

# Review of Mexican species of *Diradops* Townes, with a key and description of a new species (Hymenoptera: Ichneumonidae: Banchinae)

D.R. Kasparyan & E. Ruíz Cancino

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A key to Nearctic and Mexican species of the genus *Diradops* is presented. A new species, *D. pulcher* sp. n., is described. Distribution of 7 Mexican species of *Diradops* is given; *D. diora* Ugalde & Gauld and *D. yovera* Ugalde & Gauld are recorded from Mexico for the first time.

D.R. Kasparyan, Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia.

E. Ruíz Cancino, Centro de Investigación, UAM Agronomía y Ciencias, Universidad Autónoma de Tamaulipas, Cd. Victoria, Tamaulipas 87149, Mexico.

## Genus *Diradops* Townes, 1946

Type species: *Meniscus bethunei* Cresson, by original designation.

*Diradops* belongs to the tribe Atrophini of the subfamily Banchinae. It is a moderately large Neotropical genus with one Nearctic species (Townes & Townes, 1966, 1978; Yu & Horstmann, 1997; Gauld et al., 2002). In the recent revision of Banchinae of Costa Rica (Gauld et al., 2002), 27 new species of the genus have been described. In Mexico, 7 species are known now: 4 Mexican species were described earlier (Cresson, 1874; Kasparyan & Pinson, 2007), a new species is described here, and two Costarican species are recorded here from Mexico for the first time.

The type of the Nearctic species and all types of Mexican species described by Cresson have been studied by the senior author. Most part of material (including the holotypes of *D. pulcher* sp. n. and *D. hyphantriae* Kasp. & Pinson) are deposited at Insect Museum of Universidad Autónoma de Tamaulipas, Cd. Victoria, Mexico, and some paratypes, at Zoological Institute of Russian Academy of Sciences, St. Petersburg, Russia.

The following abbreviations are used for collections containing types and material of Mexican species of *Diradops*: ANSP – Philadelphia Academy of Natural Sciences, Philadelphia, USA; INBio – Instituto Nacional de Biodiversidad Collection, Santo Domingo, Costa Rica;

UAT – Insect Museum of Universidad Autónoma de Tamaulipas, Cd. Victoria, Mexico; ZISP – Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia.

## Key to Mexican and Nearctic species of *Diradops*

1. Mesoscutum evenly, closely and rather coarsely punctate . . . . . 2  
– Mesoscutum polished and almost impunctate, except anteriorly . . . . . 4
2. Hind coxa entirely red (as well as hind trochanters and femur). Tergites 1-3 white more or less on basal 0.33-0.4, black posteriorly. Tergites 4-6 completely blackish. Pronotum entirely black. Propodeum black basally, with a pair of lateral and one median yellow spots. – Canada, USA . . . . . ***D. bethunei*** Cresson  
– Hind coxa with fuscous dorsal mark. Hind femora blackish. Tergites coloured not entirely as above, tergites 4-6 with white apical band. Pronotum at least on dorsolateral margin yellow . . . . . 3
3. Hind coxa almost entirely black dorsally (except basally) (Fig. 11). First tergite punctate, yellow with black median third. Second and third tergites of male distinctly and closely punctate, black basally, yellow on apical 0.4. In male (lectotype): antenna black with flagellomeres 10-12(13) yellow; head yellow, only median longitudinal band on frons to hind ocelli, posterior 0.3 of vertex and upper part of occiput black. Thorax yellow; narrow line on hind margin of pronotum beyond the collar, prepectus completely, stripe under subtegular ridge, mesopleural pit, one median and two sublateral lines on mesoscutum (these lines of mesoscutum confused on its hind margin), apex of

- scutellum, metanotum entirely, suture between middle coxae, and transverse median band on propodeum black. Hind femur black; hind tibia black in apical 0.25. Wings yellow, pterostigma yellowish. – Mexico (Veracruz) . . . . . 1. **D. alternans** Cresson
- Hind coxa basally and almost entirely posteriorly black (Fig. 10), dorsally predominantly yellow. Colour pattern of tergites 1-3 as in Fig. 9. Pronotum black with dorsolateral margin yellow (but its hind corner black). Propodeum black in basal 0.65, with apical part, two small subbasal lateral spots and large median subtriangular spot at base yellow (Fig. 8). – Mexico (Veracruz) . . . . . 5. **D. mexicanus** Cresson
4. Pronotum entirely whitish (Fig. 3). – Costa Rica, Mexico . . . . . 3. **D. diora** Ugalde & Gauld
- Pronotum predominantly black . . . . . 5
5. Mesopleurum, metapleurum, propodeum and hind coxa predominantly reddish or pale rufous, without large black marks (propodeum sometimes with light brownish median spot). Apex of tergite 2 (narrowly) and base of tergite 3 (broadly) pale yellow (Figs 1, 4) . . . . . 6
- Mesopleurum, metapleurum, propodeum and hind coxa predominantly white (or yellow) and black. Propodeum with broad transverse median black band (Fig. 5). Coloration of abdominal tergites different . . . . . 7
6. Tergites 4-6 black (or with posterior margin very narrowly white), tergites 7 and 8 white (Fig. 4). – Costa Rica, Mexico . . . . . 7. **D. yovera** Ugalde & Gauld
- Tergites 4-8 entirely reddish brown (Fig. 1). – Mexico . . . . . 6. **D. pulcher** sp. n.
7. Hind coxa black dorsoposteriorly; its apex dorsally entirely black (Fig. 7). Pronotum entirely black, covered with rather dense and coarse punctures. All tarsi of female (male unknown) strongly flattened, twice as wide as their lateral height (Fig. 6). Middle femur above and hind femur completely brown; hind tibia darkened apically, stronger so on ventral side; trochanters yellow with fuscous marks. Abdomen black with basal part of first and apical margin of all segments white or yellow (at the middle of apical segments, yellow band almost interrupted). Flagellum of the type with 41 segments. – Mexico (Veracruz) . . . . . 2. **D. crassitarsus** Cresson
- Hind coxa with broad black or brownish median dorsal band, with extreme base usually yellow (Figs 12-14) (but when hind femur and trochanters black, base of coxa also black). Pronotum at least on front margin white (Fig. 2), polished, covered with rather fine and moderately sparse punctures. Tarsi more or less cylindrical. – Mexico, ?Costa Rica . . . . . 4. **D. hyphantriae** Kasp. & Pinson

### 1. *Diradops alternans* (Cresson, 1874) (Fig. 11)

Cresson, 1874: 410, ♂ [*Meniscus*?; lectotype: ♂, Mexico, Cordoba (ANSP)]; 1916: 15 (designation of lectotype); Townes, 1946: 32, 59; Townes & Townes, 1966: 134.

*Material examined.* 1 ♂ (lectotype).

*Note.* The main diagnostic features of the lectotype are given in the key. In the lectotype (male), fore wing 8.7 mm, flagellum with 38 segments, nervellus intercepted slightly above the middle (!), but face with a median vertical ridge and propodeum with median transverse dark band typical of most Mexican *Diradops*.

*Distribution.* Mexico.

### 2. *Diradops crassitarsus* (Cresson, 1874) (Figs 5-7)

Cresson, 1874: 409, ♀ [*Meniscus*; lectotype: ♀ Mexico, Orizaba (ANSP)]; 1916: 26 (designation of lectotype); Townes, 1946: 35, 59; Townes & Townes, 1966: 134.

*Material examined.* 1 ♀ (lectotype).

*Distribution.* Mexico.

### 3. *Diradops diora* Ugalde & Gauld, 2002 (Fig. 3)

Ugalde & Gauld, 2002 : 334 (Fig. 392), 336 (key), 351 (description, ♂ ♀) [Holotype: ♀, Costa Rica, Cartago Prov., Dulce Nombre, Vivero Linda Vista, 1300 m, VII-VIII.1993 (Hanson) (INBio)].

*Material examined.* Mexico, Tabasco: 1 ♀, Centro, Lagartera, 26.III.1997 (A. Martínez con col.).

*Diagnosis.* The species can easily be separated from other species owing to its very extense white coloration (Fig. 3) and strong transverse rugosity on propodeum. Head white; narrow median longitudinal band on frons to hind ocelli, small posterior spots on vertex and upper part of occiput black. Antenna basally black with scape and pedicel ventrally and flagellomeres 10-20 white, apex of flagellum (segments 21-37) in Mexican specimen pale rufous. Thorax pale yellow; three longitudinal stripes on mesoscutum, transverse mark just before prescutellar groove, apex of scutellum and postscutellum black. Propodeum with weak median pale brownish mark; its transverse striae coarse and posterior transverse carina strong and usually complete. Metapleurum smooth, with isolated punctures. Metasoma predominantly white with transverse submedian black bands on tergites 1-6. Fore and middle legs whitish with tarsi slightly infusate. Hind coxa white with dorsal black mark; trochanters infusate; femur blackish; tibia white with dark apex; hind tarsus white.

*Distribution.* Costa Rica, Mexico (new record).

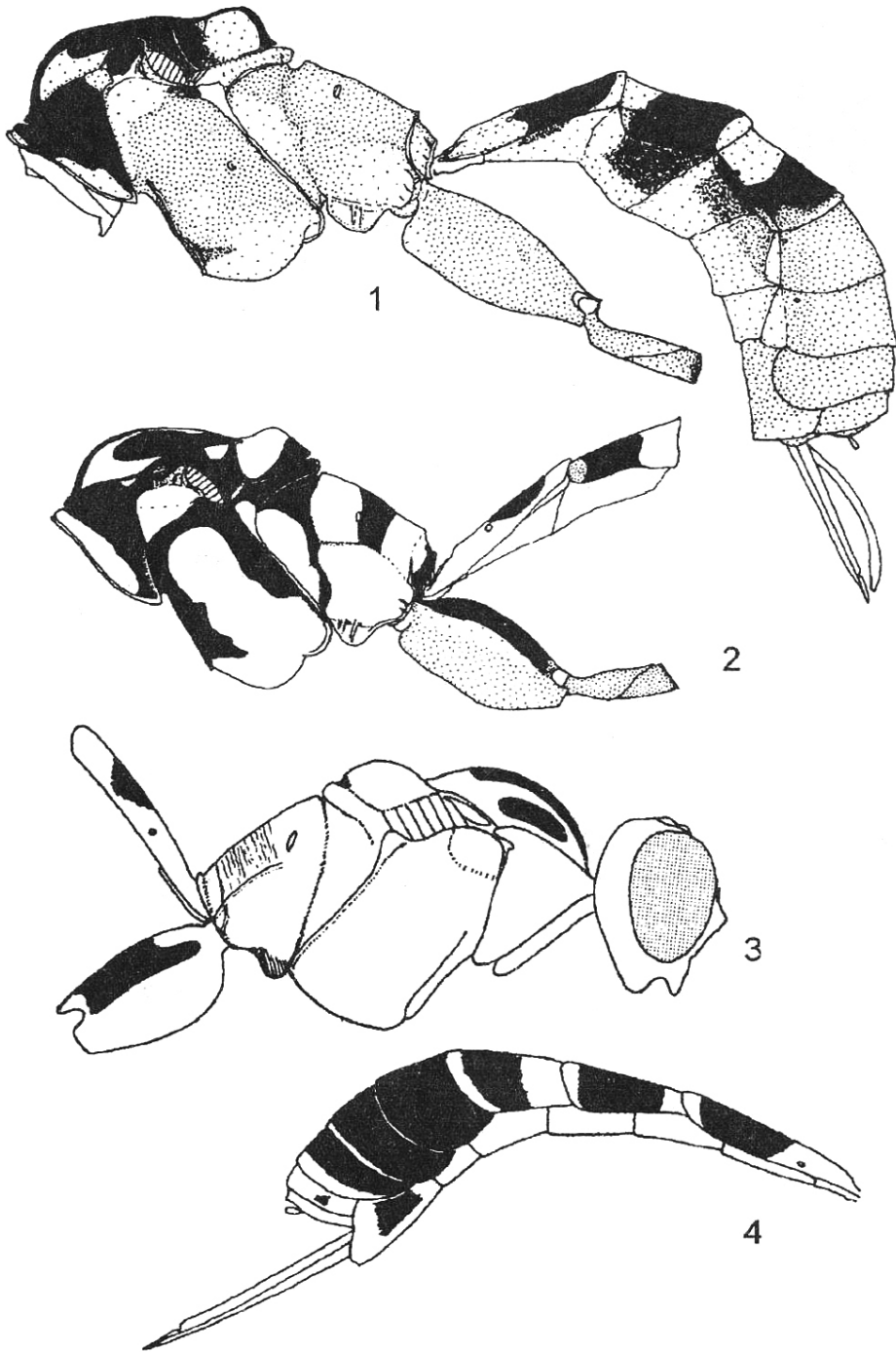
### 4. *Diradops hyphantriae* Kasparyan & Pinson, 2007 (Figs 2, 12-15)

Kasparyan & Pinson, 2007: 40, ♀ ♂ [Holotype: ♀, Mexico, Tamaulipas, Gomez Farias, Los Cedros, 340 m, tr. Malaise, 7-16.I.1999 (S. Hernández A., C. Covarrubias D.) (UAT)]. – ?*Diradops mexicana* (non Cresson): Ugalde & Gauld, 2002: 358 (part).

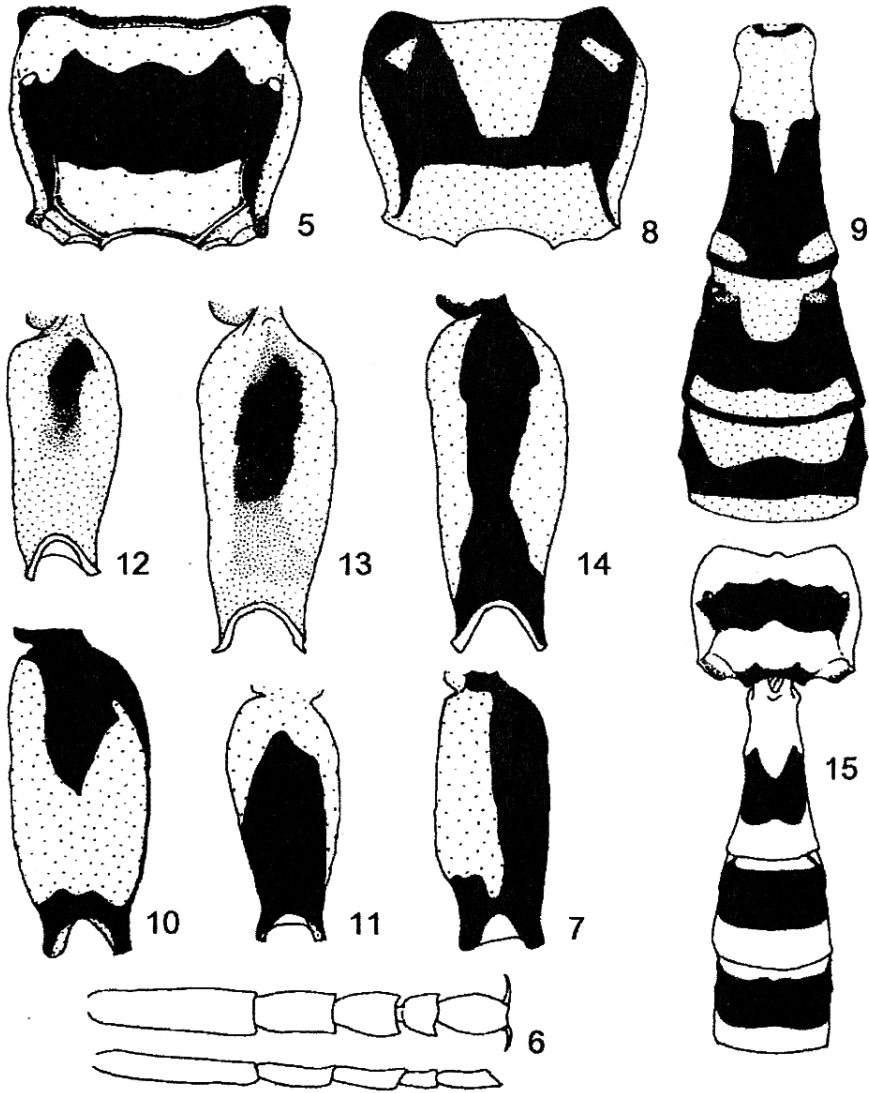
*Material examined.* Holotype and paratypes, in total 163 ♀ and 47 ♂ from Mexico (provinces Nuevo León, Tamaulipas, Veracruz, Yucatán).

*Distribution.* Mexico, ?Costa Rica.

*Biology.* One female from Jaumave (Tamaulipas) was reared from web nests of *Hyphantria cunea* Drury (Lepidoptera, Arctiidae) collected on pecan (*Carya illinoensis*).



**Figs 1-4.** *Diradops*, females, colour pattern. **1.** *D. pulcher* sp. n., body and base of hind leg; **2.** *D. hyphantriae* Kasp. & Pinson, thorax, base of abdomen and hind coxa; **3.** *D. diora* Ugalde & Gauld, head, thorax, base of abdomen and hind coxa; **4.** *D. yovera* Ugalde & Gauld, metasoma. (Figs 3, 4 after Gauld et al., 2002).



**Figs 5-15.** *Diradops*, females (except for Fig. 11, male). 5-7, *D. crassitarsus* (Cresson), lectotype; 8-10, *D. mexicanus* (Cresson), holotype; 11, *D. alternatus* (Cresson), lectotype; 12-15, *D. hyphantriae* Kasp. & Pinson. 5, 8, propodeum, dorsal view (colour pattern); 6, hind tarsus, dorsal and lateral view; 7, 10-14, hind coxa, dorsal view (colour pattern); 9, metasomal tergites 1-3, dorsal view (colour pattern); 15, propodeum and base of metasoma, dorsal view (colour pattern).

**5. *Diradops mexicanus*** (Cresson, 1874)  
(Figs 8-10)

Cresson, 1874: 410, ♀ [*Meniscus*; holotype: ♀, Mexico, Cordoba (ANSP)]; Townes, 1946: 40, 59; Townes & Townes, 1966: 134.

*Material examined.* 1 ♀ (holotype).

*Remarks.* Only the holotype is known. The Costarican material of *D. mexicanus* sensu Ugalde & Gauld, 2002 belongs perhaps to *D. hyphantriae* Kasp. & Pinson or to a related undescribed species. Differences between *D. mexicanus* Cresson and *D. hyphantriae* are discussed by Kasparyan & Pinson (2007).

*Distribution.* Mexico.



## 6. *Diradops pulcher* Kasparyan, sp. n. (Fig. 1)

*Holotype*. ♀, **Mexico**, *Tamaulipas*, Gomez Farias, Alta Cimas, 900 m, Malaise trap, 16-23.IX.2000 (D. Kasparyan) (UAT).

*Paratypes* (UAT, except for 2 ♀ in ZISP). **Mexico**, *Tamaulipas*: 1 ♀, Cd. Victoria, Canyon Novillo, 27.X.1984 (F. Lopez V.); 5 ♀, Gomez Farias, Alta Cimas, 900 m, Malaise trap, 12.VI-31.VII.1999 (S. Hernández A.); 6 ♀, same locality, 12.VIII-16.IX.2000 (D. Kasparyan); **Veracruz**: 1 ♀, Estación Biol. Los Tuxtlas, 21.IX.1985 (E. Ramirez, R. Mendez).

*Description*. *Female* (holotype). Fore wing 8.5 mm long. Antenna filiform, slightly thinner to apex, with 39 flagellomeres. Mandibles slender, rather strongly tapered, with upper tooth about 2.0 times as long as lower tooth. Malar space about 0.66 times as long as basal width of mandible. Face with raised median vertical ridge. Posterior ocellus separated from eye by 1.33 times its own diameter. Occipital carina joining hypostomal carina just above base of mandible. Mesoscutum smooth, distinctly punctate only in anterior 0.25; scutellum convex, smooth, with moderately coarse and dense punctures, at apex with short vertical wrinkles. Mesopleurum entirely (except for small polished impunctate area below the mesopleural pit), metapleurum and propodeum rather coarsely and closely punctate, distances between punctures 0.5-1.5 their diameters. Submetapleurum carina anteriorly strongly broadened; pleural carina absent. Propodeum dorsally with transverse striae in median 0.6; its apical transverse carina strong, apical area shiny, impunctate, with some vertical rugae. Nervulus interstitial; nervellus in hind wing intercepted slightly below the middle. Abdomen weakly compressed at apex. First tergite 2.3 times as long as wide; second and third tergites about as long as their posterior width. Ovipositor rather stout, more or less straight (Fig. 1); ovipositor sheath about 0.43 times as long as hind tibia.

Antenna black with about flagellomeres 9-16(17) white; scape and pedicel white ventrally. Maxillary palpi brownish; their basal segment and labial palpi whitish. Head white; face and frons with a broad median vertical stripe, which is very narrow at upper part of face; clypeal suture between clypeal foveae, interocellar area, vertex (except for orbits) and occiput (except for small spot on postgenae) black. Mesosoma with pronotum and mesoscutum predominantly black; other its parts predominantly reddish with whitish yellow pattern (Fig. 1). Tegulae brownish black. Propleurum (except for median suture) and anterior margin of pronotum (except for short dorsolateral black interruption) yellowish white. Anterolateral whitish spots of mesoscutum without dorsomedian prolongation. Tergites 1-3 with black and whitish yellow pattern as in Fig. 1; other tergites completely reddish brown; epipleurae of

tergites 4 and 5 whitish; sternites whitish with last sternite pale rufous. Fore legs (except for white coxa), middle tibiae and tarsi pale rufous, 3 apical segments of tarsi infuscate. Middle and hind coxae (except for white basal 0.35 of middle coxa), trochanters and femora reddish (femora infuscate at extreme base). Hind tibia predominantly brownish, yellowish in basal 0.25 and almost blackish brown apically. Hind tarsus whitish yellow with basal 0.4 of first segment dark brown. Wings hyaline with distal apex of fore wing distinctly infumate; pterostigma blackish brown.

*Male* unknown.

*Variability*. Fore wing 7-9 mm long; paratypes structurally and chromatically very similar to holotype.

## 7. *Diradops yovera* Ugalde & Gauld, 2002 (Fig. 4)

Ugalde & Gauld, 2002: 338 (Fig. 15), 343 (key), 373 (description, ♀ ♂) [Holotype: ♀, Costa Rica, Guanacaste National Park, 560 m, VII-VIII.1989 (Gauld) (INBio)].

*Material examined*. **Mexico**, *Tamaulipas*, Gomez Farias, Malaise tr., 2 ♀: Canindo, 1400 m, 20-21.VII.1994 (J.B. Woolley), and Alta Cima, 900 m, 12-19.VIII.2000 (D. Kasparyan).

*Diagnosis*. *D. yovera* differs from most other Mexican species in the predominantly reddish coloration of the mesosoma and hind coxa. It differs from *D. pulcher* (which has more or less similar type of coloration) in the coloration of abdomen (compare Figs 1 and 4).

*Distribution*. Costa Rica, Mexico (new record).

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