



BIOLOGY AND MORPHOLOGY OF *LAMPETIS MIMOSAE* (BUPRESTIDAE, COLEOPTERA) FROM IRAQ

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ABSTRACT

This study includes study on 138 specimens of a flat-headed borer *Lampetis mimosae* (Klug) 1829 (Buprestis) collected from Basrah province, southern Iraq. These were collected from March 2019 to April 2021. The morphological characters analysed include those of head, thorax and abdomen (females and males). The distinguishing characters include body strongly chitinized, elongate, subcylindrical and covered by fossae, with elytra bronze coloured having metallic shine. The specimens were observed attacking jujube trees *Ziziphus spina-christi* (L.) Desf.

Key words: *Lampetis mimosae*, Iraq, identification, taxonomy, distinguishing characters, *Ziziphus spina-christi*, biology

The buprestid beetle *Lampetis mimosae* (Klug, 1829) under the order Coleoptera and the suborder Polyphaga is along with about 15,000 species (Bellamy, 2008) of which seven species are known from Al-Anbar province of Iraq (Ezeddin and Iman, 2021; Knopf, 1971). The members of this inhabit wet tropics and semi-desert zones. These are distributed in Algeria, Chad, Djibouti, Egypt, Eritrea, Ethiopia, Greece, Jordan, Lebanon, Libya, Morocco, Oman, Saudi Arabia, Senegal, Sudan, Syria, Tunisia, Turkey, UAE, and Yemen (Bily et al., 2011). From Iran, 480 species are known (Ghahari et al., 2015), and these are usually xylophagous in larval stage developing under the bark or in the sapwood of trees and shrubs (Donald and Dwight, 1964). Of these, the metallic wood boring beetles *Lampetis* Dejean (1833), formerly considered a subgenus of *Psiloptera* are economically important. According to Bellamy (2003), this genus is one of the most speciose in the subfamily Chrysochroinae, tribe Dicerini. Ten *Lampetis* (*Spinthoptera*) species are known from North America, and eight species are from Mexico (Kerremans, 1893), six are from the West Indies (Corona, 2005), and three are from Iraq's Al-Anbar Province (Ezeddin and Iman, 2021). In view of their diversity and importance of *Lampetis mimosae* (Klug, 1829), this study from Iraq focused on its taxonomy.

MATERIALS AND METHODS

The study was conducted from March 2020 to June 2021. Specimens were collected from orchards

in the Shatt al-Arab region (30.7391° N, 47.8427° E) in Basra Province. Dissecting, imaging, and measuring were done in the Entomology Laboratory, Agriculture College, University of Basrah. Adult specimens of *L. mimosae* (90 females and 48 males) were collected by direct catching from the following trees: athel tree, *Tamarix aphylla* (L.) Karst; and *Tamarix chinensis* Lour.; jujube, *Ziziphus spina-christi* (L.) Desf.; river-red gum, *Eucalyptus* sp., and mesquite, *Prosopis juliflora* (Sw.) DC.; while the larvae were collected from jujube trees *Z. spina-christi*. The morphological analysis of specimens was done following Nadia et al. (2013). Important characters in the head, thorax, and abdomen were studied (Al-Mallah, 2016). The images were captured using a Leica EZ4 stereozoom microscope in the Plant Protection Department, College of Agriculture, University of Basrah.

Identification followed the taxonomic keys (Wellso et al., 2017; Corona, 2005), and confirmed by Dr. Hassan Ghahari (Department of Plant Protection, Yadegar -e- Imam Khomeini (RAH) Branch, Islamic Azad University, Tehran, Iran,) and Dr. Mark Kalashian (Institute of Zoology, Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of the Republic of Armenia, P. Sevak str. 7, Yerevan, 014, Armenia.). The plants were identified by Dr. Taha Y. Al-Edany (Department of Plant Protection, College of Agriculture, University of Basrah). The synonymy given follows the Global Biodiversity Information Facility (GBIF, 2021).

RESULTS AND DISCUSSION

Lampetis Dejean, 1833

Buprestodes Carter, 1924; *Eolampetis* Pongrácz, 1935; *Hesychiastes* Gistel, 1848; *Lampetis* Chevrolat, 1834; *Lampetis* Spinola, 1837; *Spinthoptera* Casey, 1909

Lampetis mimosae (Klug, 1829)

Buprestis mimosae Klug, 1829; *Lampetis cuprina* Alfieri, 1976; *Lampetis cyanea* (Alfieri, 1976); *Psiloptera cyanea* Alfieri, 1976; *Lampetis mimosae* (Klug, 1829)

Redescription

Head: Three species of *Lampetis* are known from Al Anbar Province: *L. mimosae*, *L. argentata* Mannerheim, 1837, and *Lampetis* sp. Adult insects are about 16-27 mm long and 5-9 mm wide, and their colour ranges from light to dark brown with a metallic reflection (Ezeddin and Iman, 2021). These have elytra with parallel striae, which join at the wing end. The elytron is dotted, as in prothorax. Head little wider than half width of thorax. *Lampetis mimosae* has the beetles medium sized (♀: length 22.3-28.9 mm, width 8.0 mm-10.6 mm); ♂: length 15.5-21.19 mm, width 6.16-7.87 mm), elongate subcylindrical, flat at front of head and sharply tapered at ends of wings and abdomen, body strongly, short antennae, bronze color (metallic shine), fossae on dorsal and ventral surfaces, ventral surface more glossier than dorsal surface. The head approximately circular (length 4.7-5.9 mm, width 5.9-6.0 mm), compound eyes relatively small, elongated and its length about 2.5x as maximum width, carving face clear, antennal cavities large, vertex nearly). broad. Antenna long (5.9- 6.0 mm) consists of 11 segments; scape rounded, 2x as long as

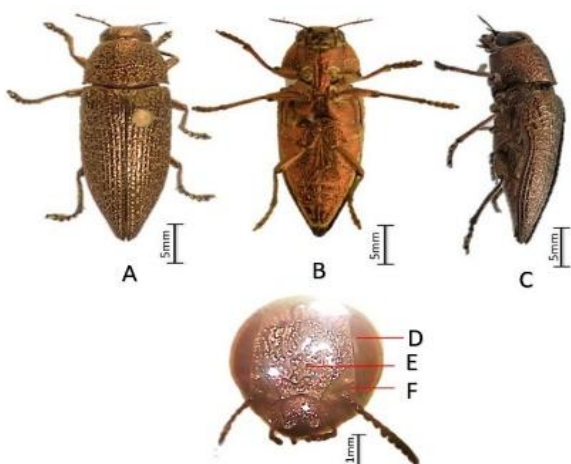


Fig. 1. Female of *L. mimosae*; A. Dorsal view; B. Ventral view; C. Lateral view; D. compound eye; E. carving face; F. antennal cavities

the pedicle, with flagellum having nine flagellomeres, 1 and 2 similar, 4-9 subtriangle and serrated. Mouthparts hypognathous, labrum bronze metallic, wider than long, distal area with row of short bristles; mandibles short, symmetrical, slightly curved, robust, approximately 2x longer than wide, condyle protruding, long and teeth simple; maxilla articulate with the head capsule through their basal sclerite cardo and stipes, elongated stipes, lacinia narrower than galea, apex rounded and covered with short bristles, oval-shaped galea, and thin and rigid bristles bordering the apical and lateral regions. and well developed with four segments, the first one shortest, while the second longest with short setulae; labium with prementum smaller than the mentum, the apical surface rounded, glossa small with a few bristles in the mid-apical region; labial palp three segmented, first of which smallest, and the third segment has a truncated apex with long hairs.

Thorax: Pronotum convex, broad about twice as wide as long (♀ wide 6.3-7.9 mm, length 3.72- 5.50 mm), anterior margin curved, posterior margin narrower than elytra, carving pattern very clear; prosternum with microbristles closed and rounded thigh cavities, scutellum transverse, almost heart-shaped, about one tenth width of elytra at base; prosternal spine clear middle region. Elytra twice as long than wide (♀ length 14.61-17.73 mm; width 3.79-4.95 mm), slightly widened in basal part base; almost parallel sided behind callosities to mid-length, outer surface of elytra with shaped cavities, mid dorsal line straight. Membranous

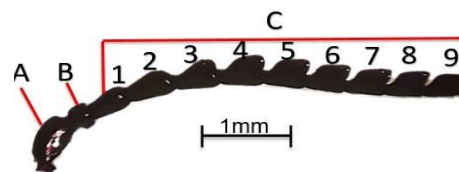


Fig. 2. Antenna of *L. mimosae*

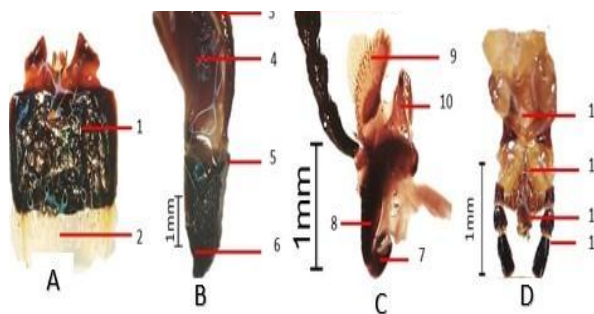


Fig. 3. Mouthparts of *L. mimosae*; A. Labrum, 1 carving face; 2 bristles; B. Mandible; 3 abductor. 4 adductor, 5 condyle, 6 teeth; C. Maxilla, 7 cardo, 8 stipes, 9 galea, 10 lacinia, 11 maxillary palpus; D. Labium, 12 prementum, 13 glossa, 14 paraglossa, 15 labial palpus

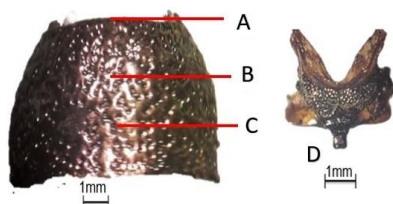


Fig. 4. Dorsal view of pronotum in *L. mimosae*; A. anterior margin; B. Carving pattern; C. Posterior margin; D. Scutellum cavities

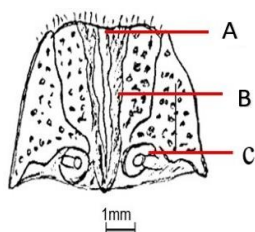


Fig. 5. Prosternum of *L. mimosae* A. Bristles; B. Prosternal spine; C. Fore coxal cavity

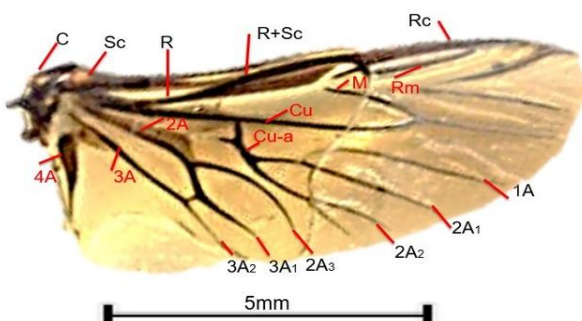


Fig. 6. Membrane wing of *L. mimosae*. C costal vein; SC subcostal; R radial, RC radial cell, M median, RM median radial, Cu cubital, CuA anal cubital, A anal

hind wing with costa short and thick, subcostal vein strong and unbranched, connects with the radial vein at the end of the first third of the wing length, extending apically along the anterior margin; radial cell (RC) formed by fusing the space between the subcosta and the radius (R+SC), and the radio-median cell (RM) is formed in the third anterior apical; medial vein, which is not connected to the radial sector (Rs), extends apically to the beginning of the apical third of the wing; the vein extends from the base of the wing and joins apically with the median (M); anal veins composed of four veins, second and third branched, while the first and fourth unbranched. The naming of veins is according to Fedorenko (2006).

Legs with foreleg 10.02- 11.77 mm long, midleg (12.14- 13.94 mm), hind leg (14.04- 14.50 mm), bronze coloured with intense metallic shine; coxa of forelegs and middle similar, coxal cavity of hind leg

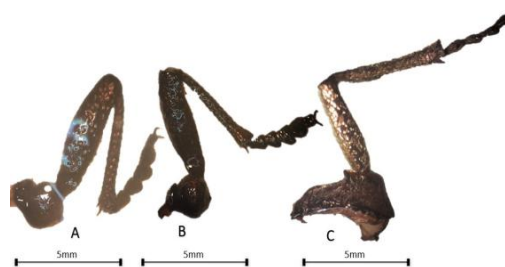


Fig. 7. Legs of *L. mimosae*; A. Foreleg, 1 coxa, 2 trochanter, 3 femur, 4 tibia; B. midleg, tibia spurs, 6 tarsus, 7 tarsal claw, 8 coxal cavity; C. hindleg

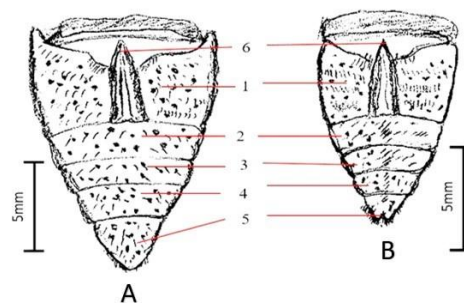


Fig. 8. Ventral view of abdomen in *L. mimosae*; A. Female; B. male, 1 first sternite, 2 second sternite, 3 third sternite, 4 fourth sternite, 5 fifth sternite, 6 first sternite process

large; trochanters exposed and differently sized; femur moderately robust, tibiae and tarsomeres similar in all legs, with femur of hind legs twice as long as wide; hind leg smaller than all, foreleg a little bigger than middle; tibial spur apical, internal in all legs, claws with tarsal pecten process tapered and curved terminally.

Abdomen: In female 15.48- 8.41 mm long, male 09.35- 11.80 mm long, surface densely punctate with abundant small, shallow, confluent punctations, first sternite almost twice as long as second, which about as long as 3 and 4; sternite 5th almost twice as long as fourth, with apex broadly and deeply excised, sternite 5th, cleft in the male and round female, sternite process

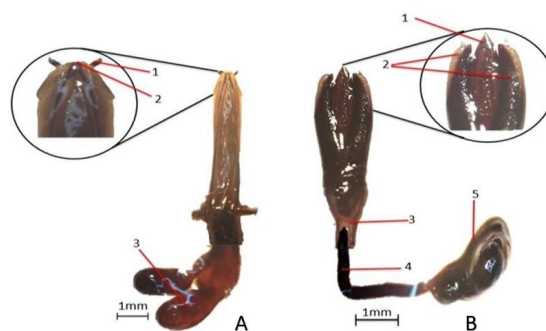


Fig. 9. Dorsal view of genitalia in *L. mimosae*; A. Female genitalia, 1 style, 2 coxito, 3 spermatheca; B. Male genitalia, 1 aedeagus, 2 lateral lobe (claspers), 3 phallobase, 4 vasa dererentia, 5 testis



Fig. 10. A Adult exit site on the *Tamarix pentandra*; B. Adult on the *Eucalyptus* sp.; C. Adult on *Tamarix articulata* trees; D. Adult on *Prosopis jutiflora* tree; E. Damage on the *Ziziphus spina-christi* tree; F. Larvae when attacking the plant stem; G. Trees dying due to injury

spear-shaped and hard. Female genitalia with few bristles located at base, styles tapered and reduced, very few short bristles at apex, spermathecal globose and very flexible; male genitalia, with sides lobes (claspers) well developed, rounded on apical region with punctuations, long bristles and sparse, aedeagus with a tapered apex, phallobase conical, base width almost twice smaller than apex and this with a mid-apical concavity.

Remarks

Hosts include athel tree *Tamarix articulate*, *T pentendra*, jujube *Ziziphus spina-christi*, river-red gum *Eucalyptus* sp. and mesquite *Prosopis jutiflora*. Adults short-lived, surviving for only a few weeks. Their larvae are injurious, develop under the bark, feeds on trunks, branches or twigs, and can severely affect the quality of timber and can make trees susceptible to disease. Adults emerge from their host and feed on its foliage, frequent trees like *Prosopis jutiflora*, *Eucalyptus* sp., *Tamarix articulata*, and *Ziziphus spina-christi* with peak abundance being around 25th March becoming less by 24th April, with a sex ratio of 1:2.

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