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Taxonomic study of damselfly nymphs and new species records from the Syrian coast

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ABSTRACT

Some nymphs of Odonata were collected from different locations in the Syrian coast area during 2022-2023, including different aquatic environments, streams, rivers, lakes, and temporary ponds. The number of samples reached up to 500 samples. It was carefully preserved and identified up to the species level based on suitable literature for distinguishing and identifying nymphs. Three species belonging to the Calopterigidae and Lestidae families were recorded: *Calopteryx virgo*, *C. splendens*, and *Chalcolestes virides*. The species *Calopteryx virgo* was recorded for the first time from the Syrian coast area.

Keywords: Nymph, Calopteryx virgo, C. splendens, Chalcolestes viricides, the Syrian coast

1. INTRODUCTION

Odonata of Syria was well studied through several works started in 1887 till today Selys-Longchamps, (1887), Bolivar, (1893), Martin, (1909), Schmidt, (1938), St. Quentin, (1965), Schneider, (1981), Schneider, (1982), Schneider, (1985), Schneider, (1986), Schneider, (1987), and some recent works were (Shiha et al., 2008; Shiha et al., 2009; Mousatat et al., 2010). The first and only study of nymphes of Odonata from Syria was by showed the distribution of three families and 6 genres of damselflies from Latakia, Syria. At the same time, studied the Odonata from Southern Syria. El-Hariri, (1968) listed three families, 12 genres, and 19 species reported so far from Syria. Till today number of dragonfly species reported from Syria is 66 species (Mousatat et al., 2010). The aim of this study to report the damselfly nymphs associated with freshwater bodies of Latakia, Syria.

2. MATERIAL AND METHODS

Nymphs were collected randomly from various aquatic environments during the period extending from 8/13/2022 to 4/30/2023 using qualitative nets, while quantitative studies were carried out using a sieve with a diameter of 20 cm and the size of its openings (1 x 1 mm) from fixed and random locations, where they were collected. Sieves were inserted under the water for a distance of 25 cm for one minute, especially in places where aquatic plants are abundant, where the nymphs

are present and more active. The sieve was quickly lifted in a circular motion to get rid of excess water. The method was repeated 3 to 4 times. Then the nymphs were picked up from the sieve using a wet brush or pointed forceps. The samples were initially sorted according to shape and size. Nymphs were preserved in 70% alcohol in small, tightly sealed containers, and all data were recorded on them. They were placed in a suitable place in the laboratory and then identified up to the species level using the proper literature. All collected material were preserved in the collection of Zoology Dept., Faculty of Sciences, Tishreen University, Latakia, Syria.

3. RESULTS AND DISCUSSIONS

Three species belonging to two families of damselfly were collected during the present study.

Systematics

Family

Calopteriogidae

Species

Calopteryx splendens (Harris, 1782)

Diagnosis

Shape of the body is cylindrical, elongated and brown in color. Total length of body 20-25 mm, (Figure 1-A). The nymph's head is almost spherical, with small eyes side of the head. The antenna has seven segments with a tapering end, the first segment is twice as long as the rest of the segments (Figure 1-D). The wing buds are approximately equal in length and reach the end of the fourth abdominal segment (Figure 1-H). The three pairs of legs are hairless with brown rings (Figure 1-G). The Prementum with a median cleft of ligula has a diamond shape reaching to the middle of the prementum plat and bearing a pair of setae on the anterior part. The labial palps are prominent and clear from the top of the labium. The inner labial palpus edge is serrated and the distal ends with a pair of long, movable hooks with three claw spines. The middle spine is longer than the first and third, while the labial palps bear two pairs of palpal setae near the inner edge (Figure 1-E).

The nymph's abdomen is cylindrical, elongated, and hairless and the reproductive appendages arise from the base of the ventral surface of the 9th abdominal segment, (Figures 1-B and C). The end of the abdomen has a pair of short cerci and three caudal gills. The two lateral ones are one and a half times as large as the middle one, with bright and dark bands. The dark ones (three) have serrations in the proximal part, in addition to the presence of bristles at their ends. The lateral gills are approximately a triangular section yellow to orange in color with dark brown dots, while the median caudal gills are leaf-shaped and pale yellow with dark brown dots on either side, and the number of dots increases clearly along the longitudinal axis of the gill (Figure 1-C).

Examined material

Eight nymphs, 15. vii.2023. Al-Snabur River (35°28'10.0"N, 35°53'15.1"E, elevation, 9m), Latakia governorate, Syria, col. Ebrahim Saeed.

Distribution

This species reported from West Europe, Central Asia, China, Russia, and Africa

Species: Calopteryx virgo (Linnaeus, 1758)

Diagnosis

The body is cylindrical and elongated, reddish brown. Total length 30-40 mm, (Figure 2-A). The head is almost spherical, with two sharp head projections on the sides of the postocular head (Figure 2-D). The first segment of antennae is longer than the rest of the segments combined, the total number of segments is seven, and the second piece is larger than the third, and so on (Figure 2-D). Labium contains a diamond-shaped, elongated cleft. The premium bearing only one hair on each side. The labial palpus large, arises from both ends of the apex of the labium. The inner edge of the labial palpus is serrated and their distal ends with a pair of wide spines with a clawed apex, followed by a portion with serrations, then a pair of large movable hooks that are curved inward, labial palps

hairless on the outer margin (Figure 2-E). The thorax is short, and cylindrical with two pairs of approximately equal-length wing buds that reach the end of the fourth abdominal segment (Figure 2-B).

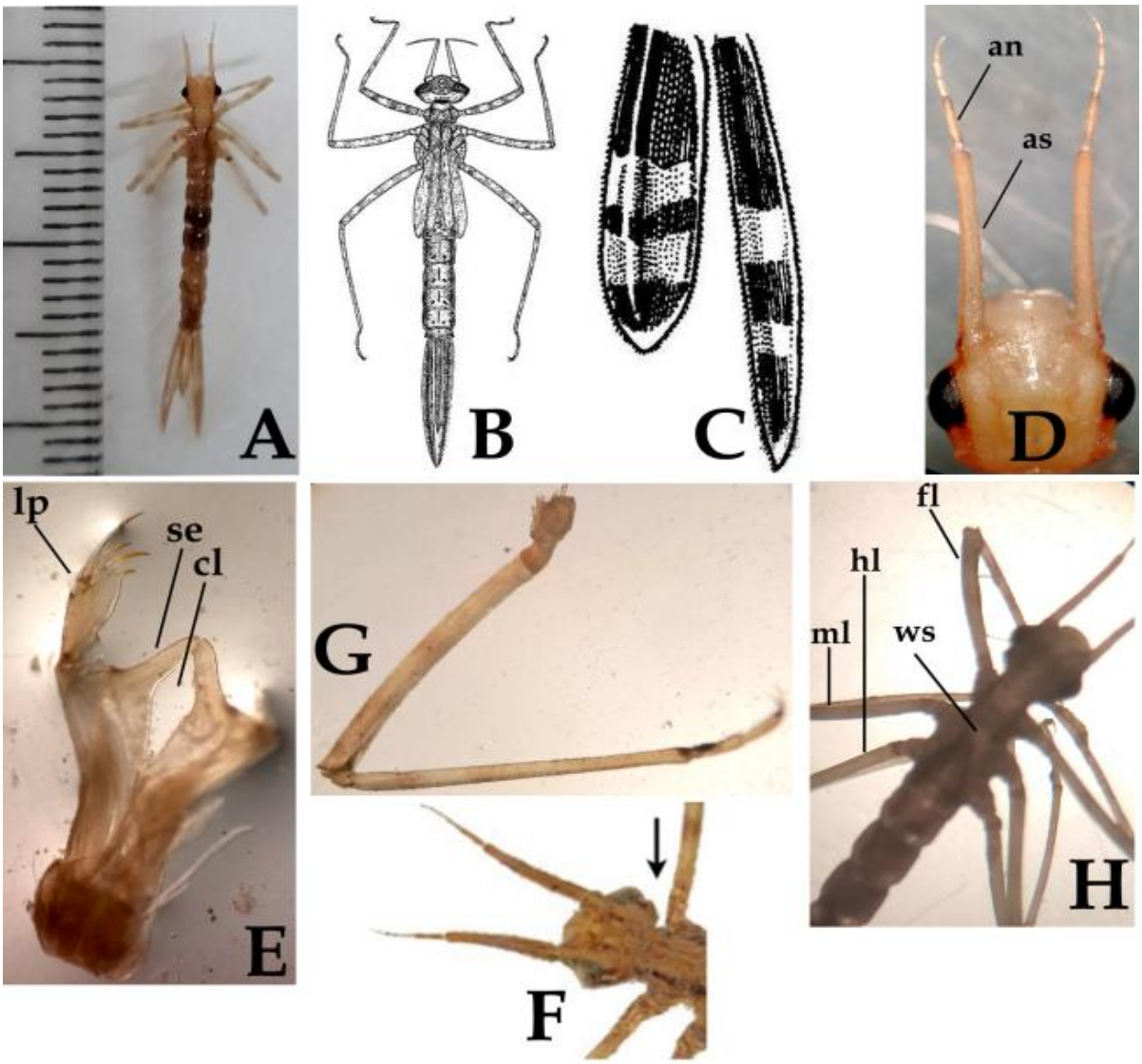

Figure 1 Calopteryx splendens nymph, (A) Habitus in dorsal view, (B) line figure of larvae, (C) median and lateral caudal gills, (D) Head and antenna segment, (E) Labium (lp=Labial palpus, se=setae, cl-cleft), (F) head with lateral process, (G) hairless leg, (H) head and thorax (ws=wing buds, fl=fore leg, ml=mid leg, hi=hind leg)

Legs are covered with hairs with dark brown strips (Figure 2-F). The abdomen is long, cylindrical, and hairless. The reproductive appendages arise from the base of the ventral surface of the 9th segment (Figure 2-G). Abdomen with a pair of short cerci (Figure 2-H) and three brown caudal gills, divided into bright and dark (two areas) areas. The two lateral gills are 3/4 times longer than the median caudal gill. The proximal part of the gills is serrated, in addition to hairs at their ends (Figure 2-C).

Remarks

This is a new record of this species to the Syrian fauna of aquatic insects.

Examined material

Five nymphs, 03. vi.2023. Manjila River (35°32′31.0"N, 35°55′14.8"E, elevation, 35m), Latakia governorate, Syria, col. Ebrahim Saeed.

Distribution

This species is reported from West Europe and Asia (China, Korea, and Japan) and Russia.

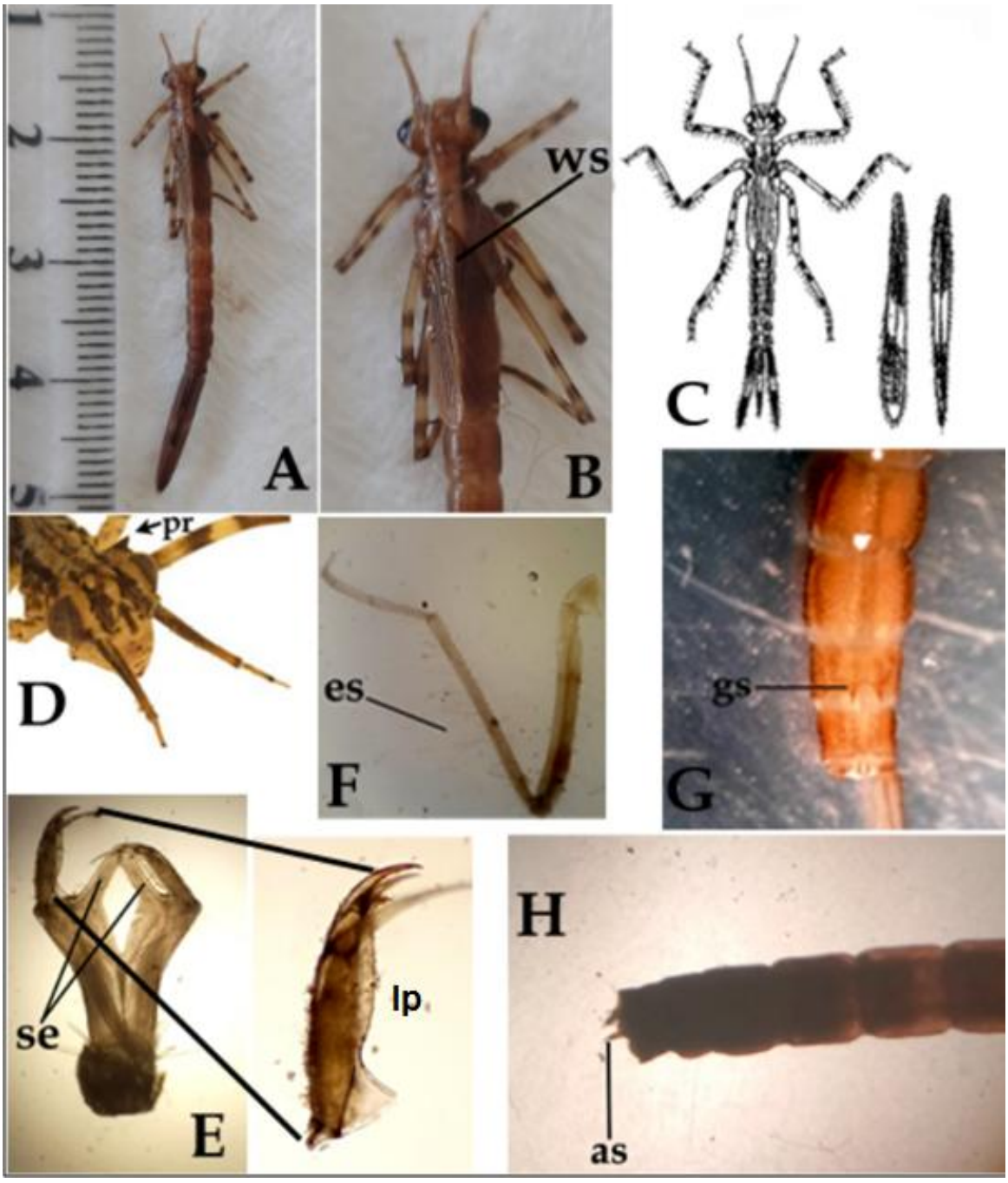

Figure 2 Calopteryx virgo nymph, (A) Habitus in dorsal view, (B) Head and thorax (ws=wing buds) (C) line figure of larva along with lateral and median gills, (D) Head with lateral process (pr= process), (E) Labium (se=setae, lp= Labial palpus), (F) haired legs (se=setae), (G) genital appendage, (H) End of abdomen (as=anal cerci).

Family: Lestidae

Species: Chalcolestes viridis (Vander Linden, 1825)

Diagnosis

The body is cylindrical, elongated, pale yellow, 20-30 mm long (Figure 3-A). The head is approximately rectangular and the eyes located are D-shaped, with three ocelli on the dorsal side of the vertex. Antenna seven segments (Figure 3-D). The thorax is short, cylindrical, and bears a pair of wing buds of approximately equal length reaching the beginning of the third abdominal segment (Figure 3-B). Legs are long, slender, and hairless with pigments in the form of brown rings (Figure 3-C). The abdomen bears numerous short spines ventrally (Figure 3-H). The labium is elongated, the permentum bearing five pairs of setae, and the median cleft is elongated, broad part carrying five hairs on each side (Figure 3-E).

The labial palps are large, and distinct, and arise from both ends of the apex of the labium. Its inner edge is slightly serrated and its apex ends with a pair of broad spines, the labial palps bear near their inner edge three long and thick setae (Figure 3-F). The abdomen is long and smooth. Each abdominal segment bears a pair of brown lateral spines (Figure 3-H). The reproductive appendages arise from the base of the 9th abdominal segment (Figure 3-I). The abdomen is ended with one pair of cerci and three gills of approximately equal length covered with smooth spines entirely, with bright and dark bands. The veins of the caudal gills are at right angles to the main axis of the gill (Figure 3-G).

Examined material

Ten nymphs, 02. ix.2023. Babou River, Latakia governorate, Syria, col. Ebrahim Saeed.

Distribution

This species is reported from Europe, Asia, and North Africa.

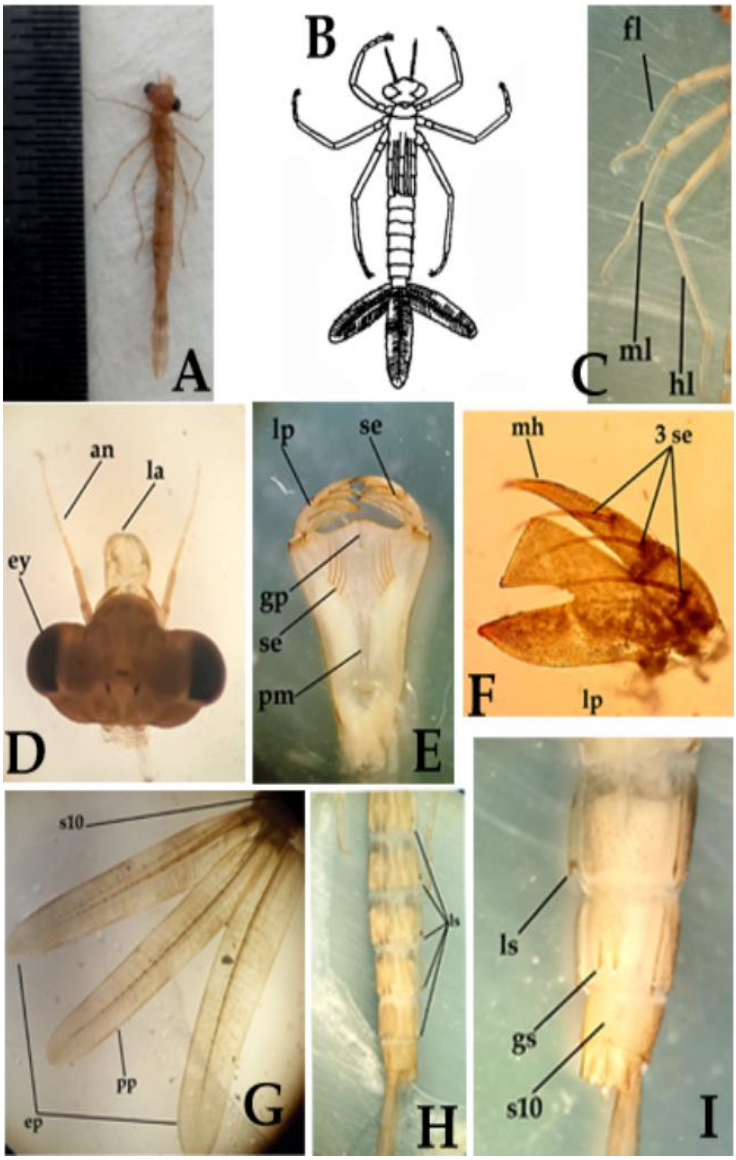

Figure 3 Chalcolestes viridis nymph, (A) Habitus in dorsal view, (B) line figure of larva along with lateral and median gills, (C) legs (fl=fore leg, ml=mid leg, hi=hind leg), (D) Head (la=labium, an=antenna, ey=eye), (E) Labium (pm=prementum, gp= gap or cleft, lp=labial palpus, se=setae), (F) Labial palpus (mh=movable hook, se=setae), (H) abdomen with lateral spines (ls=lateral spines), (I) genital appendage on the ventral view of the abdomen (Gs=genital appendage (s10 abdominal segment 10)

4. CONCLUSION

The adult Odonata and their aquatic stage (nymphs) remain a source of inspiration for humans through their predatory behavior and their role in biological control in both air and water. They have received great interest from researchers around the world, and we are in the process of identifying the Odonata in Syria through the nymphs. This research is part of my Master's thesis. 17 species have been identified so far, and we will publish them successively. Therefore, it is necessary to continue studying its biodiversity and protect the habitats in which it spreads, because urgent environmental changes have affected and are affecting the number of its species and its spread

Author Contributions

All authors contributed to the study's conception and design. Material preparation, data collection, and analysis were performed by: Adib Zeini, Ibrahim Saied.

Informed consent
Not applicable.

Conflicts of interests:
The authors declare that there are no conflicts of interests.

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Ethical approval & declaration
In this article, as per the animal regulations followed in Department of Zoology, Faculty of Science, Tishreen University, Latakia, Syria, the authors observed three species belonging to the Calopterigidae and Lestidae families were recorded: *Calopteryx virgo*, *C. splendens*, and *Chalcolestes viridis*. The Animal ethical guidelines are followed in the study for species observation, identification & experimentation.

Data and materials availability
All data associated with this study are present in the paper.

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