

NEW DESCRIPTION OF THE LARVAL STAGE OF
LATIPALPIS (PALPILATIS) JOHANIDESI NIEHUIS, 2002
(COLEOPTERA, BUPRESTIDAE) FROM ERBIL PROVINCE,
KURDISTAN REGION, IRAQ

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ABSTRACT

The present study introduced a new description of the last larval instar of the oak tree borer, *Latipalpis johanidesi* Niehuis, 2002 (Coleoptera, Buprestidae). The larval specimens were collected from the oak trees within the mountainous areas, Erbil governorate, Iraqi Kurdistan Region, during the beginning of April till the end of May 2019.

Schematic sketches were provided to illustrate unclear morphological features, and the results presented importance morphological evidence for confirming the identification of this species in the larval stage precisely.

Keywords: Buprestidae, Iraq, Larva, *Latipalpis johanidesi*, Wood borers

INTRODUCTION

The genus *Latipalpis* Solier, 1833 was originally produced for many species of different genera such as *Dicerca*, *Psiloptera*, *Aurigena*, *Poecilonota*, and *Lampra* Bílý (1980). Novak (1990) reported the *Latipalpis plana berythensis* and *Latipalpis margotana* as a new species and sub-species for the genus *Latipalpis* from the Eastern Mediterranean; in spite of differing subgroups, diagnostic characters of this genus are very distinctive (Richter, 1952). However the bionomy and host plants of the genus *Latipalpis* in convergence with *Dicerca* apparently, but larvae of *Latipalpis* develop in thin (about 2-3 cm) living and half-dead branches of oak trees (Schaefer, 1949).

Recently the genus *Latipalpis* classified into two sub-genera: *Latipalpis* Solier, 1833 and *Palpilatis* Bily, 1980; the latter included 4 species, the species *L. johanidesi* Niehuis 2002 one

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of the common distributed in Iraq, Iran and Turkey (Ghahari *et al.*, 2015; Löbl and Löbl, 2016). In the last three decades, many works ongoing to appear and explain the taxonomy of larvae of specific genera within the family Buprestidae (Alexeev, 1964; Bily, 1999; Volkovitsh, 1979) without any refereeing to the larvae of genus *Latipalpis*. Information about Buprestidae larvae in Iraq still insufficient; meanwhile, almost a few common larvae are known, but undescribed entirely. This study aimed to find out and explain the substantial morphological characteristics of the mature larva of *L. (Palpilatis) johanidesi*. Consequently, this study demonstrates the diagnostic features, that this species could be recognized for pest management planners.

MATERIALS AND METHODS

Larval collection and identification

The larvae were collected from the stems of oak trees *Quercus aegiliops* Linnaeus, 1753 (Fagaceae), started the beginning of April until the end of May 2019; (15) specimens were collected. Mature larvae were chosen for dissecting and identifying the specimens in the laboratory. Meanwhile, on the same host plant, to assure the correct identification, some larvae were allowed to reach the adult stage inside branches of the host plant in the prepared cage covered by meshed cloth with dimensions (40 × 40 × 60) cm. Furthermore, the identification of adult beetles and larval stages of the species was confirmed by expert taxonomist Dr. Mark G. Volkovitsh (St. Petersburg, Russia).

Morphological studies

The morphological features in this paper depend structurally on the study of Bílý (1999), Bílý and Volkovitsh (2007), Volkovitsh and Bílý (2015), in which the larval body was boiled in 10% KOH aqueous solution until the tissues softened and fat bodies dissolved. The specimens were then washed in distilled water and dissected with the aid of a dissecting microscope (OPTIKA, Italy). After that, the larval structures were separated and prepared for mounting and slide processing; for the preparation of microscopic slides, the protocol described by Alexeev (1960) was followed; DPX media were deposited to act as a clearing agent. A compound microscope with a camera (Huma scope premium with LCD camera-Germany) was used to illustrate the characteristics. For measuring and scaling of the examined parts, we used a stage micrometer (Shinuya, Japan).

RESULTS

Larval shape (Pl. 1): relatively large, long and flat with pale brown color; larva corresponding with the second morpho-ecological type of buprestid larva; it has reasonably expanded prothorax with sclerotized pronotal and prosternal grooves. Epicranium moderately retracted into the prothorax, head about twice as wide as long, and it appears as a flat flexible segment inside the prothorax. It contains antenna and mouthparts. Body length of fully-grown larva almost 20-28 mm; width of prothorax about 2.5-3.2cm.

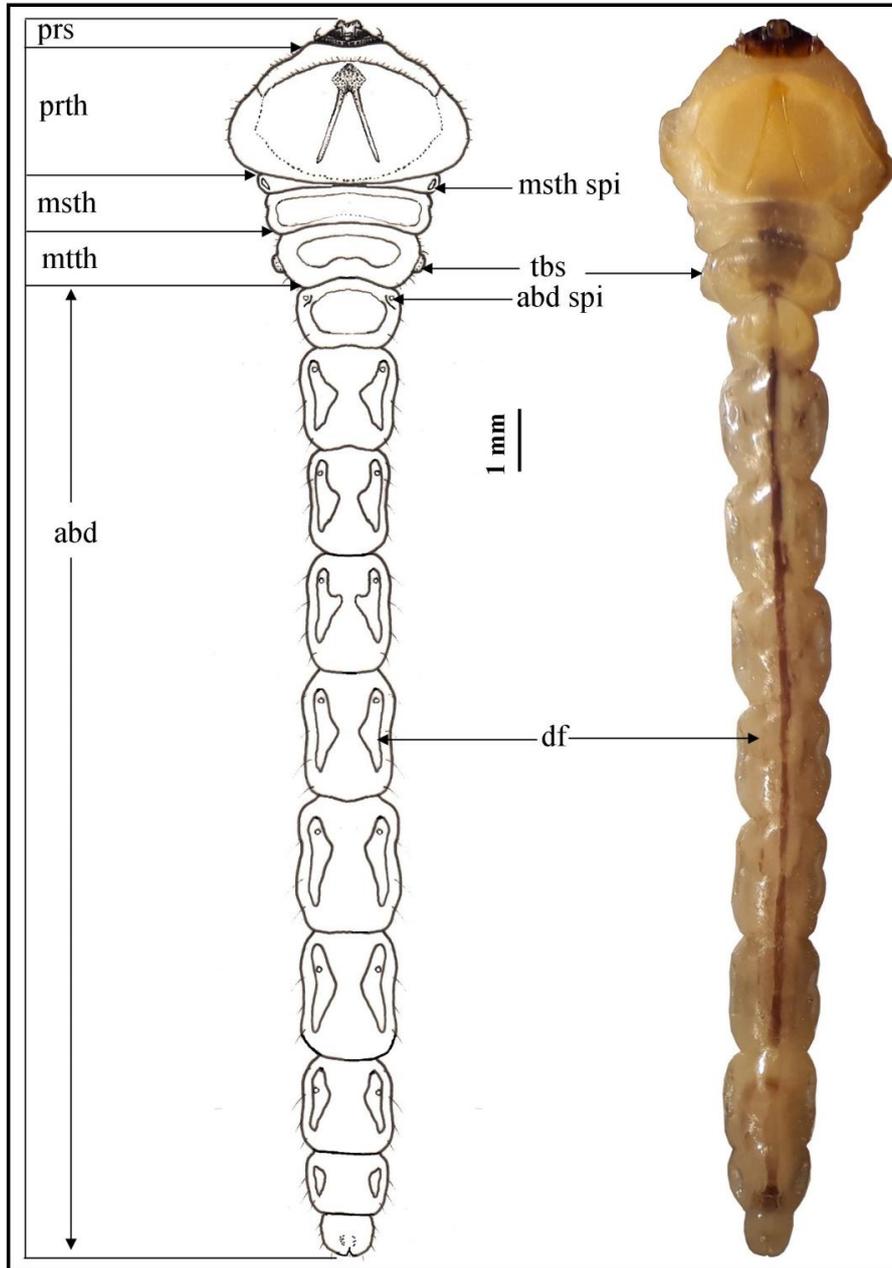


Plate (1): Mature larva of *Latipalpis johanidesi*; (abd- abdomen, abd spi- 1st abdominal spiracle, df- dorsal fold, msth- mesothorax, msthspi- mesothoracic spiracle, mth- metathorax, prs- peristome, prth- prothorax, tbs- tubercles).

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Epistome (Pl. 2 a): sclerotized tightly, brown with darkened anterior margin, about five times as wide as it is long; anterior margin bisinuous between semi-globular mandibular condyles and irregular. Latero-posterior corners angulate and obtuse, slightly projecting outward; two groups of epistomal sensilla located in deep depressions on the mid-section. Every single group consists of two short trichosensilla and one conspicuous campaniform sensillum.

Antennae (Pl.2 b), originate in the antennal incisions of posterolateral gaps of the epistome, they composed of two segments, basal segment sub-cylindrical; about 1.3 times as long as wide and about 3 times as long as the apical segment; with one external campaniform sensillum, outer surface totally smooth, but inner sclerites strongly developed; articular membrane rough. Apical segment smaller and shorter than the basal segment, and about 3 times as wide as long; outer margin surrounded by apical crown of microspinulae with long and thick trichosensillum; apical cavity of the apical segment well developed and bears long conical sensory appendage, one basiconic sensillum and two small palmate sensilla that their bases are very close to each other.

Labrum (Pl. 2 c): clypeus transverse; membranous and collar shaped, it seems rough, nearly four times as wide as long, anterior margin with slightly arcuate posteriorly. Labrum around quadrate shaped, anterior margin arcuated inward noticeably, anterolateral corners slightly rounded, lateral lobes absent and outer margins converging posteriorly; both medial and lateral branches of the palatine sclerite well- sclerotized; medial branch bears long apical seta, on the medial part, with two campaniform sensilla and another isolated one located between medial and lateral branches. The lateral branches carried long and thick trichosensilla, anterior border of labrum covered by dense and short microsetae in which condensed medially forming a transverse triangular area; anterolateral sensilla on each side consists of three long trichosensilla with two campaniform sensilla, external and internal.

Mandibles (Pl. 2 d): strongly sclerotized and approximately triangular in shape, with two obtuse dark apical teeth. On the posterior side near the mandibular condyle, short and acute setae emerged as well as a common round basis. On the dorsal side surface, a tiny area of micro sculpture can be observed; cutting edge is simply convex.

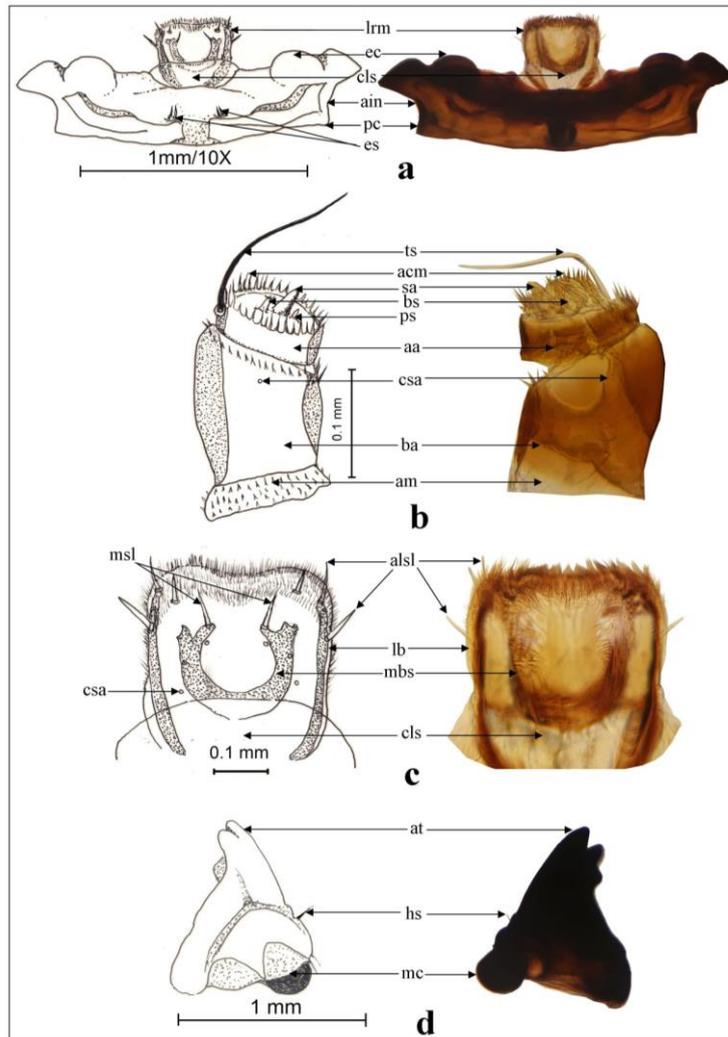


Plate (2): Illustration of mature larva of *L. johanidesi*; (a) Epistom (ain- antennal incision, ec- epistomal condyle, es- epistomal sensilla, cls- clypeus, lrm- labrum, pc- posterior corner), (b) Antenna (aa- apical antennomere, acm- apical crown of microspinulae, am- articular membrane, ba- basal- antennomere, bs- basiconic sensilla, cm- crown of microspinulae, ps- palmate sensilla, csa- campaniform sensillae, sa- sensory appendage, ts- trichosensilla), (c) Labrum (alsl- anterolateral sensillae of labrum, lbs- lateral branch of palatine sclerite, mbs- medial branch of palatine sclerite, msl- medial sensillae of labrum), (d) Mandible (at- apical teeth, hs- hind seta, mc- mandibular condyle).

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Labiomaxillary complex: labium (Pl. 3 a) with oblique shape; its length about 1.5 times greater than its width, anterior margin moderately convex and posteriorly expanded, anterolateral corners widely rounded; anterior margin carried long microspinulae bundle. Prementum corner sclerite concave and curved inward, every sclerite holds five campaniform sensilla in which distribute into two groups, on the above and the bottom level; apical seta relatively long, but not reach to anterior microspinuled area. Maxillae (Pl. 3 b): cardo relatively round; stipes somewhat conical, internal sclerite well-sclerotized; apical part of stipes with row of microspinulae. Maxillary palps composed of two segments, basal segment sub-cylindrical shaped, almost as wide as long; anterior margin of basal segment provides with few short microsetae as well as long and thick apical seta rose from outer margin. Apical segment conical-shaped; slightly two times as long as wide, also bears short and sharp curved sensillum on the lateral side, and four delicate sensory cones found on apical surface. Mala cylindrical and stout, distinctly longer than wide; internal sclerite fully-developed; apical surface of mala carried six long and thick sensilla with sparse and short microsetae.

Thorax (Pl. 3 c): prothorax extremely expanded and with a flat round shape, leg rudiments absent; pronotal groove moderately sclerotized, and it can be seen clearly, appears as a groove line with v-shaped inverted, and apex of groove with a specific shape; prosternal groove as a straight sclerotized line and slightly bifurcate posteriorly. Pronotal and prosternal plates with same micro-sculpture asperities, due to growth of dense microspinulae and sparse microsetae, which diametrically sclerotized; mesothorax transverse, its width greater about three times than length, and noticeably narrower than metathorax; metathorax larger and wider than mesothorax, and characterized by swelling two equal tubercles on ventral side (Pl. 4 a).

Spiracles: mesothoracic spiracles (Pl. 4 b) considerably obvious, resemble a mushroom in shape, with dense trabeculae; abdominal spiracles (Pl. 4 c) approximately elliptical-shaped, as with prothoracic spiracles, but smaller and fewer in numbers of trabeculae.

Abdomen (Pl. 1): long and slender, lateral depressions well developed, it consists of ten flat segments, length of each segment is twice that of its width, except the first and last segments. Segments 2-8 have nearly same length and width; 1st, 9th and 10th abdominal segments much smaller than other segments. Abdominal surface covered by longitudinal stripes of microspinulae. In addition, long thin bristles can be seen on the dorsal and lateral sides. Abdominal folds take closed longitudinal shape in which they bent toward the body axis; there are no morphological differences between dorsal and ventral folds. Last abdominal segment smallest, deficiently sclerotized and divided by a vertical anal rim with dense and short setae.

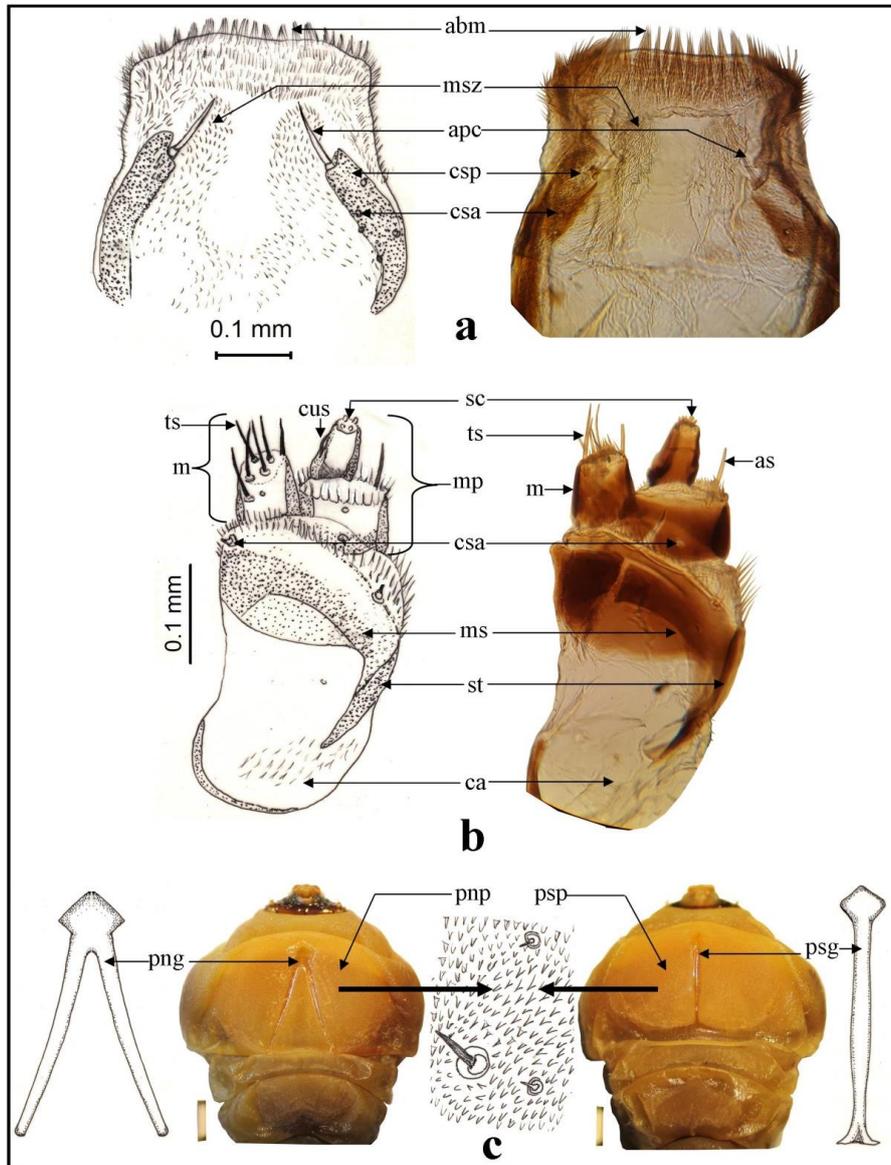
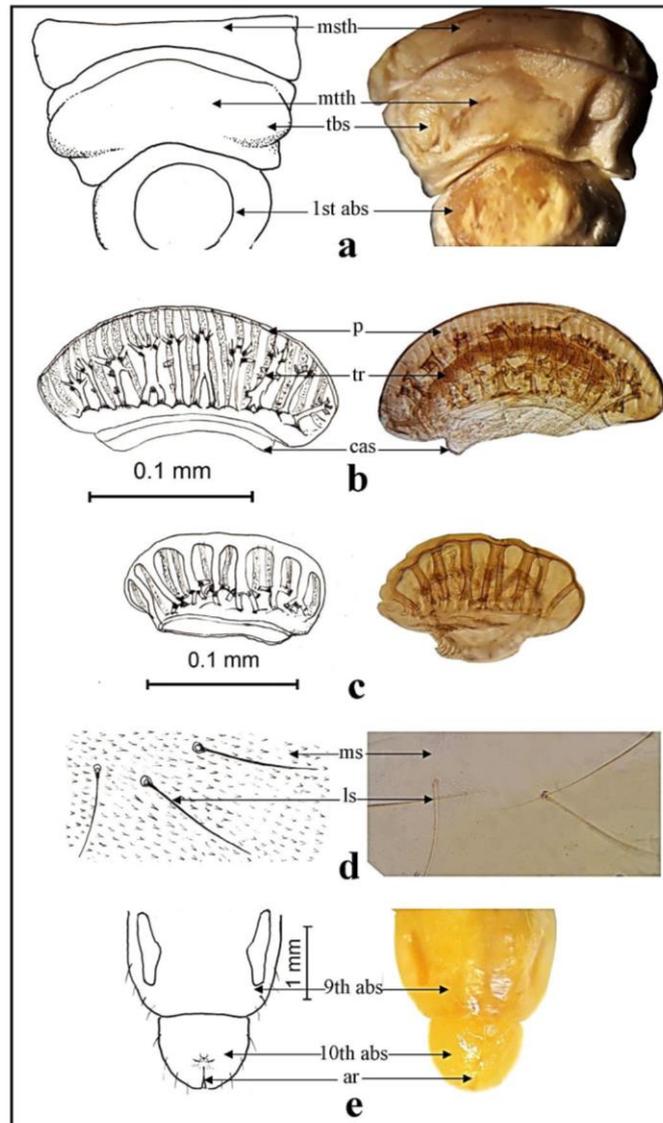


Plate (3): illustration of mature larva of *L. johanidesi*; (a) Labium (abm- anterior bundle of microspinulae, apc- apical seta of corner sclerite of prementum, csp-corner sclerite of prementum, msz-microspinules zone), (b) Maxilla (as- apical seta of basal palpomere, ca- cardo, cus- curved sensilla, m- mala, mp- maxillary palps, ms- maxillary sclerite, sc- sensory cone, st- stipes, ts- trichosensilla), (c) Thorax (png- pronotal groove, pnp- pronotal plate, psg- prosternal groove, psp- prosternal plate).

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Plate(4): Illustration of mature larva of *L. johanidesi*; (a) Thorax (msth-mesothorax, mtth-metathorax, tbs- tubercles, 1st abs- first abdominal segment), (b) Mesothoracic spiracle (cas-closing apparatus, p-peritreme, tr-trabeculae), (c) abdominal spiracle, (d) Integument surface (ls-long seta, ms-microspinule), (e) Body end (ar- anal rim, 9thabs- 9th abdominal segment, 10thabs- 10th abdominal segment).

DISCUSSION

Depending on the studies, conclusions of Bily (1980) and Niehuis (2002, 2005), the larva corresponds to a *Latipalpis johanidesi* assemblage (labrum covered with dense and along microsetae on the anterior margin, and cardo semi-rounded, anterior border of the stipes of maxillae covered with dense and long microsetae). Although, some similarities were noticed between larvae of *Latipalpis*, *Lamprodilla* and *Psiloptera*, in which *Latipalpis* larva have a distinctive character in the pronotal groove anteriorly and strongly bifurcated prosternal groove posteriorly; furthermore, the noticeable tubercles of the metathorax confirms the subgeneric separation of the genus and shows that *L. johanidesi* belongs to the subgenus *Palpilatis* (Bily, 1980).

The larvae of *L. johanidesi* differ from the larvae of other mentioned species by the main diagnostic characteristics such as anterior margin of the labrum concave and slightly deeper medially; three long and blunt trichosensillae are arranged on the anterolateral corners of the labrum. Epistomal sensillae to assemble one long and one short trichosensilla with one campaniform sensillum which they are very close basis. The first abdominal segment is round, and it appears as a districted point between the thorax and abdomen; the abdominal folds made the segments resembled as double segment.

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LITERATURE CITED

- Alexeev, A. V. 1960. On the morphology and systematics of larvae of some species of the genus *Agrilus* Curt. in the European part of the USSR (Coleoptera, Buprestidae). *Zoologicheskii Zhurnal*, 39: 1497–1510.
- Alexeev, A. V. 1964. On the distinctions between the larvae of *Phaenops cyanea* F. and *Ph. guttulata* Gebl. (Coleoptera, Buprestidae). *Entomologicheskoe Obozrenie*, 48(3):647-650.
- Bílý, S. 1980. A revision of the genus *Latipalpis* (Coleoptera, Buprestidae). *Acta Entomologica Bohemoslovaca*, 77: 46-54.
- Bílý, S. 1999. Larvae of buprestid beetles (Coleoptera: Buprestidae) of central Europe. *Acta Entomologica Musei Nationalis Pragae*, Supplementary 9: 1-45.
- Bílý, S. and Volkovitsh, M. G. 2007. Descriptions of some buprestid larvae from Chile (Coleoptera: Buprestidae). *Folia Heyrovskyana*, Series A, 15(2-3): 53-79.
- Ghahari, H., Volkovitsh, M. G. and Bellamy, C. L. 2015. An annotated catalogue of the

New description of the larval stage of *Latipalpis*

Buprestidae of Iran (Coleoptera: Buprestoidea). *Zootaxa*, 3984(1): 1-141.

Löbl, I. and Löbl, D. 2016. Catalogue of Palaearctic Coleoptera (Scarabaeoidea - Scirtoidea-Dascilloidea - Buprestoidea - Byrrhoidea), Leiden- Boston, Brill-Switzerland. 1011 pp.

Niehuis, M. 2002. *Latipalpis (Palpilatis) johanidesi* n. sp.-ein neuer Prachtkäfer aus der Türkei. *Mitteilungen des Internationalen Entomologischen Vereins*, Frankfurt, 27:105-114.

Niehuis, M. 2005. *Latipalpis* (s.str.) *cypria* n.sp. ein neuer Prachtkafer aus Zyperin (Coleoptera: Buprestidae). *Mitteilungen des Internationalen Entomologischen Vereins* Frankfurt, 30(1-2): 9-14.

Novak, G. Von 1990. *Latipalpis* (s.str.) *margotana* n.sp., neu aus Ost mediterranea (Coleoptera, Buprestidae) *Journal of the Arbeitsgemeinschaft Österr Entomologen*, 41(3-4): 81-83.

Richter A. A. 1952. Fauna SSSR. Nasekomye zhestkokrylye. Tom 13, vyp. 4. Zlatki (Buprestidae). Chast' 4 [Fauna of the USSR. Beetles. Vol. 13, Iss. 4. Jewel-beetles (Buprestidae). Part 4]. Moscow - Leningrad: Academy of Sciences of the USSR Publ. 233 p. (In Russian)

Schaefer, L. 1949. Les Buprestides de France. Tableaux analytiques des Coléoptères de la faune franco-rhénane. France, Rhénane, Belgique, Hollande, Valais, Corse. Famille LVI. *Miscellanea Entomologica*, Supplement, 1- 511.

Volkovitsh, M. G. 1979. On the larval morphology of buprestid beetles of the genus *Acmaeoderella* Cobos (Coleoptera, Buprestidae). *Trudy Zoologicheskogo Instituta, Akademiya Nauk SSSR Leningrad*, 83: 21-38.

Volkovitsh, M. G. and Bílý, S. 2015. Larvae of Australian Buprestidae (Coleoptera). Part 5. Genera *Astraeus* and *Xyroscelis*, with notes on larval characters of Australian polycestine taxa. *Acta Entomologica Musei Nationalis Pragae*, 55(1): 173–202.

وصف جديد للدور اليرقي لخنفساء
Latipalpis (Palpilatis) johanidesi Niehuis 2002
(Coleoptera, Buprestidae)
من محافظة أربيل, إقليم كردستان العراق

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الخلاصة

اظهرت الدراسة الحالية وصف جديد للعمر اليرقي الاخير لخنفساء حفار
ساق البلوط *Latipalpis johanidesi* Niehuis, 2002 (Coleoptera, Buprestidae)
جمعت عينات هذا النوع من اشجار البلوط في المناطق الجبلية لمحافظة أربيل، إقليم كردستان العراق، للفترة من بداية
شهر نيسان وحتى نهاية شهر مايس من عام 2019.

زودت رسومات تخطيطية لتوضيح السمات المظهرية غير الواضحة، و
قدمت النتائج أدلة مظهرية مهمة لتأكيد تحديد هذا النوع في مرحلة الدور اليرقي
بدقة.