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Hermelindo Hernández Torres, Alexander Georgievich Kirejtshuk, Carolina Núñez Vázquez & Oswaldo García Martínez

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NOTES AND COMMENTS

On *Aethina tumida* Murray (Coleoptera: Nitidulidae: Nitidulinae) in hives of *Apis mellifera* Linnaeus (Hymenoptera: Apidae) in Campeche, México

Hermelindo Hernández Torres^{a*} , Alexander Georgievich Kirejtshuk^b , Carolina Núñez Vázquez^c  and Oswaldo García Martínez^d

^aDepartamento de Agronomía, Universidad Autónoma de Tamaulipas, Unidad Académica Multidisciplinaria Mante, Tamaulipas, México;

^bZoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia; ^cSociedad Multidisciplinaria en Ciencias Agronómicas Aplicadas y Biotecnología, Morelia, Michoacán, México; ^dUniversidad Autónoma Agraria Antonio Narro, Saltillo Coahuila, México

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This paper reports for the first time the presence of *Aethina tumida* Murray, 1867 in hives of *Apis mellifera* Linnaeus, 1758, established in the locality of Pucnachen Municipality of Calkini the State of Campeche, México. Nitidulids were collected manually on the honey combs in the frames of *A. mellifera* hives, defecating on honey and on the floor of the hives, fermenting honey making it useless. *A. tumida* is a potential pest in beekeeping due to direct damage caused to honey as a food product, causing significant economic losses for beekeepers of this region of México. Also, the presence of this beetle was verified for the first time in stingless bee colonies, which are of great importance in traditional honey production. A detailed morphological description of the beetle is provided.

Keywords: pest; honey bee; taxonomy; morphology; small hive beetle

Apis mellifera is a producer species of honey and pollination of different plants including agricultural species; also *A. mellifera* is very susceptible to different pests that cause damage to its offspring and honey production. Among these pests is the small hive beetle (SHB), *Aethina tumida* (Umaña et al., 2015). Recently, *A. tumida* has been reported as one of the main invasive pests causing damage to colonies of *A. mellifera*, (El-Niweiri et al., 2008; Neumann & Elzen, 2004). This small nitidulid beetle of the hive was initially distributed in Sub-Saharan Africa (Grouvelle, 1913); Later in June 2002, it was detected in Etaie Al-Baroud apiaries (about 110 km north-west of Cairo, Egypt) (Mostafa & Williams, 2002). In the Western Hemisphere it was first reported in 1998 in central-eastern Florida in colonies of European honey bees (Elzen et al., 2001; Hood, 2004); and in the fall of 2007 it was detected also in México north of Coahuila State (Santana, 2011). This species, in cases of the absence of colonies of *A. mellifera*, can feed on decomposed fruits (Buchholz et al., 2008; Ellis et al., 2002c; Schmolke, 1974). *A. tumida*, has also been reported in *Melipona beecheii* Bennett, 1835 hives in Cuba, and in colonies of other stingless bees such as *Dactylurina staudingeri* Gribodo, 1893 and *Trigona carbonaria* Smith, 1874 (Lóriga Peña et al., 2014). Adults and larvae of this beetle feed on honey, causing fermentation and making it unusable (Elzen et al., 2001), which brings significant economic losses in beekeeping.

Campeche has been considered a risk area due to the detection of *A. tumida* in nearby States such as

Yucatan and Quintana Roo (Saldaña et al., 2014; Valdovinos et al., 2016). In this paper, for the first time *A. tumida* is recorded in the State of Campeche, México; on honey bees hives, also *A. tumida* for the first time is recorded in stingless bee colonies in México.

The inspection and collection of *A. tumida* was carried out manually in 300 beehives of *A. mellifera* and 50 beehives of *M. beecheii* during the months from March to June 2017 in apiaries of the Pucnachen Locality Municipality of Calkini of the State of Campeche México, with coordinates 20° 22'16" N 90°03'02" E at 3 meters above the sea level, with predominantly subhumid to semi-dry warm climate, and vegetation complexes composed of mangroves, flooded grasslands, the circular islands of green arboreal vegetation, deciduous low forest, tropical forest, and low flood forest. During the inspection, only adults were collected, no larval stages were observed because the boxes of the hives analyzed had received a treatment in advance to smooth the internal surface covering cracks or joints of the wood to avoid entry of larvae and adults of any insect pest. The adults collected were placed in plastic bottles with 80% ethyl alcohol, labeled with collection data and transferred to the Taxonomy of Insects and Mites laboratory of the Departamento de Parasitología Agrícola de la Universidad Autónoma Agraria Antonio Narro (UAAAN) in Saltillo Coahuila, México, for their subsequent identification through entomological keys. To observe the internal and external structures of the adults, a Canon EOS Rebel T6 camera was used,

*Corresponding author. Email: yemir12torres@gmail.com

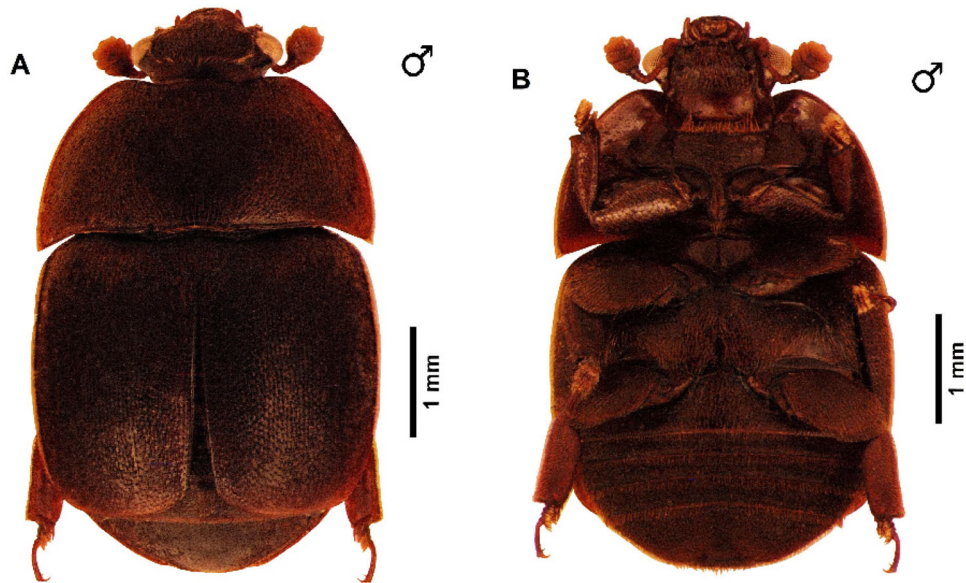


Figure 1. Male adult of *A. tumida* M.; A. Dorsal habitus view; B. Ventral habitus view.

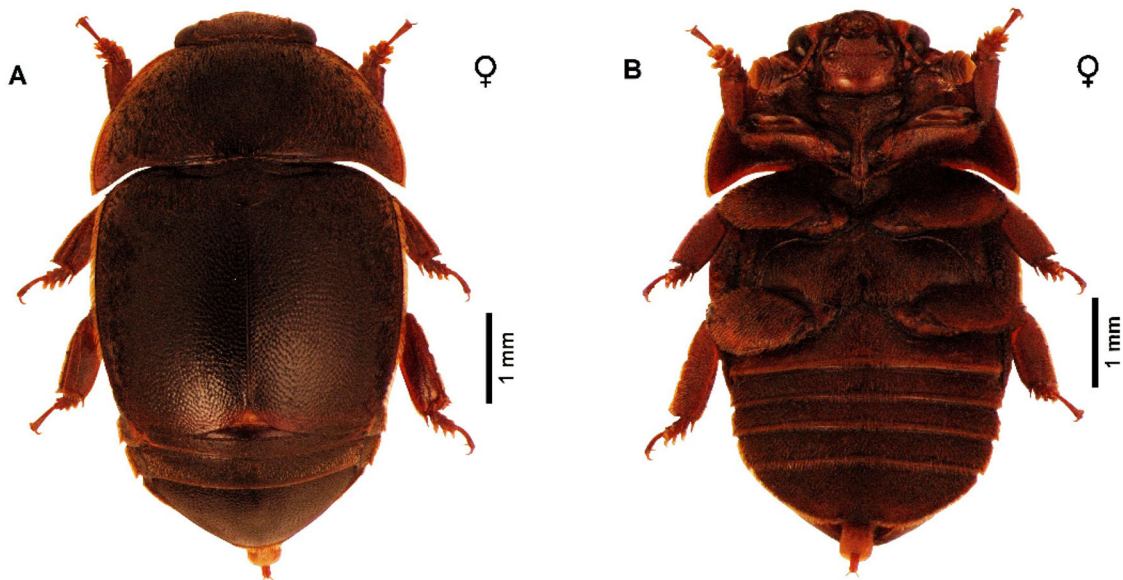


Figure 2. Female adult of *A. tumida* M.; A. Dorsal habitus view; B. Ventral habitus view.

coupled to a dissection microscope model Carl Zeiss Discovery V20. The images were processed in the Software: Entagle 0.72 and edited in GIMP 2.10.14. The taxonomic interpretation of the genus *Aethina* (Erichson, 1843) and family Nitidulidae was used after Kirejtshuk (1986, 2008). The determined material was deposited in the Entomological Collection of the Universidad Autónoma Agraria Antonio Narro.

As a result, 150 adults of *A. tumida* (Figure 1, 2) were found in *A. mellifera* hives. This is the first time that the presence of SHB in *A. mellifera* hives is recorded in the State of Campeche. Also, 12 adults of *A. tumida* were found in *M. beecheii* hives, being this the first record of this beetle in stingless bee hives in the country. The presence of this beetle in the hives of

stingless bees may be associated with human interference as mentioned by Lóriga Peña et al. (2014).

Detailed descriptions of *A. tumida* are not easily available. Some important structural features are provided in this report.

Description

Family Nitidulidae Latreille, 1802

Subfamily Nitidulinae Latreille, 1802

Tribe Nitidulini Erichson, 1843

Genus *Aethina* Erichson, 1843

Aethina (Aethina) tumida Murray, 1867

Length 5 mm to 9 mm, body brownish to rather dark, with somewhat lighter underside, legs and antennal flagelli oval, strongly convex, ventral part and upper

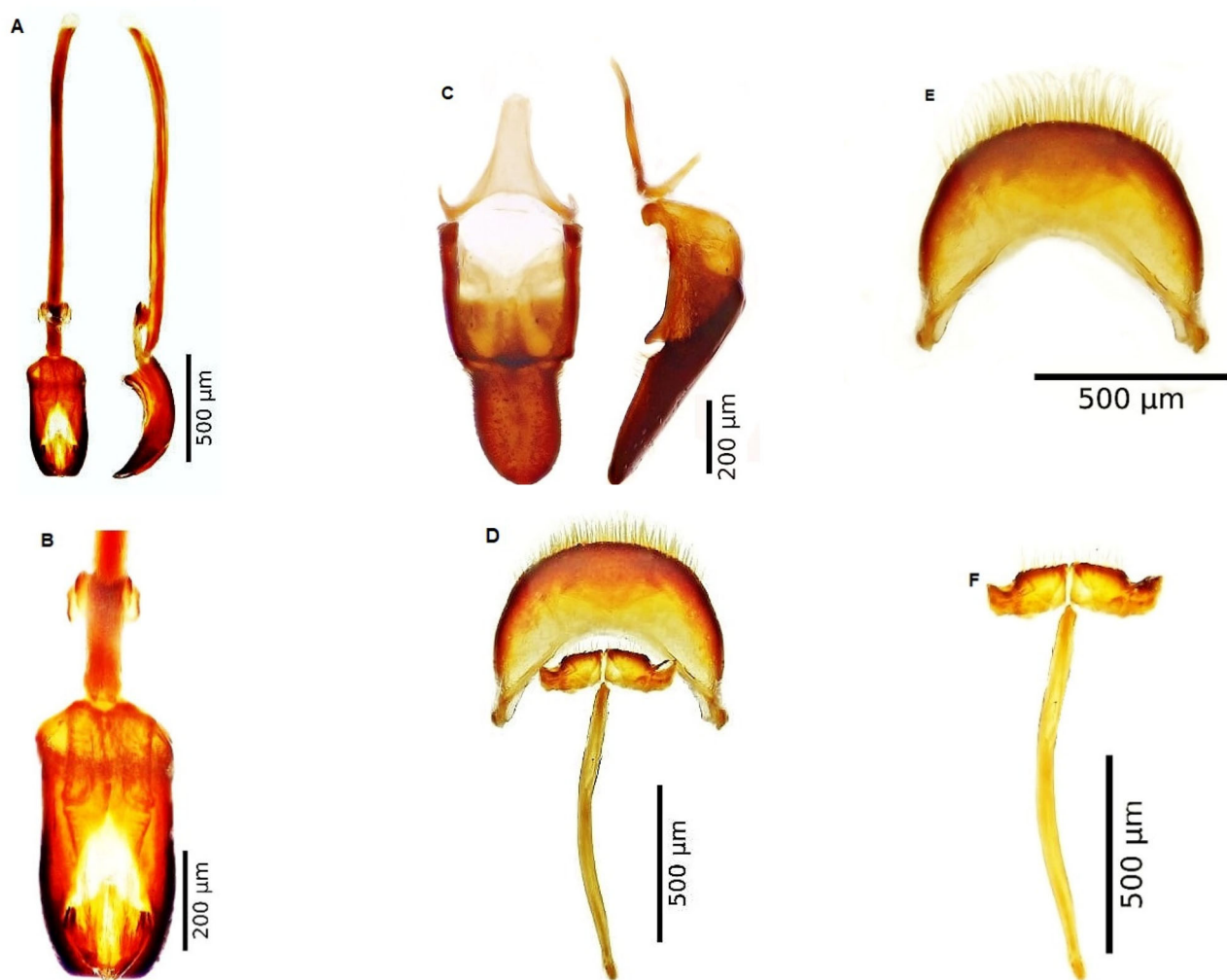


Figure 3. Male genitalia of *A. tumida* M.; A. Penis trunk, dorsal and lateral view; B. Penis trunk, dorsal enlarged view; C. Tegmen, ventral and lateral view; D. Genital capsule; E. Anal sclerite; F. Spiculum gastrale.

integument densely covered with bright yellowish hairs. Antennae 11-segmented, antennal club almost as long as wide and distinctly dorsoventrally compressed, approximately a third of total antennal length, consisting of three antennomeres. Compound eyes, with setae among the ommatidia.; pronotum with posterior angles distinct and projecting posteriorly. Prosternal process narrow and with subacute apex. Elytra usually almost as long as wide, slightly rounded at sides, widest at basal half, subtransverse at apices. Femora and tarsi somewhat flattened, tarsi dilated with long pubescence of bright yellow color on tarsomeres 1–3; last abdominal segments wider than long. Pygidium fully exposed from under elytral apices. Male genitalia (Figure 3): anal sclerite (Figure 3D, E) wider than long, gradually widened toward end, densely covered with long setae on apex. Aedeagus heavily sclerotized. Tegmen subquadrangular in proximal part (Figure 3C); penis trunk approximately 1.69 times as long as wide, widely arcuate at apex (Figure 3A, B), not including *spiculum gastrale* (Figure

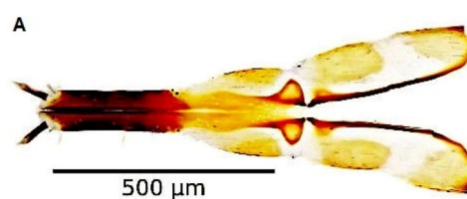


Figure 4. Ovipositor female of *A. tumida* M.; ventral view.

3F). Female: ovipositor medium-sized and moderately sclerotized (Figure 4).

This work allowed observing the presence of nitidulids defecating on honey, pollen and on the floor of the hives, causing honey fermentation making it useless, confirming what was reported by (Elzen et al., 2001; Neumann & Härtel, 2004). *A. tumida* is a potentially serious pest in beekeeping due to the direct damage caused to honey as a food product, causing significant economic losses for beekeepers anywhere in the world

because this nitidulid species is independent of the environment due to more or less ecological stability in beehives. It is worth mentioning that the possibilities of the beetle continuing to spread to other nearby states are high; it is important to continue monitoring and take the necessary control measures to reduce damage to the hives.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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ORCID

Hermelindo Hernández Torres  <http://orcid.org/0000-0002-6170-0137>

Alexander Georgievich Kirejtshuk  <http://orcid.org/0000-0002-8826-0258>

Carolina Núñez Vázquez  <http://orcid.org/0000-0003-4924-5351>

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