

First record of *Tambocerus viraktamathi* (Hemiptera: Cicadellidae: Deltocephalinae) in Pakistan

SHAH, Bismillah¹, KHAN, Ashraf², KHAN, Muhammad T.³, AHMED, Irfan⁴, KHAN, Shahid H.⁵ & YANI, Duan^{1,*}

¹ Anhui Province Key Laboratory of Integrated Pest Management on Crops, Key Laboratory of Biology and Sustainable Management of Plant Diseases and Pests of Anhui Higher Education Institutes, School of Plant Protection, Anhui Agricultural University, Hefei, Anhui 230036, China

* E-mail: duanyani@hotmail.com

² Institute of Plant and Environmental Protection, National Agricultural Research Center. Islamabad, Pakistan.

³ Department of Entomology, The University of Agriculture. Peshawar, Pakistan.

⁴ Vertebrate Pest Management, Institute of Plant and Environmental Protection, National Agricultural Research Center. Islamabad, Pakistan.

⁵ NARC-CEWRI, Pakistan Agricultural Research Council. Islamabad, Pakistan.

Received 02 - II - 2021 | Accepted 04 - IX - 2021 | Published 30 - XII - 2021

<https://doi.org/10.25085/rsea.800409>

Primer registro de *Tambocerus viraktamathi* (Hemiptera: Cicadellidae: Deltocephalinae) en Pakistan

RESUMEN. La chicharrita *Tambocerus viraktamathi* Rao es una especie recién registrada en Pakistán. Hasta ahora, sólo se han identificado dos especies del género *Tambocerus* Zhang & Webb en Pakistán. A continuación se presentan sus características distintivas, junto con ilustraciones.

PALABRAS CLAVE. Athysanini. Auchenorrhyncha. Morfología. Taxonomía.

ABSTRACT. The leafhopper *Tambocerus viraktamathi* Rao is a newly recorded species in Pakistan. So far, only two species have been identified from the genus *Tambocerus* Zhang & Webb in Pakistan. Their distinguishing features, along with illustrations, are provided below.

KEYWORDS. Athysanini. Auchenorrhyncha. Morphology. Taxonomy.

The leafhopper genus *Tambocerus* Zhang & Webb (Deltocephalinae: Athysanini) was established with *Selenocephalus disparatus* (Melichar, 1903) as the type species from Sri Lanka. Zhang & Webb (1996) first placed the genus in tribe Selenocephalini due to the transverse striations on the fore margin of the head, its distinguishing feature, but it was later included by Viraktamath (2012) in tribe Athysanini based on the key to the Deltocephalinae tribes by Zahniser & Dietrich (2008). Currently, the genus comprises 18 species worldwide. Naveed & Zhang (2018) documented the first species from Pakistan, *Tambocerus bulbulus* Naveed & Zhang, while the present study reveals a second newly recorded species i.e. *Tambocerus viraktamathi* Rao.

Leafhopper specimens were collected from Pakistan during the years 2018 and 2019 and were preserved in 90% ethanol. Characteristics like size, color, markings, and shape of the head, thorax and abdomen were carefully examined for the descriptions. Male genitalia were also observed as described by Oman (1949) and Knight (1965). The whole abdomen was removed from the specimen and treated in a 10% NaOH solution on a hot plate for maceration (removal of soft tissues and muscles) and then rinsed with water. Following, the genitalia were placed on a glass slide with a glycerol drop and observed under the microscope. A digital camera Nikon DS-Ri2 mounted on a Nikon SMZ 1500 stereoscopic microscope and Nikon Eclipse 50i POL polarizing microscope were used to take photographs.

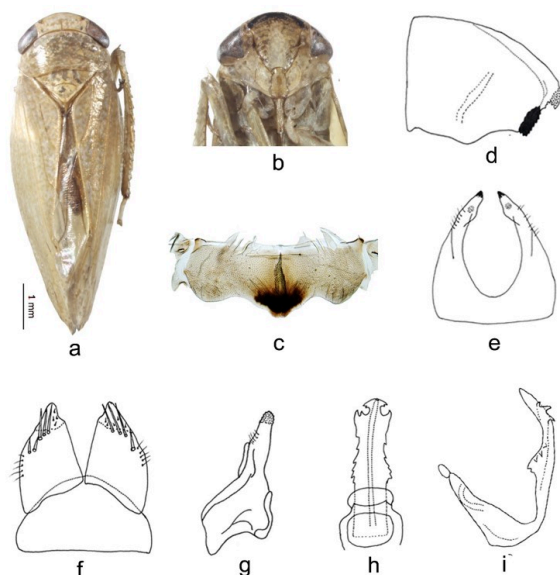


Fig. 1. *Tambocerus bulbulus*. a. habitus, dorsal view. b. face. c. female seventh sternite, ventral view. d. male pygofer lobe, lateral view. e. pygofer, dorsal view. f. subgenital plates and valve, dorsal view. g. style, dorsal view. h. aedeagus, posterior view. i. aedeagus, lateral view [a–i] after Naveed & Zhang (2018).

Digital photographs were modified to balance color and contrast, and to remove background using Adobe Photoshop CS.

Morphological terminology follows that by Zhang & Webb (1996), Shen et al. (2008), Viraktamath (2012) and Zahniser & Dietrich (2013). The studied specimens were deposited in the School of Plant Protection, Anhui Agricultural University, Hefei, Anhui, China.

Tambocerus bulbulus Naveed & Zhang, 2018 (Fig. 1)

Tambocerus bulbulus Naveed & Zhang, 2018: 240.

Material examined. No material examined.

Distribution. Pakistan.

Remarks. This species is similar to *Tambocerus viraktamathi* Rao, but can be readily distinguished by the following features: absence of brown spots on forewing, pygofer with serrated posterior margin, dark pigmented crests adjacent to each other and a dorsal crest often pigmented; subgenital plates usually sub-triangular with a truncated apex rather than elongated (Naveed & Zhang, 2018).

Tambocerus viraktamathi Rao, 1996 (Fig. 2)

Tambocerus viraktamathi Rao, 1996: 85; Viraktamath, 2012: 59; Naveed & Zhang, 2018: 244.

Measurement. Male: 5.7 – 6.1 mm; female: 6.2 – 6.3 mm.

Redescription. Coloration. Ochraceous, with brownish spots on the head, thorax and forewings; claval veins apices, veins joining costal margin with a dark brown spot.

Morphology. Head as wide as pronotum, Vertex more

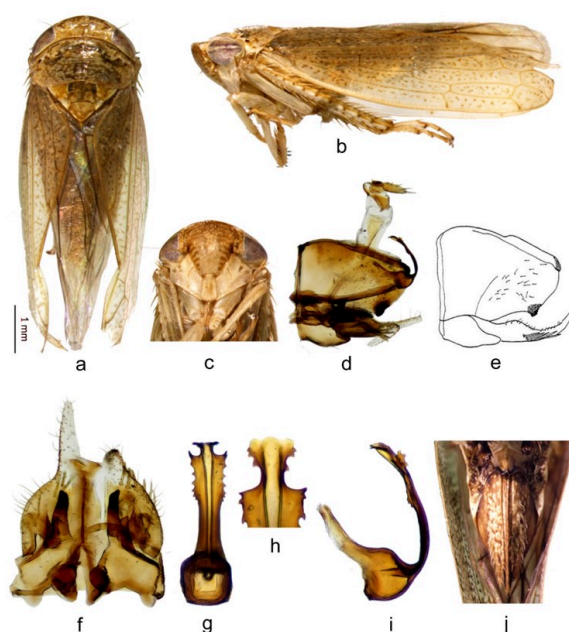


Fig. 2. *Tambocerus viraktamathi*. a. habitus, dorsal view. b. habitus, lateral view. c. face. d. male pygofer, lateral view. e. male pygofer, lateral view [after Viraktamath, 2012]. f. subgenital plate, valve and styles and connective, dorsal view. g. aedeagus, dorsal view. h. apex of aedeagus, caudal view. i. aedeagus, lateral view. j. female abdominal tip, ventral view.

than twice as broad between eyes as median length.

Male Genitalia. Pygofer somewhat narrowed towards posterior, with dorsal marginal thickness in posterior half, ending in a dark pigmented crest directed laterally, another similar posterior crest on the ventral margin, macrosetae absent but with few hair-like setae. Subgenital plate with an apical membranous prolongation, with a transverse row of macrosetae before apical prolongation at midlength. Styles with short apical lobe, apophysis slightly thick. Connective with stem longer than arms. Aedeagal shaft curved dorsally, with lamellate lateral projection and serrated margins at base and somewhat anteriorly near apex, highly constricted before apex, with variable and asymmetrical serrations.

Material examined. PAKISTAN, Khyber Pakhtunkhwa: Maidan, 34°57'6.678" N, 71°48'29.5632" E, 13-VII-2018, Light trap, 1♂, 1♀; Shangla, 34°53'13.848" N, 72°45'25.2144" E, 21-VII-2018, Sweeping hand net, 1♂; Bisham, 34°52'13.7856" N, 72°51'48.1104" E, 21-VII-2018, Sweeping hand net, 1♀; Shinkiar, 34°28'19.1064" N, 73°16'14.3004" E, 22-VII-2018, Sweeping hand net, 1♀; Abbottabad, 34°10'7.5036" N, 73°13'17.3892" E, 23-VII-2018, Sweeping hand net, 2♂; Kaka Sahib, 33°55'43.3668" N, 72°2'38.7276" E, 27-VII-2018, Sweeping hand net, 2♀; Kohala Bala, 33°51'51.318" N, 73°12'35.4708" E, 30-VII-2019, Sweeping hand net, 1♂; Mansehra,

34°20'37.8456" N, 73°13'9.7428" E, 10-VIII-2019, Sweeping hand net, 6♂, 7♀; Ibrahim Bagh, 34°20'50.6252" N, 73°13'16.4748" E, 11-VIII-2019, Sweeping hand net, 1♂; Azad Kashmir: Muzaffarabad, 34°21'44.1144" N, 73°27'10.62" E, 14-VIII-2019, Sweeping hand net, 1♂, 2♀ (All collected by Bismillah Shah).

Distribution. India (Viraktamath, 2012) and Pakistan (new record).

Remarks. This species can be easily differentiated from *T. bulbulus* by the pygofer with two dark brown crests; male pygofer posterior margin with ventral serrated area smaller, and distant to dorsal sclerotized area, and by the shape of the lamellate expansion on aedeagal shaft.

ACKNOWLEDGEMENTS

We thank the editor in chief and anonymous referees for their comments and suggestions for improving this manuscript. The first author also wishes to thank the Chinese Scholarship Council (CSC) for supporting his doctoral study and stay in China.

LITERATURE CITED

Knight, W.J. (1965) Techniques for use in the identification of leafhoppers (Homoptera: Cicadellidae). *Entomologist's Gazette*, **16**, 129–136.

- Melichar, L. (1903) *Homopteren-Fauna von Ceylon*. F.L. Dames, Berlin.
- Naveed, H., & Zhang, Y.L. (2018) A key to species of the leafhopper genus *Tambocerus* (Hemiptera, Cicadellidae, Deltocephalinae) with description of a new species from Pakistan. *Zootaxa*, **4462**(2), 237-244.
- Oman, P.W. (1949) The Nearctic leafhoppers (Homoptera: Cicadellidae). A generic classification and checklist. *Memoirs of Entomological Society of Washington*, **3**, 1-253.
- Rao, K.R. (1996) Description of a new species *Tambocerus viraktamathi* (Homoptera: Cicadellidae) from India. *Hexapoda*, **8**, 85–88.
- Shen, L., Shang, S.Q., & Zhang, Y.L. (2008) Study of the leafhopper genus *Tambocerus* (Hemiptera: Cicadellidae) with four new species from China. *Proceedings of the Entomological Society of Washington*, **110**, 242-249.
- Viraktamath, C.A. (2012) Seven new species of the leafhopper genus *Tambocerus* (Hemiptera: Cicadellidae) from the Indian subcontinent. *Zootaxa*, **3385**, 43-61.
- Zahniser, J.N., & Dietrich, C.H. (2008) Phylogeny of the leafhopper subfamily Deltocephalinae (Insecta: Auchenorrhyncha: Cicadellidae) and related subfamilies based on morphology. *Systematics and Biodiversity*, **6**, 1-24.
- Zahniser, J.N., & Dietrich, C.H. (2013) A review of the tribes of Deltocephalinae (Hemiptera: Auchenorrhyncha: Cicadellidae). *European Journal of Taxonomy*, **45**, 1-211.
- Zhang, Y.L., & Webb, M.D. (1996) A revised classification of the Asian and Pacific selenocephaline leafhoppers (Homoptera: Cicadellidae). *Bulletin of the Natural History Museum London, Entomology*, **65**, 1-103.