ZANCO Journal of Pure and Applied Sciences
The official scientific journal of Salahaddin University-Erbil
https://zancojournals.su.edu.krd/index.php/JPAS

ISSN (print):2218-0230**, ISSN (online):** 2412-3986**, DOI: http://dx.doi.org/10.21271/zjpas**

RESEARCH PAPER

Redescription of spittlebugs, *Cercopis vulnerata* Rossi, 1807 (Hemiptera: Cercopidae) from Kurdistan Region– Iraq.

Shatha H. Ahmmed, Dilzar H. Mawlud and Nabeel A. Mawlood
[1]College of Agricultural Engineering Sciences, Salahaddin University-Erbil, Iraq.

A B S T R A C T:

The present paper provides a comprehensive description of the spittlebugs, *Cercopis vulnerata* Rossi, 1807, in Kurdistan Region of Iraq. From April to the end of July of 2021, the specimens were taken from some flowers of herbaceous plants. Photographs have been taken of certain significant taxonomic components, include the mouthparts, antennae, fore wing, 8th abdominal segment and male genitalia. The locations of collection, date of collection and the hosts of plants have been recorded.

KEY WORDS: Cercopidae, *Cercopis vulnerata*, Hemiptera, Kurdistan region- Iraq, Redescription.
DOI: http://dx.doi.org/10.21271/ZJPAS.35.4.14
ZJPAS (2023) , 35(4);146-150

1. INTRODUCTION :

The Cercopoidea (Hemiptera: Auchenorrhyncha: Cicadomorpha) includes approximately 2,500 described species classified into approximately 340 genera in five families (Cercopidae, Aphrophoridae, Clastopteridae, Machaerotidae, and Epipygidae (Soulier-Perkins, 2012). There are approximately 1,360 described species belong to the family in 140 genera, and a recent revision listed 416 of these species distributed in the New World. This group is predominately tropical (Peck and Thompson, 2008).

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The family commonly called spittlebugs or froghoppers, these insects feed on fluid content in plant xylem tissues and many species shows a strong preference for nitrate-fixing plants (Thompson,1994; Triplehorn and Johnson, 2005). The members of this family causing severe damage to both natural and planted forest trees as well as orchards in Mexico, Italy, and Spain (Castro-Valderrama et al., 2017). Spittlebugs are characterized by the nymphal habit of covering themselves with a frothy saliva-like mass composed of air bubbles trapped partially in digested xylem fluids discharged from the insect alimentary system and supplemented by mucopolysaccharides and proteins produced by the specialized Malpighian tubules of the immatures (Rakitov, 2002). The adults resemble tiny frogs with bright color patterns (Carvalho and Webb, 2005). These insects are a xylem-sap sucking of many herbaceous, some of them have economic importance, causing serious stunting especially to Clover (Triplehorn and Johnson, 2005). Lodos and Dolling (1991) indicated that

* **Corresponding Author:**
Shatha H. Ahmmed
E-mail: dilzar.mawlud@su.edu.krd
Article History:
Received: 04/01/2023
Accepted: 22/05/2023
Published: 30/08 /2023

some species of spittlebugs are polyphagous, feeding on ferns and grasses as well as broad leaves herbs and shrubs. Most species of the family are polyphagous, nymph found in soil crevices, under stones (Chinery, 1986). Hamilton and Morales (1992) described fifteen species in four genera from New Zealand, with keys of the identification of the species. *C. vulnerata* Rossi,1807 is one of the most important species of the family have an elongated and strongly shielded body, they are shining black, with bright red marks on the elytra, one triangular mark at the base, one square mark in the middle and a stripe at the apex. These colors serve as a warning for their unpleasant taste (Gibbons, 2008). Rossi (1807) is the first who described the species. Le Quesn (1965) prepared a key to identify the genera of British insects including *C. vulnerata* Rossi. Tanyeri and Zeybekoğlu (2020) mentioned four different variants of *C. vulnerata* have been described up to now based on forewing color/patterns. These are *C. vulnerata* var. *helvetica*, *C. vulnerata* var. *typica*, *C. vulnerata* var. *nicolausi* and. *C. vulnerata* var. *confluens* (Holzinger, 2008) formulated a key to genera and species of the Cercopidae of Europe and gives an overview of the color morphs of Central European *Cercopis* taxa. Derwesh (1965) recoded one species of the family, *Triecphora septemmaculat*a Mel in Iraq.

2. MATERIALS AND METHODS

The present paper is based on 60 specimens collected during the period from April to the end of July/ 2021, from the flowers of some herbaceous plants (Mallow) *Malva sylvestris* L. (Wild mint*) Mentha arvensis* L. and (Hollyhock) *Alcea* sp. L., in different localities (Girdarasha, Ankawa and Hiran) of Erbil governorate; (Kalar, Sarchnar) of Sulimani and Sumel in Dohuk governorate, Kurdistan region – Iraq.

The specimens were placed in boiling water for 10-15minutes to soften their parts. Then the parts were separated and put in 10% KOH which placed in water bath for 10-15 minutes. After that placed in distilled water for 2-3 minutes to neutralize the alkali. The parts were placed in ethyl alcohol 25% and dissected under microscope (Lane and Crosskey, 1993; Mawlood et al., 2018). The habitus and some important parts were photographed by a digital camera (Ucmas series microscope camera), then these parts were illustrated and drawn. The species was identified with the help of available literatures (Le Quesne, 1965 and Gibbons, 2008) and the diagnosis was confirmed by the Gene Bank of Zheen International Hospital / Erbil, Using DNA test, with sequence ID: EU414724.1

3. RESULTS AND DISCUSSION

3.1. Body (Male)

Elongated oval, shinning with four bright red marks on elytra. Length 7.4. -9.6 mm, width 2.8-3.9 mm.

3.2. Head

Black, nearly triangular 0.9-1.3 long. Vertex and face shinning black, anterior margin evenly arcuate. Vertex straight or slightly concave, with a flat, downward-sloping apical slope. considerable convexity of the fronto-clypeus. Black eyes with an almost ball form. Little, light brown Ocelli, Labrum triangular with acute apex. Mandibles (Fig.1A) bristle like, 1.2 - 1.4 mm long. Maxilla (Fig. 1B) bristle - like slightly longer than the mandible, 1.3-1.5 mm long. Labium (Fig.1C) three segmented, 1st segment spherical shaped, 2nd and 3rd parts are rectangular, 2nd segment 1.1 times longer than 3rd segment. Antenna (Fig.1D) dark brown, 2.0 - 2.6mm long, bristle type, longer than the head, readily visible from above, 1st segment cylindrical, 1.2 times longer than the 2nd segment, 2nd segment almost rectangles, twice longer than 3rd segment, no segmentation was found on arista, three times longer than the 2nd segment,

3.3. Thorax

Pronotum smooth, black, hexagonal, width is wider than length, anterior border straight, middle, and posteriorly concave, descending into depressed vertex, anterior lateral margin somewhat oblique, layer with tiny shallow puncture wounds and a high density of yellow stamens. Scutellum black, triangular shaped, apex

slightly sloping downwards caudal, scutellar disc shallow depressed. Fore wings (Fig.1E) shining black, 6.2- 7.2mm long, sloping rather steeply without either a costal break or cuneus; roof-like over through the abdomen; it is almost similar in texture with transparent cells (leathery between the veins); and have a clavus, surface comprising 4 vivid red markings upon the elytrum: a stripe somewhere at peak, a triangle sign somewhere at bottom, and a squared sign throughout the middle. The hind wings are brownish, relatively shorter than that of the fore- wings, and have four stretched, sealed apical cells. Cu1 is branching, with the m-cu located in the center of the wings and coming together with Cu1a well before the Cu1a/Cu1b were branched. The fore legs red-black, 4.8- 5.6 mm long with the fore coxae oval, trochanter semi-triangular, fore femur cylindrical with both the basal half black and the apical 1/2 red, fore tibia black tubular formed with distance a little only about 2 times of femur, with nearly one - fifth of the apical being red carrying a set of short spurs with 9–10 apical spines; pretarsus, cardiac shaped, black with 4 parts, lengthy setae covering the apical spines of the metatarsus; with the exception of the more mobile, boat-shaped rear legs and the tibia cylindrical with two spines at the antero-dorsal edge, The mid legs and fore legs are essentially identical.

3.4. Abdomen

Elongated oval, consist of 7 observable red-black segments, measurement is 3.0- 3.6 mm long, outward covered by short, condensed of black setae. Abdominal sternites, red with black spot, these are flanked by membranous lateral lobs derived from terga and pleura of segments 3-9. 1^{st}-6^{th} sternite nearly transverse oval. 7^{th} sternite cup shaped. The tergites posteriorly, narrowly reddish. 1^{st} - 6^{th} tergites rectangular. 7^{th} tergite oval.

3.5. Male genitalia

Eighth abdominal segment (Fig.1F) cup shaped, 0.2-0.3mmlong, anterior margin feebly imagenated medially, laterally with moderate condensed of short setae. Pygophore (Fig.1G) nearly triangular, 0.8-1.2 mm long, laterally with low dense of short setae, Subgenital plates (Fig.1 H) elongated oval, highly sclerotized, broad at base, evenly tapered to apex, apical and lateral margins covered with low dense of short setae, 1.8-2.2mm long. Parameres (Fig.1 I) irregular shaped, apical part bilobed, with low dense of short setae, 1.7- 2.2mm long. Aedeagus (Fig.1 J) hook shaped, highly sclerotized. Blade small bear 4 needle-like processes, half of these needles are long, while other halves are short, 2.4-2.9mm long.

Acknowledgements

We sincerely thank Dr. Hanna Hani Al-Safar in Iraqi Natural History Museum and Research Center - University of Baghdad for her assistance to identify the genus, Special thanks to Zheen International Hospital/ Erbil, for confirming the identification of the insect using DNA test.

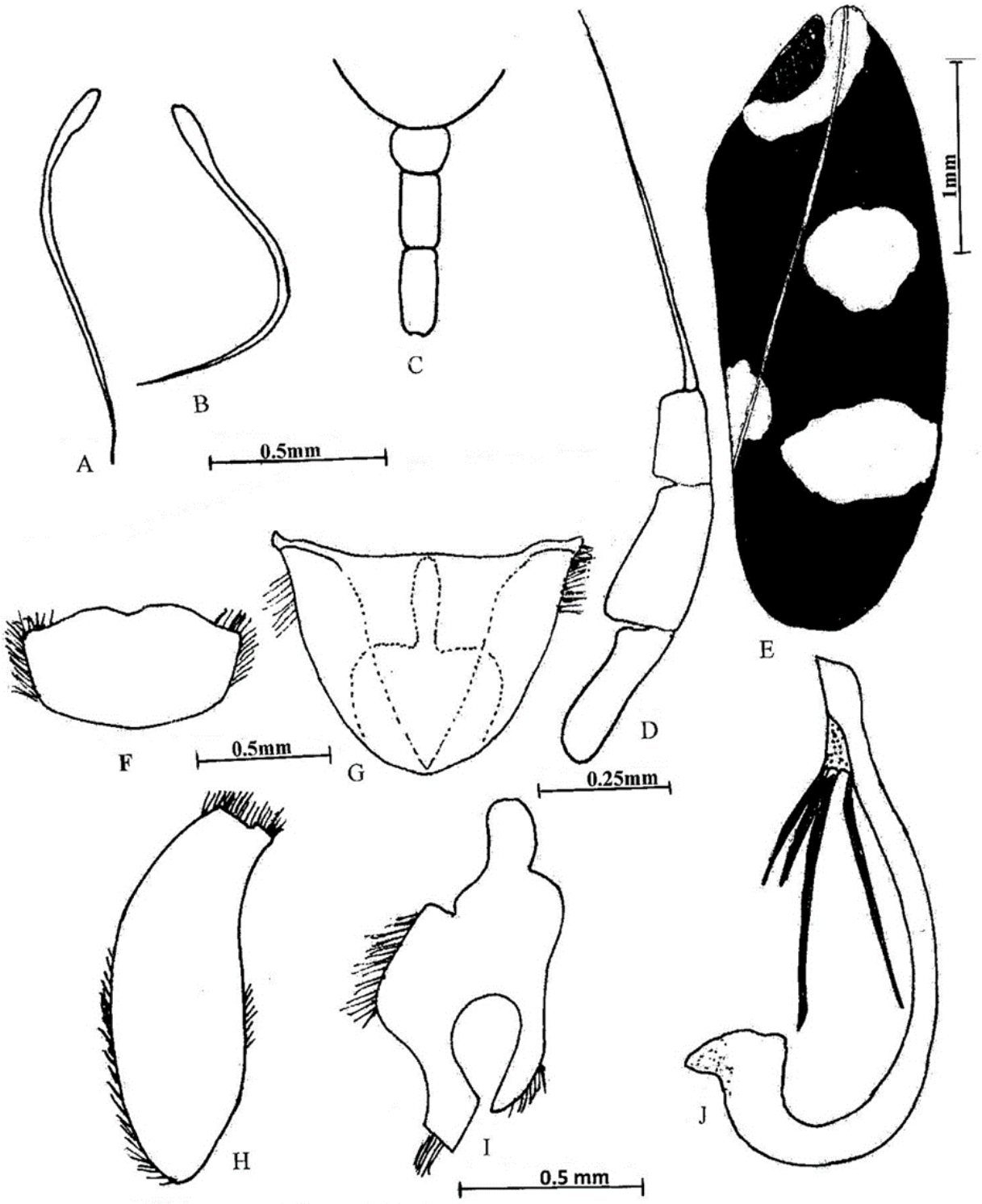

Figure (1) : ***Cercopis vulnerata*** **Rossi**

A. Mandible ; B.Maxilla ; C.Labium ; D.Antenna ; E.Fore-wing ; F. 8th abdominal segments ; G. Pygophore (dorsal view) ; H. Subgenital plates ; I. Paramere ; J. Aedeagus

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