DUGESIANA

Revista de Entomología

Volumen 33 número 1

ISSN 2007-9133

Dugesiana, Año 33, No. 1 (enero-junio, primer semestre 2026), es una publicación semestral, editada por la Universidad de Guadalajara, a través del Centro de Estudios en Zoología, por el Centro Universitario de Ciencias Biológicas y Agropecuarias. Camino Ramón Padilla Sánchez # 2100, Nextipac, Zapopan, Jalisco, Tel. 3337771150 ext. 33218, http://dugesiana.cucba.udg.mx/index.php/DUG, glenusmx@gmail.com. Editor responsable: José Luis Navarrete-Heredia. Reserva de Derechos al Uso Exclusivo 04-2009-062310115100-203, ISSN: 2007-9133, otorgados por el Instituto Nacional del Derecho de Autor. Responsable de la última actualización de este número: José Luis Navarrete-Heredia, Editor y Ana Laura González-Hernández, Asistente Editorial. Fecha de la última modificación 1 de enero 2026.

Dugesiana 33(1): 61-66
Fecha de publicación: 1 de enero 2026

ISSN 1405-4094 (edición impresa)
ISSN 2007-9133 (edición online)
Artículo
http://zoobank.org/899E0CE1-E349-4169-8217-428ADEB5595E

First record of the genus *Didimioza* Quate and Brown in Mexico, with the description of *Didimioza noveloi* sp. nov. (Diptera: Psychodidae)

Primer registro del género *Didimioza* Quate and Brown en México, con la descripción de *Didimioza noveloi* sp. nov. (Diptera: Psychodidae)

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ABSTRACT

A new species of the Neotropical moth fly genus *Didimioza* Quate and Brown is described based on male characteristics. *Didimioza noveloi* **sp. nov.** is the fourth known species of this genus and represents the first record of the genus in Mexico. It is distinguished from other species of the genus by the angular curvature of the aedeagus and sigmoidal form of the paramere.
Key words: Moth fly; new species, Maruinini.

RESUMEN

Una especie nueva de moscas palomilla del género *Didimioza* Quate y Brown es descrita con base en las características del macho. *Didimioza noveloi* **sp. nov.** es la cuarta especie que se conoce del género y la primera que se registra en México. Se distingue de otras especies del género por la curvatura angular del edeago y la forma sigmoidal del parámero.
Palabras clave: Moscas palomilla; nueva especie, Maruinini.

Quate (1999) described *Desmioza symphylia* based on a male specimen collected in Barro Colorado Island, Panama. Later Quate and Brown (2004) determined that this species, along with two others collected in Venezuela and Peru, presented characteristics sufficiently different to be included in a new genus, *Didimioza* Quate and Brown, 2004.

Didimioza is recognized principally by the eyes separated, with interocular suture and eye bridge with four facet rows; antenna longer than wing width, with 13 flagellomeres of which the basal is enlarged, 2-11 pyriform with poorly defined internodes, flagellomere 12 without internode, flagellomere 13 with apiculus as long as base, ascoids paired in flagellomeres 1-12, unidigitate, longer than the flagellomere bearing them, wing with only small faint dark spots at vein tips and forks, radial and medial forks near the middle of the wing, and R_5 ending beyond wing apex (Quate and Brown 2004).

Before this work, three species were known: *Didimioza symphylia* (Quate, 1999) known from Panama (type locality) and Costa Rica, *D. venezuelica* Quate and Brown, 2004, from Venezuela, and *D. chachapoya* Quate and Brown, 2004, from Peru.

In this work, a new species of *Didimioza* is described based on the male morphological characters from a specimen collected in southern Mexico.

MATERIAL AND METHODS

Collection site and field methods. Specimens were obtained through collections for the project: "Estratificación de tres enfermedades prioritarias en áreas de riesgo con base en sus insectos vectores en el estado de Veracruz, México", granted to Sergio Ibáñez-Bernal by CONACYT FOMIX-Veracruz-Salud, 68317 (INECOL 1333), and additionally supported by the Scientific Collaborative Agreement between Servicios de Salud de Veracruz (SESVER) and the Instituto de Ecología, A.C. (INECOL).

The specimen was collected in an "acahual" (vegetation that covers fallow or crop fields after mowing or harvesting, particularly that formed by herbaceous plants or shrubs) near the locality of Medellín of the municipality Santiago Tuxtla, in the southern part of the state of Veracruz, Mexico (18°24'59"N 95°22'03"W, altitude 69 m).

The climate is warm and humid, with a temperature range of 24-26°C and rain most of the year. The vegetation in the Los Tuxtlas region has as dominant type the evergreen tropical forest as original vegetation, but some areas are transformed for agricultural use and for livestock breeding (INEGI 2010). This locality belongs to the Veracruz physiographical province (Morrone 2005; Durán-Luz and Ibáñez-Bernal 2025).

The specimen was collected using a Miniature CDC-UV light trap (Model 912, John W. Hock Company, Gainesville, FL.). The specimens were preserved in 70% ethanol.

Laboratory procedure. The specimen was cleared, dissected, and permanently mounted on slides following the procedure outlined by Ibáñez-Bernal (2024), with Euparal as permanent mounting medium (Bioquip Products, Inc., Rancho Dominguez, CA, USA). Specimens were examined using a Nikon Eclipse 50i phase contrast microscope. Measurements were obtained using an ocular micrometer

and are given in millimeters. Drawings were rendered with the aid of a Nikon Y-IDT drawing tube, artwork completed by mixed media drawing technique using Chinese ink and charcoal, and then digitally processed with Corel Photo Paint X3 (Version 13). The specimen is deposited in Colección de Insectos del Instituto de Ecología, A. C., Xalapa, Veracruz, Mexico (IEXA).

Terminology. The general morphological terminology of Cumming & Wood (2017) and Kvifte & Wagner (2017) is used, with the terms hypopod and gonocoxal condyle as proposed by Kvifte (2014). The term "frons" refers to the sclerite situated below the eyes at level of the antennal insertions, whereas "vertex" corresponds to the upper portion of the head above the eye bridge, and "face" the sclerite situated below the tentorial pits and above the oral margin that usually presents a patch of setae alveoli.

Measurements. Head width was taken at the widest part, whereas the length was measured from the vertex to the lower margin of the head. Wing length is measured from the beginning of the basal node of costa to the wing tip. Proportion of the palpus segments are given considering the length of palpus segment I as a unit (1.0).

TAXONOMY TREATMENT

Didimioza noveloi Ibáñez-Bernal, sp. nov.

(Figures 1-10)

http://zoobank.org/BF20C716-01CA-499B-AC8A-2A0DF78F4E68

Diagnosis. *Didimioza noveloi* **sp. nov**. differs from other species of the genus by the long and angularly curved aedeagus and the elongated and sigmoidal paramere.

Male description. Head (Figs. 1-2) oval in frontal view, vertex barely outstanding with surface covered with setae alveoli, except for a narrow longitudinal line in the middle. Eyes separated by 1.0 facet diameter, with an inverted Y-shaped interocular suture, eye-bridge with four rows of facets, and supraorbital macrosetae alveoli confined to the lateral and posterior portion of head. Frontal patch of alveoli complete, nearly quadrangular with upper margin slightly bilobed and with an upper extension of two rows of alveoli that reaches the level of the first inferior facet. Face with a quadrangular, longer than wide, patch of setae alveoli (Fig. 1). Occiput with about four supraorbital macrosetae, with a patch of alveoli reaching the posterior inferior angle of eye, separated from the margin of the oval foramen magnum (Fig. 2). Antenna longer than wing width; scape short, 2.3 times the length of the spherical pedicel (Fig. 4); flagellum with 13 flagellomeres, internodes poorly defined, those of basal flagellomeres short but progressively elongating (Fig. 1), flagellomere 12 without internode, flagellomere 13 with apiculis as long as its basal portion (Fig. 3). Ascoids much longer than the flagellomere of origin, paired on flagellomeres 1-12, unidigitate and strongly convoluted (Figs. 1. 3, 4). Palpus about 0.75 the length of the antenna, reaching the level of the flagellomere 8; proportion of palpal segments: 1.00: 1.37: 1.50: 2.30, last segment corrugated, fleshy (Fig. 1). Labium with an inverted Y-shaped sclerite and with six small spines at each side on internal margin and patches of long setae externally (Fig. 5).

Thorax with no allurement organs; anepisternum sparsely covered with setae alveoli, laterotergite with a patch of alveoli at center. Mid coxa with an anterior patch of small sensilla. Pretarsal claws at apex. Wing with small faint brown spots at R and M forks and at vein tips; costa without second costal node, Sc ending at level of the origin of R_5, Rs not pectinate, R_{2+3} weakly joined to R_4, R_3 with spur, radial and medial forks basal but near wing center, medial fork basal to radial fork, M_2 weakly joined to M_1; R_5 ending beyond wing apex (Fig. 6).

Male terminalia (Figs. 7-10). Epandrium nude, about as long as wide, the posterior margin concave and with a large single foramen; subepandrial sclerites as divergent laminar rods with irregular margins (Fig. 7). Hypopod longer than epandrium, tapering towards apex (Fig. 7), with one spatulate tenaculum at apex (Fig. 8). Epiproct triangular, hypoproct arrowhead shaped, more than twice the length of epiproct (Fig. 7). Hypandrium is a thin bar connecting the gonocoxites. Aedeagus strongly asymmetrical, basally broad with complex curvatures, apex long and lanceolate, bent near the middle almost at a right angle so the tip is laterally directed; ejaculatory apodeme expanded anteriorly, longer than aedeagus and with a large hole. Paramere broad at base with a pyramidal short protuberance and a long sigmoidal branch which is longer and somewhat narrower than the aedeagus, with the apex directed laterally in the opposite direction to the aedeagus (Fig. 9). Anterior gonocoxal condyles oval, greatly expanded, ending in a point anteriorly; posterior gonocoxal condyles rounded, nude, and in contact each other (Fig. 10). Gonocoxite short, with a patch of delicate sensilla on the inner area. Gonostylus longer than gonocoxite, simple, tapering towards apex (Figs. 9-10).

Measurements (in millimeters). Head height: 0.49; head width: 0.54; palpus length: 0.62; antenna length: 1.22; wing length: 2.16; Wing width: 0.82; epandrium length at middle: 0.10; hypopod length: 0.20; tenaculum length: 0.06; gonocoxite length: 0.10; gonostylus length: 0.14; aedeagus length: 0.16; paramere length: 0.18.

Female. Unknown.

Type material. Holotype male. Mexico, Veracruz, municipality Santiago Tuxtla, Medellín, 7-iv-2010, acahual, CDC light trap, Jurisdicción Sanitaria 10, colls.

Etymology. This species is named in honor of the prominent Mexican entomologist Rodolfo Novelo Gutiérrez, a specialist in the study of Odonata and other aquatic insect orders, in recognition to his work. Rodolfo Novelo has been a teacher, colleague and friend for more than 45 years.

Comments. Genus *Didimioza* has been placed in the tribe Maruinini Enderlein, 1937 (= Arisemini Vaillant, 1982; Setomimini Vaillant, 1982) (Quate and Brown 2004; Kvifte 2018) although its monophyly is questionable. The gonocoxal condyles of *Didimioza* are expanded as lobes, in contact with each other, but do not form a median keel that links to the ejaculatory apodeme, whereas the parameral sheath is untraceable (see Durán-Luz and Ibáñez-Bernal 2025), characteristics that are important for recognizing the tribe.

Didimioza noveloi **sp. nov**. is the fourth known species of this genus and the first recorded in Mexico. *Didimioza venezuelica* Quate and Brown differs because it has spines in the posterior margin of the posterior gonocoxal condyles, and the aedeagus and paramere straight.

Didimioza symphylia and *D. chachapoya*, are similar to *D. noveloi* **sp. nov**., as the three species possess the posterior condyles destitute of cluster of spines in the posterior margin, but *D. chachapoya* has the gonocoxites as long as wide, with the aedeagus and paramere only slightly curved only at their distal fifth, whereas *D. symphylia* has the ejaculatory apodeme nearly quadrate, being as long as 2.0 times its maximum width, and the aedeagus and paramere nearly straight.

It is important to mention that specimens of *D. symphylia* from the Canal zone, Panama, and those of Guanacaste, Costa Rica, have the aedeagus nearly as long as paramere, whereas specimens from Cartago and Punta Arenas, Costa Rica, have the aedeagus much shorter than the paramere (Quate and Brown 2004), a difference that probably will be significant for separating both populations into species through future studies.

However, *D. noveloi* **sp. nov.** is distinguished from the other three species by the aedeagus strongly asymmetrical, basally broad with complex curvatures and apex long and lanceolate bent near the middle almost at a right angle so the tip is laterally directed, and by the paramere broad at base with a pyramidal short protuberance and a long sigmoidal branch which is longer and somewhat narrower than the aedeagus, with the apex directed laterally in the opposite direction to the aedeagus.

ACKNOWLEDGEMENTS

I am indebted to the entomological personnel of the Jurisdicción Sanitaria 10 of the Secretaría de Salud de Veracruz for their help in the field collections. I appreciate the support of María Teresa Suárez-Landa for digitizing the original figures illustrating this work. I appreciate the commentaries of two anonymous reviewers that help to improve the final version of this work.

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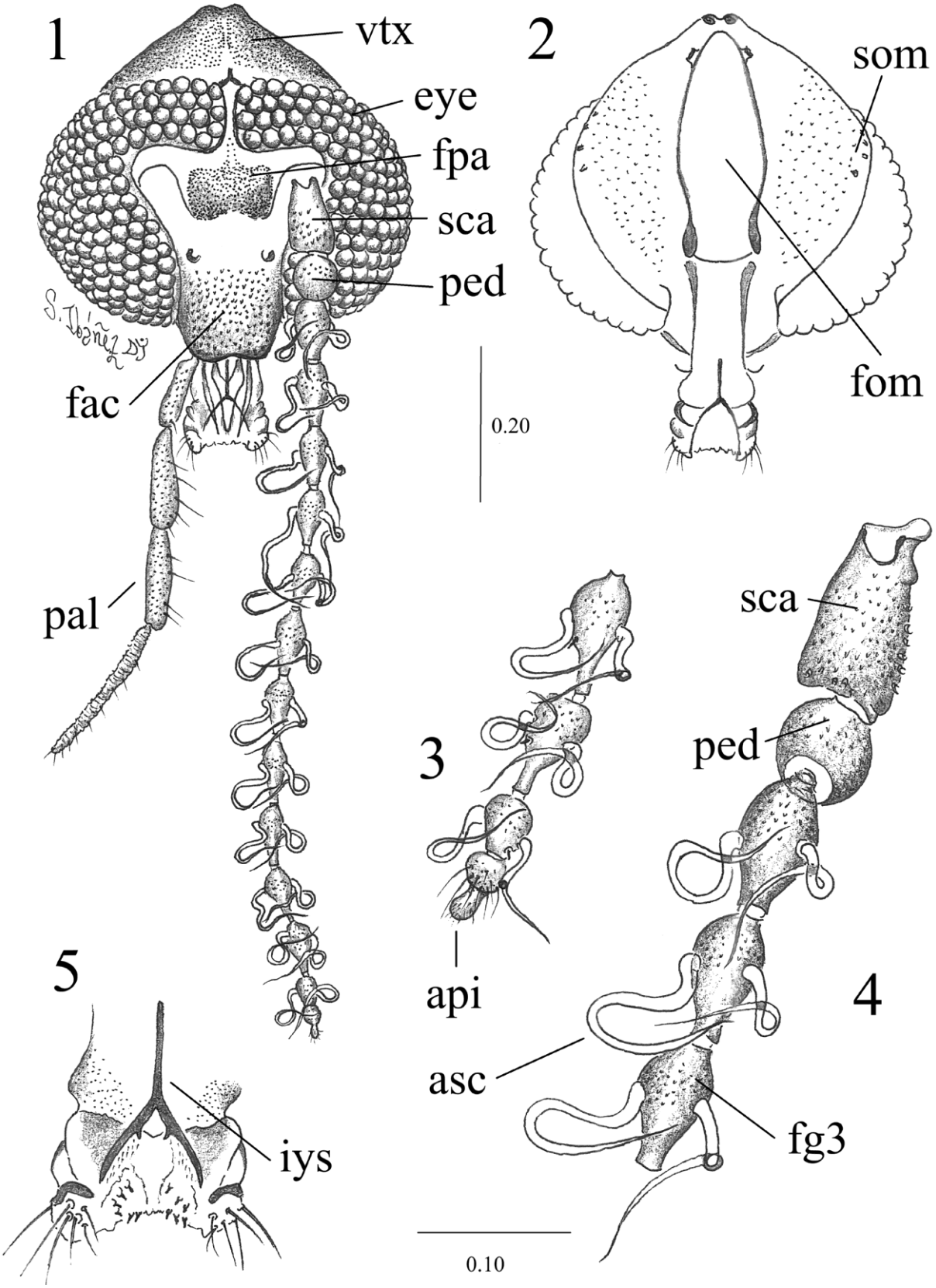
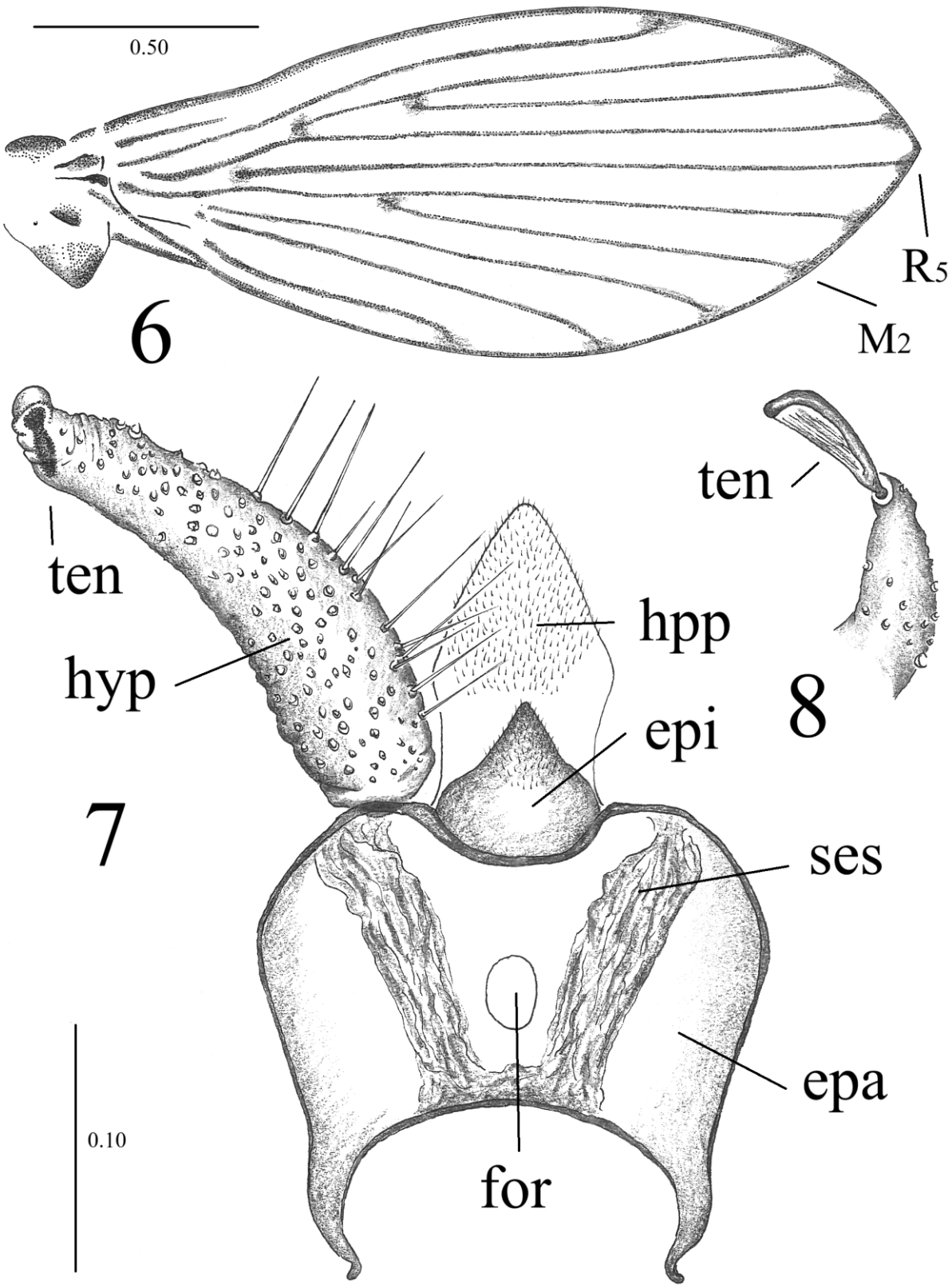
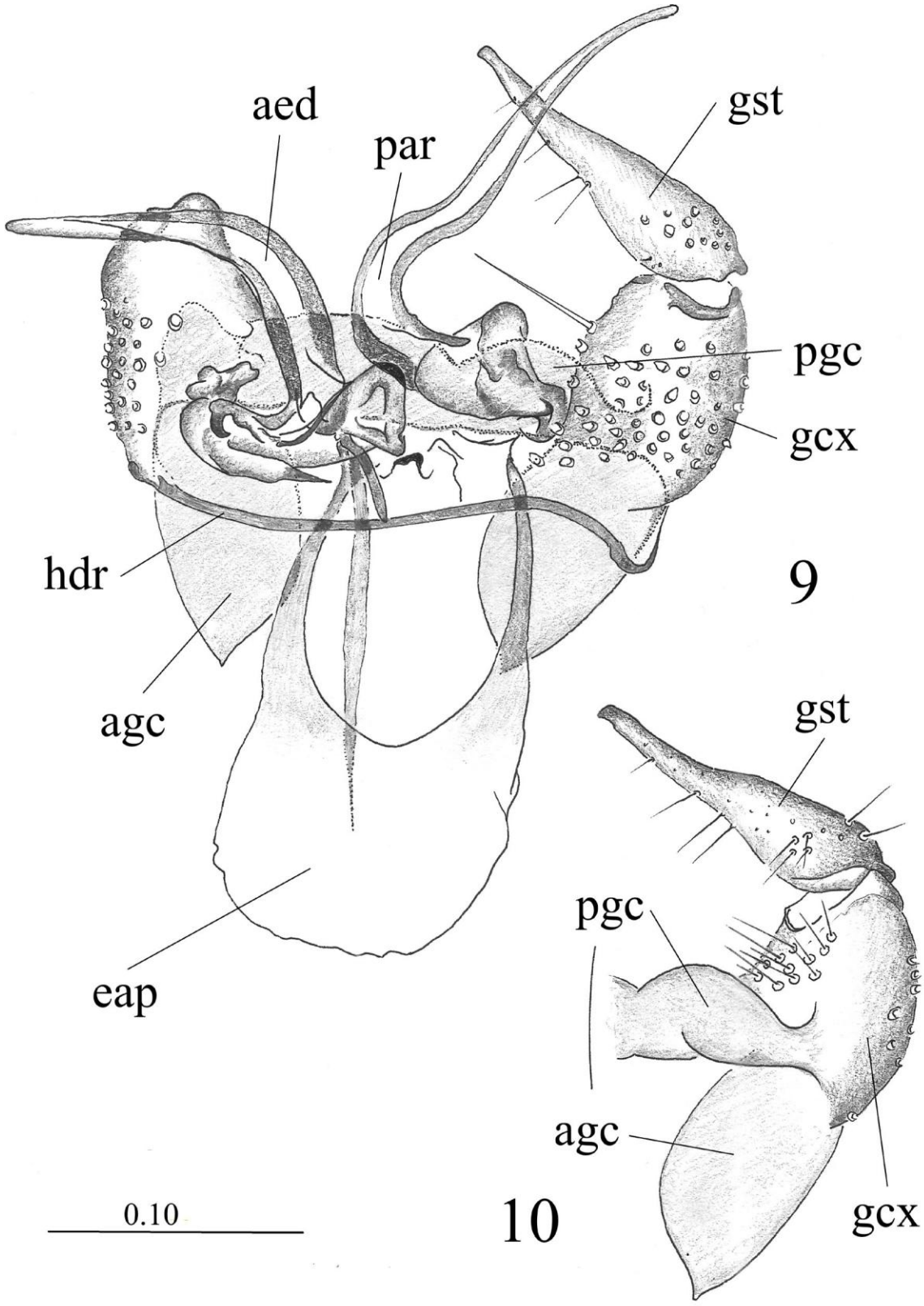
Recibido: 7 de mayo 2025
Aceptado: 12 de noviembre 2025



Figures 1- 5. *Didimioza noveloi* **sp. nov.**, male. **1**) Head, frontal view; left palpus and right antenna not drawn. **2**) Head, posterior view. **3**) Apical section of antenna. **4**) Basal section of antenna. **5**) Labium. Abbreviatures: **api**: apiculus; **asc**: ascoid; **eye**: eye; **fac**: face; **fg3**: flagellomere 3; **fom**: foramen magnum; **fpa**: frontal patch of alveoli; **iys**: inverted Y-shaped sclerite; **pal**: palpus; **ped**: pedicel; **sca**: scape; **som**: supraorbital macrosetae **vtx**: vertex. Scales in millimeters.



Figures 6- 8. *Didimioza noveloi* **sp. nov.**, male. 6) Wing. 7) Epandrium, hypopod, hypoproct, and epiproct. 8) Apex of hypopod showing the tenaculum in lateral view. Abbreviatures: **epa**: epandrium; **epi**: epiproct; **for**: foramen; **hpp**: hypoproct; **hyp**: hypopod; **M_2**: medial two vein; **R_5**: radial five vein; **ses**: subepandrial sclerite; **ten**: tenaculum. Scales in millimeters.



Figures 9-10. *Didimioza noveloi* **sp. nov.**, male. 9) Ventral view of terminalia. 10) partial view of terminalia showing the anterior and posterior gonocoxal apodemes. Abbreviatures: **aed**: aedeagus; **agc**: anterior gonocoxal condyle; **eap**: ejaculatory apodeme; **gcx**: gonocoxite; **gst**: gonostyle; **hdr**: hypandrium; **par**: paramere; **pgc**: posterior gonocoxal condyle. Scale in millimeters.

