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Bionomy Description of *Julodis speculifer* Laporte, 1835 in South Iraq

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Abstract:

Objective: The beetle family Buprestidae (jewel beetles) includes about 15,000 species and has a number Worldwide distribution. *Julodis speculifer* is one of these species, for the first time Recorded in south Basrah province.

Methods: Collected specimens were from March 2022 to November 2022, AL-Zubair region, The main characters adopted: compound eyes, carving face, antennal cavities, flagellum, scape, pronotum, scutellum, elytra, membrane wing, abdomen, and male genitalia.

Results: Body adult beetles Large sized, elongated, oval in shape, resembling a boat, slightly convex at the dorsal, brown to shiny copper, with white spots in the form of parallel lines on all parts of the dorsal surface body, all parts of the body are covered with a light white fluff. The male is smaller in size than the female.

Conclusions: They were diagnosed did not have traits that differed from the species recorded in Kuwait, but different subspecies in Saudi Arabia.

Keywords: *ecotype; geotype; buprustidae; Julodis; description; Basrah; Iraq.*

1 Introduction

Julodis speculifer Laporte, 1835, is one of the buprestid beetles that belong to the subfamily Julodinae, family Buprestidae, order Coleoptera, Suborder Polyphaga. Buprestidae Also known as flat-headed Borers, Jewel Beetles and Metallic Wood Borers. (Essing 1947; Borror and Delong, 1964). There are 1500 species recorded around the world (Bellamy, 2008). Most of the species in this family are considered the most dangerous pests of agriculture and forest trees in the world (Stebbing, 1977; Fadl, *et al.*,1991). The genera distributed in Jordan, Lebanon, Libya, Egypt, Oman, Saudi Arabia, Sudan, Syria, UAE, Yemen, Algeria, Tunisia, Chad, Djibouti, Eritrea, Ethiopia, Greece, Morocco, Senegal and Turkey (Bily *et al.*, 2011).

In Iraq, there are recorded Holdhous(1919) : *Julodis audouini* Cast.&Gory, *J. speculifera* Cast., *J. distincta* Gory, *J. intricata* Redt., *J. andreae* Oliv., *J. pictschmanni* Kerr., *Julodella mesopotamica*, Holdh. while recorded Obenberger (1926) 10 species with five species affiliated subspecies *J. onopordi* F. spread within mesopotamia and the northern region. Recorded Kalaf and Al-Omar (1974) two species *J. distincta* Gory, *J. lineigera* Mars, and subspecies *J. onopordi pilosa* F. in Northern Erbil Province. recorded by Abdul-Rassoul (1976) *J. speculifera* Cast, the researcher himself (1988) subspecies *J. onopordi luteogramma* Mars, *J. onopordi scovitzii* Steven, *J. onopordi sulcata* Redtb. in northern regions. Recorded Al- Ali (1977) *J. audouini* Cast.&Gory. Recorded Ali *et. al.* (2011) four species *J. intricate*, *J. armeniaca*, *J. andreae*, *J. onopordi*. two species are recorded in the northern regions (Derwesh, 1962). *J. speculifer*, *J. balucha*, *J. syriaca*, Recorded in the Al-Anbar- region (Albayyar and Khudhair, 2021).

Due to the Lack of studies on this Family and its species in the south of Iraq, so this study was considered the First of its kind to describe the species widespread in that region.

2 Materials and Methods

Study location:

The study was conducted from March 2022 to November 2022, specimens were collected from the AL-Zubair region (30.136698, 47.622377). AL-Zubair region is located southwest of Basrah province, characterized by its hot, desert climate in summer and cold dry winter. Photography and examination at samples were done in Entomology Laboratory, Agriculture College, University of Basrah, Fig. 1.

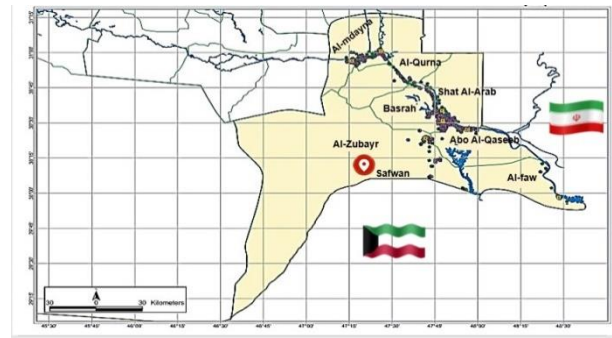


Fig. 1: A map of Basrah province showing the sample collection area

Specimens collecting:

Adult specimens (♀6, ♂3) of *Julodis speculifer* were collected by direct catching from plants, trees, and weeds of AL-Zubair region fields. The samples were kept in special boxes to preserve insects with records the information about the place and date of collection, Slides were prepared according to Lane and Crosskey (1993).

Morphological study:

The morphological study of specimens was conducted according to Abdul-Rassoul *et al* (1988). The main characters adopted in the current study are as follows: compound eyes, carving face, antennal cavities, flagellum, scape, pronotum, scutellum, elytra, membrane wing, abdomen, and male genitalia.

Entomology forceps, tweezers, scalpel handles, and needles straight were used to dissect a fresh body in three parts: head, thorax, and abdomen (Al-Mallah, 2016), The specimens were examined and photos captured using a Leica EZ4 stereomicroscope and compound microscope. Use the program ImageJ to dimensions (Schneider, *et al.*, 2012).

3 Results and Discussion

Published in: Eschscholtz, Johann F. von. 1829. Zoologischer Atlas enthaltend Abbildungen und Beschreibungen neuer Thierarten während des Flottcapitains von Kotzebue zweiter Reise um die Welt auf der Russisch-Kaiserlichen Kriegesschlupp Predpriaeti in den Jahren 1823-1826. G. Reimer, Berli.: (1): i-iv; 1-17.

Taxonomy study (GBIF, 2021).

Genus *Julodis* Eschscholtz, 1829

Synonyms

= *Phyllis* Gistel, 1834

= *Saccosoma* Motschulsky, 1860

Julodis speculifer Laporte, 1835

Synonyms

= *Julodis iranica* Obenberger, 1923

= *Julodis monstrosa* Abeille de Perrin, 1904

Description: Body (Fig. 2&3): Adult beetles Large sized, elongated, oval in shape, resembling a boat, slightly convex at the dorsal, brown to shiny copper, with white spots in the form of parallel lines on all parts of the dorsal surface body, all parts of the body are covered with a light white fluff. The male is smaller in size than the female. Length female♀: 3.002cm-3.880cm, width 1.102cm-1.690cm; male♂ length 2.623cm-3.017cm, width 1.002cm-1.385 cm.

Head (Fig. 4): The head is flat front is very solid and its parts have held together tightly, it is of the type Hypognathous, resting in front of prostrum, where it is drawn to the prothorax. Spherical in shape, with pits uneven- shaped, wrinkled dorsal surface, circular nodes are fused hairy, compound eyes are oval - shape with edge a dark sclerotic. The antennae groove is semi-circular, upward protruding, with the anterior edge a sclerotic dark color, with long white hairs.

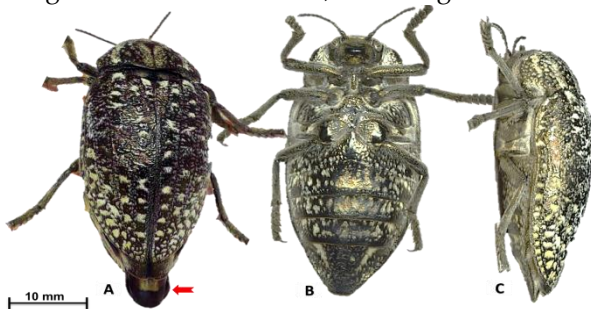


Fig. 2: Female of *J. speculifer*; (A), Dorsal view → = female gentela, (B) Ventral view, (C) Lateral view.

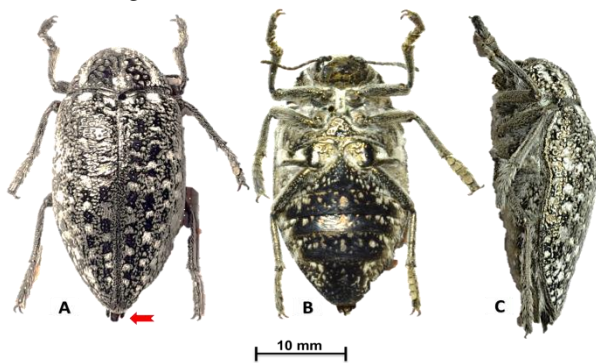


Fig. 3: Male of *J. speculifer*; (A), Dorsal view → = male gentela, (B) Ventral view, (C) Lateral view.

Antennae (Fig. 5) come out from the front of the compound eye with a distance at the forehead, the last segment of antennae is truncat or semi-oval, long (8.226mm), Serrate- shaped and consists of eleven antemomers, the scape is spherical and represents its connection point with the head. As for the parts, the upper one is elongated, the pedicel is goblet-shaped, flagellum of the first and second antemomers are elongated, and cup-shaped without teeth. While the other seven

antemomers contain clear teeth, the antennae are similar in both sexes.

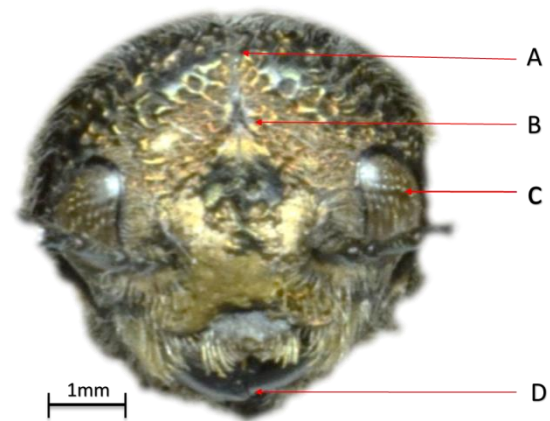


Fig. 4: Head front view: A= Vertex, B= carving face, C= Compound eyes, D= mouth parts.

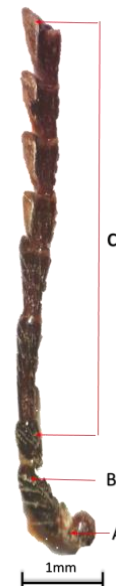


Fig. 5: Antenna (Serrate): A=scape, B=pedicel, C=flagellum.

Thorax (Fig. 6): Dorsal Pronotum convex, especially from the middle, and narrow from the front, where it covers most of the vertex of the head, its lateral edges are sclerotic with a slight serration, and this sclerotic is incomplete at the two posterior lateral edges. The color is dark to black glossy, the surface is wrinkly, stippled with thin, hairs non-erect, white in color, with several sclerotic spots of dark color, smooth, irregular in shape, scattered on the anterior pronotum disc, and inside them is a white waxy substance. As well as the presence of a thin sclerotic spot in the form of a line in the middle of the Pronotum disc, the back In the posterior margin at the base there is a deep depression resembling a crescent-shaped fossa.

The prescutum is a pair of small pieces that rest on either side of the scutum. Scutum In the form of a transverse plate of semi-square shape

with convex and concave edges, the posterior end of which is connected to the anterior end of the scutellum. Its dorsal surface is also covered with sclerotic, wrinkly carapace reliefs, with a long, thin medial edge, scutellum cardiform is triangular.

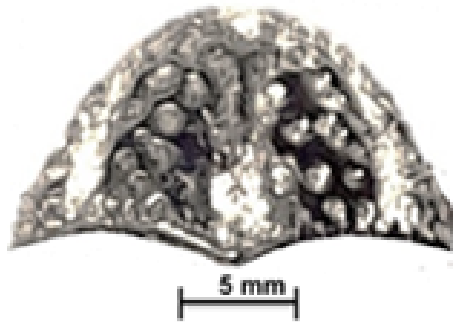


Fig. 6: Dorsal Pronotum.

Elytron (Fig. 7) length ♀ 3.107-3.326 cm, width 0.731-0.749 cm, length ♂ 2.619-2.640 cm width 1.224-1.495 cm semi-convex, yellowish-dark brown, gradually narrowing in its last third, Its apex is almost round, the longitudinal lines of the elytron are indistinct and distinct, with smooth irregularly shaped dark brown spots tending to the blackness is distributed sequentially and alternately, with other concave spots Small circular mortises smaller than those on the dorsal pronotum.

Membrane wing (Fig. 8) length: ♀ 2.193-2.550 cm, width: 1.145-1.168 cm, ♂ 1.901-2.112 cm width 1.018- 1.290 cm, it is not clearly integrated in terms of venation. It appears in the apical margin with a narrow and broad base, shows the costal margin costa vein which starts from the base of the wing runs along the costal margin, and ends at the basal third of the costal margin, followed by the subcosta vein, which is located directly under costa vein and ends at its end, and it is difficult to distinguish between them at the end and appears fused from the back with radius vein that extends with its extension and continues along the costal margin. front to third The last is from the margin of the wing, where this vein is represented by R1, from which a branch off at the center of the wing, extends a short distance to connect to it again forming a radial cell (CcuR) This branch is represented by RS, while R2 is represented by a single short branch that is not connected to the main branch and is located near the costal margin towards the wing tip. Thus, the decay of the Radial vein appears as R3+4. media vein It is represented by the 1M vein, which is short and loose and is located above the 2M vein near the anal margin of the wing, which is associated with the Cu and the Rem2 vein which is a retrograde

extension near the Rs vein. The Cu vein branches off into two branches Cu1 and Cu2, as the Cu2 branch also has two branches Cu2.1 and Cu2.2, and three A veins can be observed, namely A1 and A2, which are connected to the two components of the wedge cell with a sharp top, including the third anal A3 vein in addition to the vein located within the finger region called the J vein.



Fig. 7: Forewing (Elytron) Shows vien spots covered with white hair.

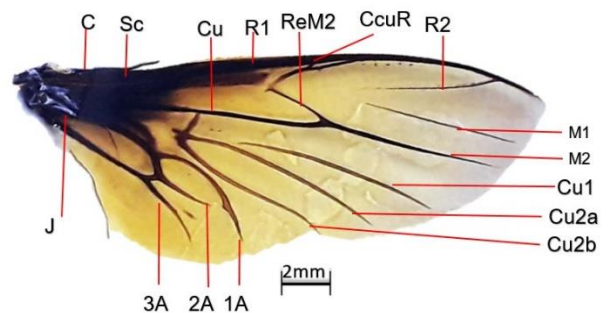


Fig. 8: Membrane wing of *J. speculifer* C: coast, Sc= subcoastal; R: radial, ReM2: second medial, CcuR= radio cell, M: media vein, RM: medial radial, Cu1: first cubitus, Cu2a: second cubitus, A=Anal vein.

Legs (Fig. 9) Length foreleg ♀ 1.805 mm, midleg 2.144mm, hindleg 2.559 mm, Length foreleg ♂ 1.155mm, midleg 1.711 mm, hindleg 2.257 mm. The femur, tibia, and tarsus of the legs are dark brown with speckles with fine bristles of white color, the ventral surface of the body is dark brown to brown, black shine color with small circular holes scattered bearing short, thin hairs with some bristles long erect, the surface is generally smooth, devoid of pitting except for Some areas stippled with bundles of white to yellow capillaries in color. presence of a pair of (spurs) symmetric on the apical margin- internal in

the tibia of all legs, claw tarsal pectin with process tapered and curved terminal.

Abdomen (Fig. 9) The sutures of the ventral sternal are clear, black, with sclerotic edges, smooth, shiny, and dark brown. The ventral surface of the abdominal segment is semi-smooth, bearing very short, thin hairs in the form of patches of irregular size and distribution, with long erect hairs on the sides of the sternum of the abdominal segment.

Male genitalia (Fig. 10) The male genitalia arise from the ninth abdominal segment. This segment is incomplete, weakly sclerotic, and retracts under the eighth abdominal segment. As for the tenth abdominal segment, it is a plate-weakly sclerotic, the terminal part of which is sclerotic and conical, under which lies the anus, it is called the proctiger. Male genitalia consists of a penis or median lobe, of cylindrical shape, consisting of two united plates, flattened dorsally and ventrally, almost parallel to each other, forming a thin flattened cylindrical structure with a truncated end. With a deep groove on the ventral view that ends with the ejaculatory duct aperture, which branches into two branches in the first third of the penis.

Pars basalis or Basal pieces are two structures that are thin, slightly sclerotic, and of dark color fused so that they appear from the dorsal view of the shaft in the form of a semi-circular structure elongated on both sides with a curved top forming what is called the basal plate, the basal plate is strongly attached to the penis first connecting membrane, while the two basal segments are connected to the ninth abdominal ring by the second connecting membrane.

The lateral lobe or parameres are two sclerotic structures that articulate with the lateral ends of the basal segments and surround most of the penis. They are slightly longer than the penis and have a flat, cylindrical shape. The apex of each of them is sharp, and its edges are strongly oblique and smooth.

The parameral apodeme is the junction of the two lateral pieces. This is known as the above four structures collectively as aedeagus or Tegmen.

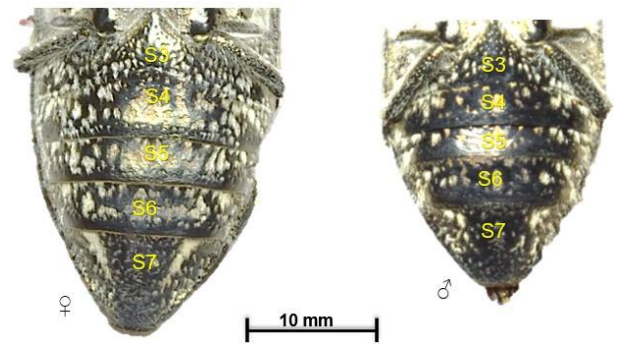


Fig. 9: Ventral view of abdomen in *J. speculifer*; (♀) Female, (♂) male, S3 third sternite, S4: fourth sternite, S5: fifth sternite, S6: Six sternite, S7 seven sternite.

Eggs (Fig. 11) It has a rectangular shape with rounded ends, a white color, a length: of 5.545mm, and a width of 3.142mm, external surface (Sculuptring) for chorion smooth, it is devoid of appendages or fonts or the terrain, Females lay single eggs on the soil surface near wild plants.

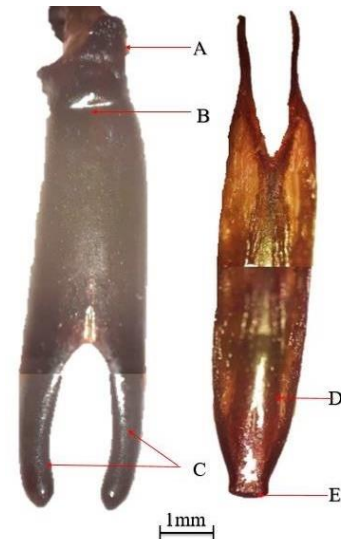


Fig. 10: Male genitalia (Aedeagus) Dorsal view, A= Pars basalis, B= Basal peg, C= parameres, D= Parameral apodeme, E= ejaculatory duct aperture.

Larva Body: (Fig. 11) First instar cream-white, somewhat flattened, legless, the head epicranium completely retracted into the prothorax, the tentorium was poorly sclerotized, and the mandibles wide podded and toothless.



Fig. 11: Egg shape *J. speculifer*.



Fig. (12): Larva First instar *J. speculifer*

Specimens examined: Nine specimens collected from wild plants (3 specimens on 7/3/2022 and 6 specimens on 8/9/2022) were studied in Basra province, Safwan region (30.136698, 47.622377).

Host plant: Larval development outside plant roots in the soil Sands.

Distribution: Southwestern Jordan (Kubáň & Volkovitsh, 2006; new record), Kuwait (Théry, 1936b [type locality]; Bílý 1990), Saudi Arabia (Bílý, 1979, 1985, 1990).

4 Conclusion

The showed results diagnostic traits that studied do not differ from the species in recorded Kuwait, but different in species Saudi Arabia which was considered subspecies.

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