emargination, reaching 0.33 of this segment length (Fig. 31); A4 3.0 times as long as wide; epomia strongly prominent; mesoscutum and scutellum convex and pubescent; anterior scutellar pit subsquare; fore wing length 2.6–2.9 mm; marginal vein 0.4–0.5 times as long as its distance from basal vein (Fig. 32); inner side of fore

tibiae with three bristles (Fig. 33); dorsal area of propodeum smooth and with sparse setae; median propodeal keel widely forked (Fig. 34); petiole in dorsal view 1.7–1.9 times as long as wide, with longitudinal keels (Fig. 34); T2 anteriorly with a median groove and laterally with some striations.


Figs 28–34. *Belyta rugosicollis* Kieffer, 1909, male. 28 – general habitus; 29 – head in frontal view; 39 – head in dorsal view; 31 – base of antenna; 32 – fore wing; 33 – fore tibiae; 34 – propodeum and base of metasoma.

DISTRIBUTION. Iran (new record); Austria, Czech Republic, England, France, Germany, Ireland, Slovakia, Sweden, Switzerland (Nixon, 1957; Wall, 1967; Macek, 1996).

BIOLOGY. Unknown.

***Belyta sanguinolenta*** **Nees, 1834**
Figs 35–40

MATERIAL EXAMINED (86 ♂). Gilan Province: Roodsar, Rahimabad, Ghazichak (36°45′52.62″ N, 50°20′01.08″ E, 1787 m a.s.l.), 03.V 2010, 1 ♂ (TMUC); Roudsar, Rahimabad, Orkom (36°45′44.34″ N, 50°18′11.88″ E, 1201 m a.s.l.), 03.V 2010, 1 ♂ (TMUC); 14.VI 2010, 5 ♂ (TMUC); 06.VII 2010, 3 ♂ (TMUC); Astaneh Ashrafiyeh, Eshman kamachal (37°22′03.66″ N, 49°57′57.84″ E, 1 m b.s.l.), 07.VI 2010, 1 ♂ (TMUC); leg.: M. Khayrandish. Astara, Lavandevil forest (38°18′19″ N, 48°42′57″ E, 873m a.s.l.), 06.VI 2017, 1 ♂ (TMUC); 08.VII 2017, 1 ♂, leg. S. Farahani (TMUC); Rezvan Shahr (37°31′00″ N, 49°02′07″ E, 199 m a.s.l), 13.V 2018, 27 ♂ (TMUC); Shafaroud forest (37°28′18″ N, 48°49′23″ E, 1114 m a.s.l), 25.VI 2018, 12 ♂ (RIRF). Mazandaran Province: Galanderoud (36°26′56″ N, 51°51′20″ E, 1407 m a.s.l), 24.VII 2018, 4 ♂ (TMUC); 28.VIII 2018, 2 ♂ (RIRF); Kheyroud Kenar (36°34′36.23″ N, 51°34′37.94″ E, 722 m a.s.l), 24.VII 2018, 8 ♂ (TMUC); 28.VIII 2018, 1 ♂ (TMUC); Neka forest (36°30′00.4″ N, 53°27′14.2″ E, 828 m a.s.l), 16.V 2017, 4 ♂ (TMUC); Neka forest (36°34′49.2″ N, 53°27′55.6″ E, 465 m a.s.l), 24.VII 2018, 12 ♂ (RIRF). Golestan Province: Shast Kola forest (36°44′10.83″ N, 54°24′11.23″ E, 754 m a.s.l), 26.VI 2019, 3 ♂ (TMUC); Bandar Gaz, Nowkandeh, Cheshme Bolbol (36°41′37.16″ N, 53°53′07.24″ E, 190 m a.s.l), 26.VI 2019, 1♂, leg. F. Kazerani (TMUC).

DIAGNOSIS: **Male** (Fig. 35). Body length 3.1–3.5 mm, face smooth and pubescent (Fig. 36), head in dorsal view transverse, 1.8 times as wide as long, smooth and pubescent (Fig. 37); POL as long as OOL; antenna slender, A3 basally with emargination, reaching 0.33 of this segment length; A4 3.5 times as long as wide (Fig. 38); epomia present, moderately prominent; mesoscutum convex and pubescent; anterior scutellar pit semicircular; scutellum convex and bare; fore wing length 2.9–3.2 mm, marginal vein 0.6–0.75 times as long as its distance from basal vein (Fig. 39); propodeum pubescent, median propodeal keel simple or forked (Fig. 40); petiole in dorsal view 1.8–2.1 times as long as wide, with longitudinal keels (Fig. 40); T2 anteriorly with striations that similar in length.

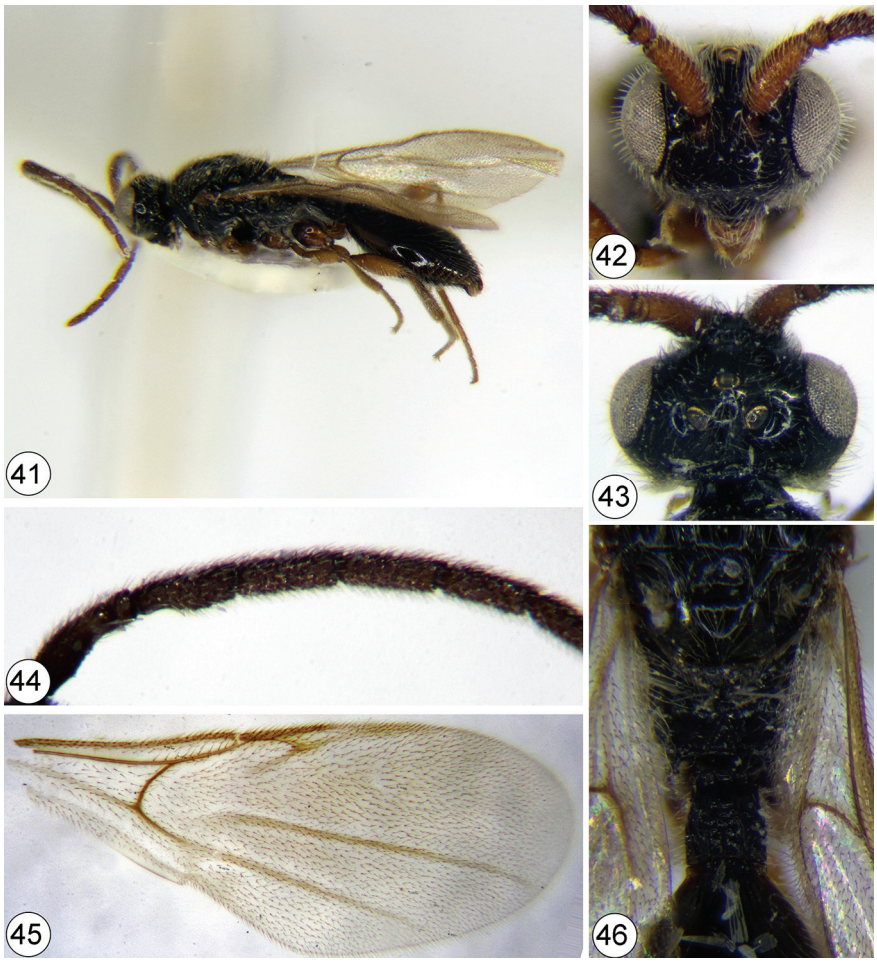
DISTRIBUTION: Iran (new record); Czech Republic, Finland, France, Germany, Hungary, Japan, Malta, Norway, Poland, Romania, Russia, Scotland, Sweden, Slovakia, Switzerland, China (Taiwan), former Yugoslavia (Nixon, 1957; Hellén, 1964; Wall, 1993; Macek, 1996; Notton & Mifsud, 2019).

BIOLOGY: Unknown.


Figs 35–40. *Belyta sanguinolenta* Nees, 1834, male. 35 – general habitus; 36 – head in frontal view; 37 – head in dorsal view; 38 – base of antenna; 39 – fore wing; 40 – propodeum and basal part of metasoma.

***Belyta validicornis* Thomson, 1858**
Figs 41–46

MATERIAL EXAMINED (7 ♂). Alborz Province: Chalous Road, Arangeh (35°55′07.20″ N, 51°05′09.24″ E, 1891 m a.s.l.), 08.VI 2010, 1 ♂, leg. A. Nadimi (TMUC). Golestan Province: Shast Kola forest (36°45′29″ N, 54°23′12″ E, 424m a.s.l.), 03.VII 2016, 1 ♂, leg. S. Farahani (TMUC). Mazandaran Province: Kheyroud




Figs 41–46. *Belyta validicornis* Thomson, 1859, male. 41 – general habitus; 42 – head in frontal view; 43 – head in dorsal view; 44 – base of antenna; 45 – fore wing; 46 – propodeum and base of metasoma.

Kenar (36°34′36.23″ N, 51°34′37.94″ E, 722 m a.s.l), 24.VII 2018, 2 ♂ (TMUC); Neka forest (36°30′00.4″ N, 53°27′14.2″ E, 828 m a.s.l), 27.VI 2018, 1♂ (RIRF); 20.X 2018, 2 ♂, leg. F. Kazerani (RIRF).

DIAGNOSIS. **Male** (Fig. 41). Body length 2.9–3.3 mm; face smooth and pubescent (Fig. 42); head in dorsal view transverse, 1.6 times as wide as long; POL as long as OOL (Fig. 43); antenna slender, A3 with basal emargination, reaching 0.45 of this segment length; A4 3.0 times as long as wide (Fig. 44); epomia present; mesoscutum convex and pubescent; fore wing length 2.3–2.6 mm; radial cell open (Fig. 45); marginal vein 0.45–0.55 times as long as its distance from basal vein; anterior

scutellar pit semicircular (Fig. 46); scutellum convex and pubescent; propodeum smooth, with sparse setae, median propodeal keel widely bifurcate (Fig. 46); petiole in dorsal view 1.1–1.2 times as long as wide, with longitudinal keels (Fig. 46); T2 anteriorly with short striation.

DISTRIBUTION. Iran (new record); Czech Republic, England, Finland, Germany, Hungary, Italy, Slovakia, Sweden, Switzerland (Nixon, 1957; Wall, 1993; Macek, 1996).

BIOLOGY. Unknown.

**Key to species of the genus *Belyta* in Iran**
(modified from Nixon, 1957 and Macek, 1996)

1. Macropterous forms: wings reaching at least apex of metasoma (males and females) ..... 2
– Brachypterous or micropterous forms: wings not reaching apex of metasoma (females) .... 9
2. Radial cell open (Figs 5, 21, 45) ..... 3
– Radial cell closed (Figs 13, 26, 32, 39) ..... 5
3. Face entire strongly punctate (Fig. 2); female A4–A14 subquadrate (Fig. 4); petiole with longitudinal keels (Fig. 6) ..... ***B. abrupta*** Thomson (part.)
– Face entire smooth (Figs 16, 42); female A4–A14 transverse; petiole with rugose reticulation (Figs 18, 46) ..... 4
4. Scutellar fovea almost semicircular (Fig. 46); dorsal area of propodeum with strongly rugose sculpture ..... ***B. validicornis*** Thomson
– Scutellar fovea transverse, reniform (Fig. 17); dorsal area of propodeum smooth or with fine rugose sculpture ..... ***B. depressa*** Thomson (part.)
5. Marginal vein long, more than half as long as its distance from basal vein (Fig. 39) ..... ..... ***B. sanguinolenta*** Nees (part.)
– Marginal vein short, as most half as long as its distance from basal vein (Figs 13, 26, 32) ..... ..... 6
6. Radial vein upcurved to fore wing margin (Fig. 7); face strongly punctate (Fig. 2) ..... ..... ***B. abrupta*** Thomson (part.)
– Radial vein strait and radial cell tapering to the top (Figs 13, 26, 32); face smooth (Fig. 10) ..... 7
7. Radial cell long, more than 2.5 times as long as marginal vein (Fig. 26) ..... ..... ***B. elongata*** Thomson
– Radial cell short, at most 2.0 times as long as marginal vein ..... 8
8. Radial cell 1.2 times as long as marginal vein (Fig. 32); female metasoma posteriorly pointed in lateral view; lateral corners of T2 not wider than width of petiole posteriorly ..... ***B. rugosicollis*** Kieffer
– Radial cell as long as or only little longer than marginal vein (Fig. 13); female metasoma posteriorly truncate in lateral view; lateral corners of T2 wider than width of petiole posteriorly ..... ***B. bicolor*** Jurine
9. Female antennae with A4–A14 distinctly transverse; female metasoma truncate in lateral view with last tergite in vertical position; toruli posteriorly without projecting keel ..... ..... ***B. depressa*** Thomson (part.)
– Female fntennae with A4–A14 subquadrate; female metasoma pointed in lateral view with last tergite in almost gorizontal position; toruli posteriorly with keel projecting sharply between them ..... ***B. sanguinolenta*** Nees (part.)

## CONCLUSION

The *Belyta* is cosmopolitan genus with 33 species are known from the Palaearctic region (Johnson, 1992; Macek, 1996; Chemyreva, 2019). The present study with seven identified species increases the number of known Iranian Belytinae species from seven to 14 species (Izadizadeh et al., 2021). Because many areas of Iran have not been explored yet and we expect that the species number of the genus *Belyta* in Iran will be significantly increased in future. On the other hand, no data are available on this genus from neighboring with Iran countries (e.g Turkey, Iraq, Turkmenistan, Afghanistan and Pakistan).

The species *Belyta abrupta* was the highest frequency (636 specimens, 60% from a total number of *Belyta* specimens), then follow *B. depressa*, *B. sanguinolenta* and *B. rugosicollis* (Fig. 47). *Belyta abrupta* is also widely distributed in Europe but it is not so plenty there (Macek, 1996). *Belyta elongata* are rare species in Europe (Macek, 1996) and also we collected only two specimens from the northern Iran.

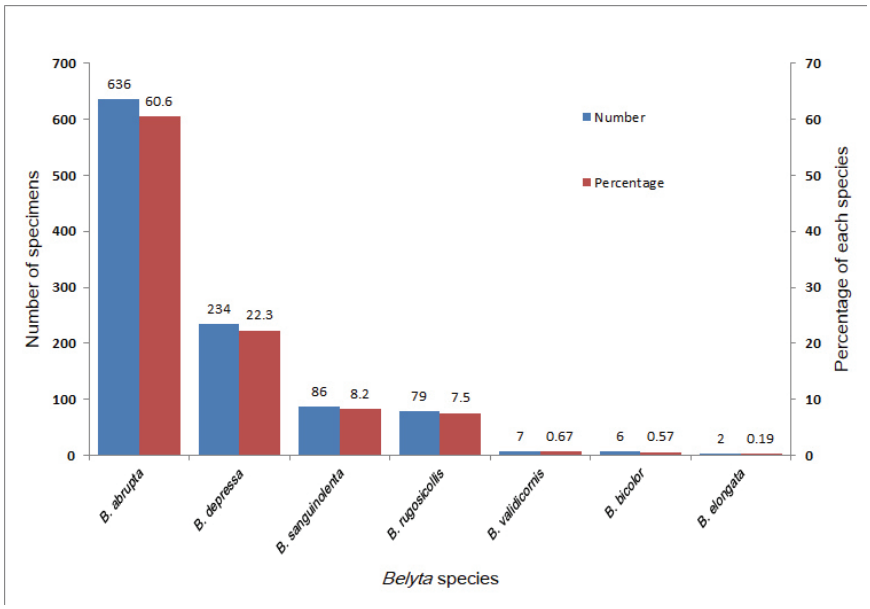



Fig. 47 – Number and percentage of *Belyta* species in northern Iran.

As well known, some females of *Belyta* species have macropterous, brachypterous and micropterous forms (Macek, 1996). However we have not collect any brachy- or micropterous females in Iran: all 13 females of *B. depressa* are macropterous but no any females of *B. sanguinolenta* have been find yet. We do not have relevant explanation of this observation but possible the Malaise trap is not appropriate method to collect of such flightless parasitoids.

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