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## A New Species of *Diospilus* Haliday (Hymenoptera: Braconidae, Brachistinae, Diospilini) from Mexico

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ABSTRACT: A species of *Diospilus* from Mexico is described and illustrated. *Diospilus sisyphus* Sánchez, Figueroa and Sharkey new species attacks *Anthonomus sisypus* Clark (Coleoptera: Curculionidae) on the fruit of red nanche, *Malpighia mexicana* A. Juss. A key is included to identify the described species of *Diospilus* of the New World.

KEY WORDS: Neotropical, parasitoid, taxonomy, *Anthonomus sisypus*

Here we include *Diospilus* in Brachistinae following the phylogenetic placement of Sharanowski *et al.* (2011). The diospiline genera recorded in the New World are *Diospilus* Haliday, *Dyscoletes* Haliday, *Taphaeus* Wesmael, *Topaldius* Papp and *Vadum* Mason (Sharkey, 1997). Papp (1995) added *Aspigonus* Wesmael and *Austrodolops* Blanchard but Sharkey (1997), based on the descriptions of the respective types, suggested that they either do not belong to the tribe Diospilini or are not found in the New World. Members of *Diospilus* are cosmopolitan and common in both temperate and tropical regions. They are known to be endoparasites of coleopteran larvae, especially those of the families Anobiidae, Curculionidae and Nitidulidae (Williams *et al.*, 1984; Sharkey, 1997; Billqvist and Ekbohm, 2001). Taxonomic studies of *Diospilus* have been conducted in Europe (Hellen, 1958; Abdinbekova, 1969; Tobias, 1986; Belokobylskij, 1990, 1993a, b, 1998; Belokobylskij and Lobodenko, 1997; Papp, 1993, 1998; Beyarslan *et al.*, 2008), North America (Rohwer, 1917; Gahan, 1916, 1927; Mason, 1968, 1978; Papp, 1995), Asia (Chou and Tsu, 1998) and Africa (Granger, 1949; Papp, 2005). Presently there are 54 described species of *Diospilus* in the world, five of which are found in the New World (*D. curticaudis* Gahan, *D. fomitis* Mason, *D. fulvus* Papp, *D. podobe* Papp and *D. washingtonensis* Rohwer). *Diospilus curticaudis* is the only species reported from Mexico (Papp, 1995; Yu *et al.*, 2005). Other nominal species, such as *Taphaeus californicus* (Rohwer), *T. neoclyti* (Rowher) and *T. polydrusi* (Gahan), were previously included in the genus *Diospilus* but these were transferred by Marsh

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(1974) and Papp (1995) to the genus *Taphaeus*. The objective of this study is to describe and illustrate a new species of *Diospilus* from Mexico, which was reared from *Anthonomus sisyphus* Clark on red nanche fruit, *Malpighia mexicana* A. Juss. The red nanche is a plant with edible fruits, used for crafts and medicine, as well as for the establishment of living fences (Morton, 1987). This plant is distributed in the Mexican states of Durango, Jalisco, Michoacán, México, Puebla, Guerrero, Oaxaca, Chiapas and Yucatán (Martínez, 1994; Guizar and Sánchez, 1997).

#### Material and Methods

Our description of the new species is based on 100 specimens, which were determined by comparison with a combination of specimen types and literature descriptions. Measurement data are based on the analysis of five females and five males and are given in millimeters or ratios. The terminology used in the descriptions follows Sharkey and Wharton (1997) except for the use of *precoxal sulcus* instead of sternaulus, which follows Wharton (2006). Photographs were taken with a Zeiss Stemi 2000-C stereoscope equipped with a Canon G9 digital camera. The illustrations were prepared using Adobe Illustrator 10.0.3. Acronyms used for collections are: CIIDIR-IPN, Unidad Oaxaca, Santa Cruz Xoxocotlán, Oaxaca, México; IIAF, Instituto de Investigaciones Agropecuarias y Forestales, Universidad Michoacana de San Nicolás de Hidalgo, México; USNM, Smithsonian National Museum of Natural History, Washington, D.C., USA; and TAMU, Texas A&M University, Texas, USA.

#### Systematics

*Diospilus* Haliday, 1833

*Diospilus sisyphus* Sánchez, Figueroa and Sharkey, new species

(Figs. 1a–h)

#### Female

*Body length:* 2.30–2.42 mm. *Color:* head reddish brown or dark brown except eye dark green or gray; mesosoma dark brown or black except pronotum light brown, legs and tegula yellowish, fore wing with veins light brown and parastigma and pterostigma darker; metasoma dark brown except first and second terga, and ventral areas yellowish.

*Head:* Transverse in dorsal view; antenna length 1.90–2.06 mm, 23–24 antennal segments, first flagellomere 1.20–1.30 times longer than second, length of first, second and penultimate flagellomere 2.40–3.00, 2.00–2.50 and 1.20 times their respective widths; diameter of ocelli 0.05 mm, anterior ocellus rounded, posterior ocelli slightly elliptic and near to each other, OOL (distance between posterior ocellus and eye) 4.00 times as long as POL (distance between both posterior ocelli); eyes not protruding, 1.20–1.30 times as high as width in lateral view, eye length 1.00–1.15 times as long as temple in dorsal view; temple and occiput smooth with some isolated setae, occiput weakly excavated; occipital and hypostomal carinae meeting each other; frontal and malar sutures absent; malar space 0.92 times as long as basal width of mandible, mandible with basal notch; clypeus 2.92–3.00 times as wide as high, with two apical teeth and its ventrolateral margin denticulate; face 1.45–1.50 times as wide as high, with some small foveolae and isolated setae; frons, vertex and clypeus smooth, with some isolated setae.

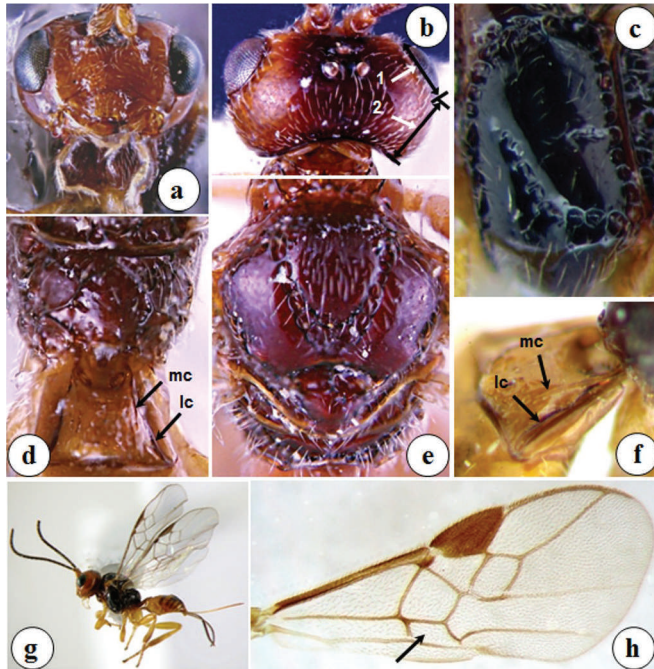


Fig. 1. *Diopilus sisyphus* n. sp. Female: a. anterior view of head, b. dorsal view of head, arrow “1” indicates eye length and arrow “2” indicates temple length, c. lateral view of mesopleuron, d. dorsal view of propodeum, e. tergum 1 in dorsal view, arrows indicate medial carinae (mc) and lateral carinae (lc), f. tergum 1 in lateral view, arrows indicate medial carinae (mc) and lateral carinae (lc), g. female habitus, h. fore wing, arrow indicates first subdiscal cell.

**Mesosoma:** Mesosoma length 1.12–1.17 times its height in lateral view; pronotum crenulate except dorsal area smooth; notauli deep and crenulate; mesonotum margined and crenulate; scutellar sulcus wide, deep and with three costulae; epicnemial carina crenulate; precoxal sulcus crenulate; propodeum medially with a large, smooth pentagonal areola that occupies most of the propodeum (0.90), maximum width of areola 1.0–1.6 times its maximum height, lateral areas of propodeum reticulate. **Wings:** fore wing 2.34–2.51 mm, about as long as body; pterostigma 2.60–2.75 times as long as high, radial vein issuing from its middle; r short, 0.15–0.33 times as long as 3RSa; 3RSa 0.68–0.71 times as long as 2RS; 2RS 0.27–0.28 mm, 1.00–1.09 times as long as r-m; second submarginal cell rectangular, 3RSb 3.85–4.00 times as long as 3RSa, and almost reaching tip of wing; R1 1.25 times as long as pterostigma; 1CUa very short, 0.32–0.59 times as long as 1CUb; first subdiscal cell as in figure h. **Legs:** length of femur, tibia and basitarsus of hind leg 4.00–4.13, 7.70–8.00 and 4.40–5.50 times its width, respectively; tarsal claws with a basal lobe.

**Metasoma:** Length of first tergite 1.08–1.21 times its apical width in dorsal view, pair of carinae laterally reaching hind margin of tergite, medial carinae extending three-quarter length of tergite; and hind half of tergite with short striae; ovipositor length 1.73–2.20 mm, apical end of ovipositor straight; ovipositor sheath 0.77–0.81 times longer than fore wing length.

*Male*

Similar to female, body length 2.36–2.42 mm; fore wing length 1.86–2.42 mm; antenna length 2.03 mm; first flagellomere 1.20–1.33 times longer than second; length of second and third flagellomere 2.4 and 1.80–2.0 times their widths, respectively; 23 antennal segments; length of first tergite 1.13–1.32 times its apical width.

Types: Holotype, female. MEXICO, Oaxaca. Jardín Etnobotánico, Oaxaca, 7-IX-2006, R. Jarquín, host: *Anthonomus sisyphus* on *Malpighia mexicana* Juss. (red nanche fruit) (CIIDIR Oaxaca). Allotype, male. MEXICO, Oaxaca, Atzompa, 14-X-2010, J.Sánchez and R. Jarquín, red nanche fruit (CIIDIR Oaxaca). Paratypes: MEXICO, Oaxaca: Jardín Etnobotánico: 1 female, same data as holotype; 3 female and 1 male, 27-V-2004; 2 female and 1 male 4-VIII-2005; 5 female and 2 male 6-VIII-2005; 1 male 13-VIII-2005; 3 female and 3 male 16-VIII-2005; 1 male 19-VIII-2005; 4 female 23-VIII-2005; 1 female 27-VI-2006; 4 female and 1 male 4-VIII-2006; 2 female 30-VIII-2006; 1 female 16-VI-2011; 1 female 9-IX-2011; 2 female 14-IX-2011; 1 male 20-IX-2011; Atzompa: 2 female and 1 male same data than allotype; 2 female 7-X-2010; 1 female 30-IX-2010; 1 male 4-VIII-2011; 2 male 19-VIII-2011; 2 female and 2 male 4-IX-2011; 11 female and 7 male 22-IX-2011; 7 female and 9 male 29-IX-2011; 2 female and 3 male 6-X-2011; San Lorenzo Cacotepec: 1 female 15-V-2007 R. Jarquín, red nanche fruit; 1 female 8-VI-2007; 2 female and 2 male 21-X-2010. Paratypes deposited in CIIDIR, IIAF, USNM, and TAMU (74, 20, 2, 2, respectively).

Etymology. The specific name refers to the host *Anthonomus sisyphus*.

Hosts. *Anthonomus sisyphus* Clark on *M. mexicana* (red nanche fruit).

Distribution: MEXICO (Oaxaca).

Diagnosis: Distinguished from other *Diospilus* species by the following combination of characters: *D. sisyphus* has a large areola in propodeum, eye length in dorsal view as long as temple, clypeus with two apical teeth and its ventrolateral margin denticulate, first tergite with medial carinae extending three-quarters length of tergite, and posterior half of first tergite with short striae.

This species is similar to *D. fulvus* Papp, and runs to the couplet containing this species in the key to New World species of *Diospilus* in Papp (1995:105). Six species of *Diospilus* are distinguished in the following key modified from Papp (1995).

1. Lower margin of clypeus not denticulate . . . . . 2
- Lower margin of clypeus denticulate . . . . . 5
- 2(1) Females; ovipositor at most 0.5 times the length of metasoma. Body length:
  - 2.50 mm. . . . . *D. curticaudis* Gahan
  - Females; ovipositor at least 1.0 times the length of metasoma. Body length:
    - 2.80–6.00 mm . . . . . 3
- 3(2') Body length: 6 mm. Legs reddish-brown, apical fourth of the posterior tibia dark . . . . . *D. washingtonensis* Rohwer
- Body length: 3.00–4.00 mm. Legs yellow . . . . . 4
- 4(3') Head in dorsal view less transverse, 1.78 times as broad as long, eye not protruding. Distal 10 flagellomeres 1.4–1.6 times as long as broad. Face and clypeus sparsely and weakly punctate, interspaces smooth and shiny. Propodeum with a median pentagonal area, laterally areolated; surface of propodeum smooth to uneven, shiny. First tergite slightly shorter than

- wide posteriorly, pair of keels reaching posterior margin of tergite, posterior half of tergite longitudinally striate. Ovipositor posteriorly straight. Female: 3.30 mm . . . . . *D. podobe* Papp
- Head in dorsal view more transverse, twice as broad as long, eye protruding. Distal 10 flagellomeres as long as broad (cubic). Face below antennal sockets and clypeus entirely aciculo-punctate. Propodeum postero-medially with a pair of weak longitudinal carinae, its surface rugose-rugulose. First tergite 1.2 times as long as wide posteriorly, posterior half rugose, pair of keels extending to basal half of tergite. Ovipositor posteriorly somewhat down-curved. Female: 3.00–4.00 mm, male: 2.80–3.50 mm . . . . . *D. fomitis* Mason
- 5(1') Propodeum medially with small pentagonal areola that occupies 0.75 its length, areola width 0.8 times its height. First tergite as long as wide posteriorly, pair of rather weak carinae restricted to its basal third. Eye length in dorsal view one-third longer than temple. Female: 4.80 mm, male: 3.80 mm. . . . . *D. fulvus* Papp
- Propodeum medially with large pentagonal areola that occupies 0.90 its length, areola width 1.0–1.6 times its height (Fig. 1d). First tergite slightly shorter than wide posteriorly; pair of carinae laterally reaching posterior end of tergite, medial carinae extending three-quarters length of tergite (Fig. 1d, f); and posterior half of tergite with short striae. Eye length in dorsal view as long as temple. Female: 2.30–2.42 mm, male: 2.36–2.42 mm. . . . . *D. sisyphus* n. sp.

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