Two new species, *Bracon* (*Lucobracon*) *kuzguni* sp. n. and *Bracon* (*Lucobracon*) *breviradius* sp. n., from Turkey (Hymenoptera: Braconidae: Braconinae)

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**Abstract:** During studies on the Braconidae fauna of the Black Sea, Central Anatolian and Eastern Anatolian regions of Turkey 2 new species, *Bracon* (*Lucobracon*) *kuzguni* sp. n. and *Bracon* (*Lucobracon*) *breviradius* sp. n., were recorded and described. Important morphological diagnostic characters are figured and they are compared with the related species, *B. (L.) triangularis* Nees, 1834 and *B. (L.) brachycerus* Thomson, 1892 respectively.

**Key words:** Braconinae, Braconidae, *Bracon*, *Lucobracon*, *kuzguni*, *breviradius*, new species, Turkey

**Introduction**

The Turkish Braconinae are becoming increasingly well known at species level. Over 145 species of Braconinae have been recorded in Turkey, but almost all (110 species) are rather small, blackish or partly orange insects belonging to the genus *Bracon* (Beyarslan, 1986a, 1986b, 1987, 1988, 1991, 1992, 1996, 1999, 2002a, 2002b, 2009; Beyarslan et al., 2002, 2005, 2006, 2008, 2009; Beyarslan and Tobias, 2008). It is necessary to investigate the Turkish Braconidae fauna more extensively to provide a complete description of the Braconinae in the whole of Turkey.

Unfortunately work on one of the majority subfamilies, Braconinae, has advanced slowly over
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the past 50 years and its species, even from the Palaeartic region, are not well known.

The genus *Bracon* is an extremely large with thousands of species and a worldwide distribution although only about 500 species have been described to date (Yu et al., 2006). In most parts of the world, the vast majority of braconines collected belong to this genus. There are no adequate keys to the species of the Palaeartic region despite the fact that many are parasitoids of actual or potential economic importance, and there are undoubtedly many species from this part of the world that still await description. All the species of *Bracon* are ectoparasitoids, usually of cryptic larvae. Known hosts of *Bracon* are very diverse; many species attach concealed lepidopterous larvae (stem-borers, leaf-rollers, leaf-miners, etc.) or concealed coleopteran larvae, and, interestingly, a number of species have been found to parasitize larval Diptera (especially gall-forming larvae) and stem-boring sawflies (notably *Cephus*) (Quicke and Sharkey, 1989; Shaw and Huddleston, 1991).

Materials and methods

Adult specimens of *Bracon* were collected by sweeping from various habitats of the Black Sea, Central Anatolian, and Eastern Anatolian regions of Turkey. Relevant literature (Tobias, 1986, 2000; Papp, 1969) was used for taxonomical examination and identification of the specimens.

Type materials are deposited in the collection of the Biology Department of Faculty of Science, University of Trakya.

The definitions, ratios, and abbreviations follow those of van Achterberg (1990) and van Achterberg and Quicke (1991). The following abbreviations are used in the text: OOL = ocular-ocellar line, POL = postocellar line, OD = maximal diameter of lateral ocelli.

Length of the ovipositor sheath defines the part extending beyond the apex of the metasoma in dorsal view.

Figures of the new species were drawn and measurements taken using a camera lucida attached to a stereomicroscope.

Results

*Bracon* (*Lucobracon*) *kuzguni* sp. n. (Figures 1-7)

Description. Female (holotype). Length of body 3.4 mm, of antennae 2.3 mm, of forewing 3.3 mm, of hindwing 2.7 mm, of hind leg 3.6 mm, of mesosoma 1.3 mm, of metasoma 1.7 mm.

Head. Transverse, ratios of width: length: height of head = 40: 25: 35 (Figure 1).

Antennae damaged, 19 segments present, probably only few distal segments missing, first flagellomere 1.25 times longer than its width and 1.16 times as long as second flagellomere, from third flagellomere on all flagellomeres square (Figure 2). Width of the hypoclypeal depression 0.7 times longitudinal diameter of eye and 2.5 times length of malar space; longitudinal diameter of eye 1.25 times longer than its transverse diameter; ratios of height of clypeus:inter-tentorial distance:tentorial-ocular distance = 3:14:7; length of maxillary palp 0.8 times height of head; width of face 1.3 times its height, face punctured and with long, white setae; height of eye:width of face:width of head = 24:25:46; vertex and frons smooth and glabrous with some white setae; length of eye 2 times as long as temple in dorsal view; ratios of OO:OD:POL = 20:9:13; basal part of mandible microsculptured; temple smooth, shiny; length of malar space 1.5 times as long as basal width of mandible and 0.4 times longitudinal diameter of eye.

Mesosoma (Figure 3). Mesosoma approximately 1.70 times longer than height; pronotum and propodeum with very fine longitudinal carina, smooth; mesoscutum smooth, glabrous, with silvery setae; notaui distinct; scutellum sulcus smooth, scutellum compressed, smooth and matt; flange of metapleuron distinctly developed; metanotum smooth, shiny; surface of propodeum smooth and silvery setae laterally.

Forewing (Figure 4). Pterostigma almost triangular, length of pterostigma 3.8 times its maximal width, vein 1-SR+M straight; vein cu-a interstitial; ratio of r:3-SR:SR1 = 8:20:35; CUlb very short, 3-CU1 1.3 times longer than m-cu; ratios of 2-SR:3-SR:r-m:2-M:2-SR+M = 23:30:15:41:6; ratio of forewing:hind tarsus:ovipositor = 100:30:60.
Hindwing (Figure 5). Ratios of cu-a:1-M:1r-m:2-SC+R:SC+R1 = 11:65:11:9:35; apex of C+SC+R with one especially thickened bristle.

Legs (Figure 6). Hind coxa smooth, with long, whitish setae; femur weakly compressed; ratios of femur:tibia:basitarsus:tarsus of hind leg = 36:55:21:58; length of femur, tibia and basitarsus of hind leg 3.3, 5.3, and 4.2 times their maximum width, respectively; length of both hind tibial spurs 0.6 times hind basitarsus; length of foretibial spur 0.4 times forebasitarsus, tibia and tarsus densely setose.

Metasoma (Figure 7). Length of first tergite 0.75 times its apical width and smooth; suture between 2nd and 3rd metasomal tergites deep and sinuate; medial length of second tergite as long as medial length of third tergite; all tergites smooth, only a small medio-basal area of 2nd tergite rugose, folds longitudinal. Ovipositor 1.7 mm and as long as metasoma.

Colour. Black; only tibiae and tarsi of forelegs, basal half of middle and hind legs yellow; wing membrane dark brown; pterostigma and veins brownish-black.

Male: Similar to female.


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Figures 1-7. *Bracon* (Lucobracon) *kuzguni* sp. n. (female): 1 – head in frontal view; 2 – antenna; 3 – mesosoma in lateral view; 4 – forewing; 5 – hind wing; 6 – hind leg; 7 – metasoma. Scale 1 mm (Figure 1), 0.8 mm (Figures 3, 7), 1.4 mm (Figure 2), 1.3 mm (Figures 4, 5), 1.2 mm (Figure 6).
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Paratype: Male-Kastamonu-Daday, Ballıdağ (41°34´00˝N, 33°24´00˝E), 1600 m a.s.L, 01.07.2001, 1♂; Ö.Cetin.

*Bracon (Lucobracon) kuzguni* sp. n. is similar to *B.(L.) triangularis* Nees, 1834, which also has the marginal cell of the forewing terminating apically, and the length of mesosoma as long as length of ovipositor. The new species can be distinguished by its completely smooth metasoma (only a small medio-basal area of metasomal tergite II longitudinally sculptured), the square flagellomeres and the black coloration.

**Etymology.** The specific name refers to my grandchild Kuzgun, who gives me invaluable enjoyment.

*Bracon (Lucobracon) breviradius* sp. n. (Figure 8-15)

**Description.** Female (holotype). Measurements length (mm): Body 2.6, antennae 1.7, hind leg 2.8, mesosoma 1.1, metasoma 1.3.

Head. Transverse, ratio of width:length:height of head = 20:12:17 (Figures 8, 9).

Antennae 23-segmented, 3rd antennal segment almost as long as 4th segment (6:5), 3rd segment 1.7 times and 4th twice as long as width (Figure 10); width of hypoclypeal depression 0.8 times longitudinal diameter of eye and 2.5 times length of malar space; length of maxillary palp 0.6 times height of head; OOL:OD:POL = 10:3:5; basal part of mandible microsculptured; temple smooth, shiny; length of malar space as long as basal length of mandible and 0.4 times longitudinal diameter of eye.

Mesosoma (Figure 11) twice as long as its height; side of pronotum and propleuron densely punctate; mesoscutum smooth, glabrous; notauli distinct; scutellar sulcus crenellated, scutellum compressed and smooth; flange of metapleuron weakly developed; metanotum smooth, shiny; propodeum roughly sculptured, with mediolongitudinal ditch and having some long, white setae laterally.

Wings. Forewing (Figure 12): Pterostigma almost triangular, length of pterostigma 1.6 times its maximal width, vein 1-SR+M curved; vein cu-a interstitial.

Legs (Figure 14). Hind coxa punctate, with long, whitish setae; femur weakly compressed; ratio of femur:thorax:basitarsus:tsarsus = 35:52:20:52; length of femur, tibia, and basitarsus of hind leg 3.6, 7.0, and 4.5 times their maximum width, respectively; length of both hind tibial spurs 0.3 times hind basitarsus; length of foretibial spur 0.5 times forebasitarsus, tibia and tarsus densely setose.

Metasoma (Figure 15). Length of first tergite 0.7 times its apical width; its median area smooth; suture between 2nd and 3rd metasomal tergites very weak and straight; medial length of 2nd tergite almost as long as medial length of 3rd tergite; tergite I granulose sculptured like propodeum; Tergites II and III very slightly leather-like granulose. Ovipositor (1.2 mm) almost as long as metasoma.

Color. Black; tibiae and tarsi reddish-brown; wing membrane dark brown; pterostigma and veins brownish-black.

Male like female, only darker colored.

**Material examined.** Holotype: Female – Sivas, Cumhuriyet Univ. Campus, in an area with *Salvia aethiopis*, *Scorzonera tomentosa*, *Vicia cracca stenophylla*, *Leontice leontopetalum*, *Dactylorrhiza iberica*, *Cephalaria syriaca*, *Moltchia coerulea*, *Reseda lutea*, *Papaver rhoas*, *Consalida orientalis*, *Adonis aestivalis*, *Glaucium leiocarpum*, *Scabiosa argentea* (39°44´54˝N, 37°0´58˝E), 1310 m a.s.L, 18.VI.2002, (Malaise trap).

Paratypes: Male – Bartın, Kurucaşile, Danişment, in an area with *Juglans* sp., *Prunus* sp., *Corylus* sp., *Fragaria* sp., *Rubus* sp., and species of Labiataeae, (41°50´41˝N, 32°42´53˝E), 165 m a.s.L, 9.VI.2002, leg. F. Inanc 1, male, Ö. Çetin, 1 male. All types deposited in the Zoological Museum, Department of Biology, Trakya University, Edirne.
This species is similar to *B. (L.) brachycerus* Thomson, 1892, which also has the marginal cell of the forewing terminating preapically, the first 3 metasomal tergites with granulose sculpture, and the flagellar segments longer than wide (Figure 10).

The new species can be distinguished by its completely rugose propodeum, its granulose sculpturing on the basal half of metasomal tergites III, and its enlarged hypoclypeal depression.

**Etymology.** The specific name refers to the distinctive short radius.

**Discussion**

Studies on Turkish Bracon fauna have revealed the existence of 28 *Bracon* (*Lucobracon*) species (Beyarslan, 1986a, 1986b, 1987, 1996, 1999, 2002a, 2002b; Beyarslan et al., 2002, 2005, 2006, 2008, 2009; Beyarslan and Tobias, 2008). Unfortunately, few specimens from each species were collected, e.g., *B. (L.) kuzguni* sp.n. was obtained only from 2 localities of subeuxine phytogeographical province of the Turkish Black Sea region. The holotype (a female) was collected at an altitude of 1430 m at Dere yolu, Şebinkarahisar, Giresun. The paratype (a male) was collected at 1600 m at Ballıdağ, Daday, Kastamonu.

*B. (L.) kuzguni* sp.n. is closely related to congeneric *triangularis* Nees, 1834. *B. (L.) triangularis* is distributed in the Palaearctic region. This species was obtained from a euxine phytogeographical province of the Western Black Sea region (Beyarslan et al., 2005).

*B. (L.) breviradius* sp. n. was collected from Western Black Sea and Central Anatolia regions of Turkey. The holotype (a female) was collected from Cumhuriyet University campus, Sivas, at an altitude 1310 m, which is a subeuxine phytogeographical province of Turkey. The
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paratype (2 males) of this species was collected from Kurucaşile, Bartın, at an altitude 160 m, which is a euxine phytogeographical province. B. (L.) brachycerus Thomson, 1892, a closely related species, is distributed in the Western Palaeartic region and is not known from Turkey.

Further studies are needed to determine their complete distribution in Turkey.

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