



Review of the grassland leafhopper genus *Nephotettix* Matsumura (Hemiptera: Cicadellidae: Deltocephalinae: Chiasmini) from the Chinese mainland

YANI DUAN^{1,2} & YALIN ZHANG^{1,3}

¹Key Laboratory of Plant Protection Resources and Pest Management of Ministry of Education, Entomological Museum, Northwest A&F University, Yangling, Shaanxi Province 712100, China

²School of Plant Protection, Anhui Agricultural University, Hefei, Anhui Province 230036, China

³Corresponding author. E-mail: yalinzh@nwsuaf.edu.cn

Abstract

The Chinese mainland species of the leafhopper genus *Nephotettix* Matsumura (Hemiptera: Cicadellidae: Deltocephalinae: Chiasmini) (*Nephotettix cincticeps* (Uhler), *Nephotettix malayanus* Ishihara & Kawase, *Nephotettix nigropictus* (Stål), *Nephotettix parvus* Ishihara & Kawase **rec. n.**, and *Nephotettix virescens* (Distant)) are reviewed. This genus is re-described. Variation is described and illustrated. Keys for their separation are provided together with a worldwide checklist.

Key words: Auchenorrhyncha, morphology, taxonomy

Introduction

The genus *Nephotettix* was described by Matsumura (1902) for *Selenocephalus cincticeps* Uhler. Ghauri (1971) revised the genus based on the type material. Until now, this genus included 8 valid species. According to Ghauri (1971), members of this genus can be recognised by the following combination of characters: 1) opaque green, usually with black markings on head, face, pronotum, forewing and other parts of body showing variable degrees of sexual dimorphism, the females usually with reduced black markings (Plate I: A–H); 2) crown somewhat flat with transverse discal furrow (Plate I: A–G); 3) aedeagus with lateral processes, and in most species, dorsal surface with elongate sclerotised carinae with variable numbers of spines directed towards apex (Figs. 4E–I). Overall, this genus is similar to *Exitianus* Ball in the relatively large body size, fully developed forewings with broad appendix, and male pygofer with modified macrosetae, but differs in being opaque green with various black markings, and having the crown-face transition sharply angled. Some members of this genus are important vectors of rice viruses in the Old World. Most *Nephotettix* spp. are widely distributed.

This study reviews for the first time the species of *Nephotettix* from the Chinese mainland. The main characters used to identify specimens are the male pygofer spines and aedeagus where we found the most variation in structures. In order to provide exact species identification data for this genus that has great economic significance, we describe and illustrate the variation. Variation within species can be found in all the species and is limited. We usually find variants when many specimens of same species are collected, and this continuity of variation usually is found when many specimens of same species are collected from the same time and place. Some synonyms have been published since it is not easy to discern the nature of this variation in practical leafhopper classification. We studied the variation in order to not only provide more exact species identification data, but also to draw attention to this variation and to reduce the publication of synonyms. Materials examined are deposited in the Entomological Museum of Northwest A&F University (NWAUFU). Morphological terminology follows Oman (1949), Zhang (1990) and Rakitov (1998).

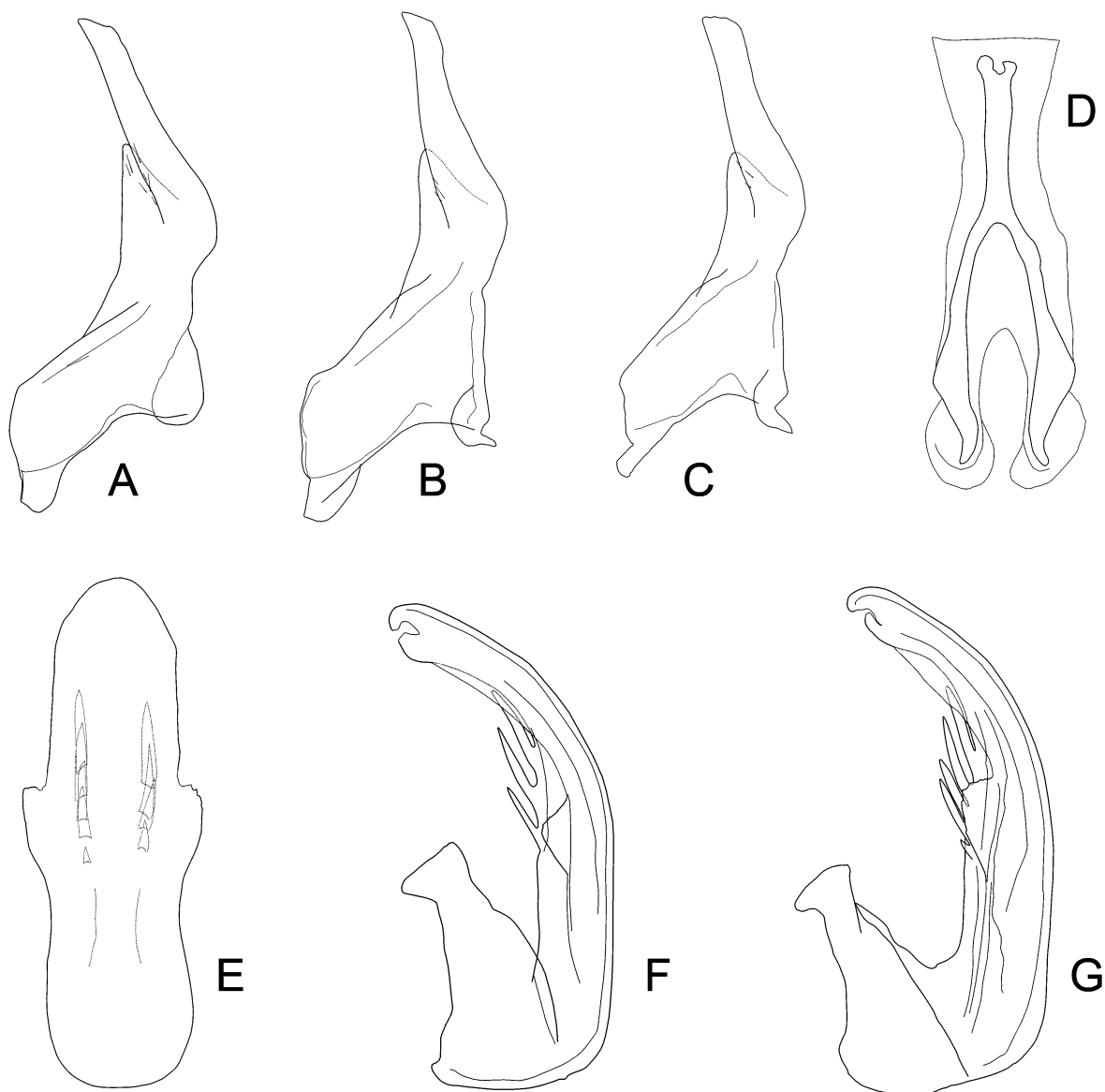


FIGURE 18. *Nephrotettix virescens* (Distant). A–C: style, dorsal view; D: connective, dorsal view; E: aedeagus, ventral view; F–G: aedeagus, lateral view.

References

- Distant, W.L. (1908) Rhynchota-Homoptera. *The Fauna of British India, including Ceylon and Burma*, 4, 1–501.
- Distant, W.L. (1918) Rhynchota, Homoptera: Appendix. Heteroptera: Addenda. *The Fauna of British India, including Ceylon and Burma*, 7, 1–210.
- Dmitriev, D.A. (2003) Larvae of leafhoppers of the subfamily Deltocephalinae (Homoptera, Cicadellidae) from European Russian and adjacent territories. II. Tribes Grypotini, Selenocephalini, Goniagnathini, Fieberiellini, Tetartostylini, Macrostelini and Doraturini. *Entomologicheskoe Obozrenie*, 82 (3), 650–686.
- Emeljanov, A.F. (1999) A key to genera of the subfamily Deltocephalinae s.l. (Homoptera, Cicadellidae) from Kazakhstan, Middle Asia, and Mongolia with description of new genera and subgenera. *Entomological Review*, 79 (5), 547–562.
- Ghuri, M.S.K. (1968) The African and Malagasian species of *Nephrotettix* Matsumura (Homoptera, Cicadelloidea). *Bulletin of Entomological Research*, 57, 643–650.
<http://dx.doi.org/10.1017/s0007485300052974>
- Ghuri, M.S.K. (1971) Revision of the genus *Nephrotettix* Matsumura (Homoptera, Cicadelloidea, Euscelidae) based on the type material. *Bulletin of Entomological Research*, 60 (3), 481–512.
<http://dx.doi.org/10.1017/s0007485300040438>
- Ghosh, M. & Ghosh, L.K. (2004) Insecta: Homoptera: Cicadelloidea. *Zoological Survey of India*, 253–284.

- Ishihara, T. (1964) Revision of the genus *Nephotettix* (Homiptera, Deltocephalidae). *Transactions of the Shikoku Entomological Society*, 8 (2), 39–44.
- Ishihara, T. & Kawase, E. (1968) Two new Malayan species of the genus *Nephotettix* (Homiptera, Cicadellidae). *Applied Entomology and Zoology*, 3 (3), 119–123.
- Linnavuori, R.E. (1956) On some Palearctic Homoptera. *Suomen Hyonteistieteellinen Aikakauskirja*, 22, 136–138.
- Linnavuori, R.E. (1960) Homoptera: Cicadellidae. *Insects of Micronesia*, 6 (5), 225–344.
- Mahmood, S.H. & Aziz, S. (1979) Taxonomic studies of genus *Nephotettix* (Homoptera, Cicadellidae) from Pakistan and Bangladesh. *Proceedings Pakistan Academy of Science*, 16, 53–69.
- Matsumura, S. (1902) Monographie der Jassinen Japans. *Termesztrajzi Fuzetek. Kiadja a Magyar Nemzeti Muzeum Budapest*, 25, 353–404.
- Melichar, L. (1912) *Homoptera. Wissenschaftliche Ergebnisse der Zweiten Deutschen Zentral-Afrika-Expedition 1910–1911 unter Führung Adolf Friedrichs, Herzog zu Mecklenburg*, 1, 109–134.
- Oman, P.W. (1949) The Nearctic leafhoppers (Homoptera, Cicadellidae) A generic classification and check list. *Memoirs of the Entomological Society of Washington*, 3, 1–253, pls. 1–44.
- Oman, P.W., Knight, W.J. & Nielson, M.W. (1990) *Leafhoppers (Cicadellidae): a bibliography, generic check-list, and index to the world literature 1956–1985*. CAB International Institute of Entomology, Wallingford, UK, 368 pp.
- Orosz, A. (2011) Study on the *Nephotettix* material deposited in the Hungarian Natural History Museum (Homiptera, Auchenorrhyncha, Cicadellidae). *Annales Historico Naturales Musei Nationalis Hungarici*, 103, 23–37.
- Rakitov, R.A. (1998) On differentiation of cicadellid leg chaetotaxy (Homoptera, Auchenorrhyncha, Membracoidea). *Russian Entomological Journal*, 6, 7–27.
- Ramakrishnan, U. & Ghauri, M.S.K. (1979) Probable natural hybrids of *Nephotettix virescens* (Distant) and *N. nigropictus* (Stål) (Homiptera, Cicadellidae) from Sabah, Malaysia. *Bulletin of Entomological Research*, 69, 357–361.
<http://dx.doi.org/10.1017/s0007485300017831>
- Stål, C. (1870) Homiptera insularum Philippinarum. *Bidrag till Philippinska oarnes Homipter-fauna. Ofversigt af Kongliga Svenska Vetenskaps-Akademiens Forhandlingar*, 27, 607–776.
- Uhler, P.R. (1896) Summary of the Homiptera of Japan presented to the United States National Museum by Professor Mitzukuri. *Proceedings of the United States National Museum. Washington*, 19, 255–297.
<http://dx.doi.org/10.5479/si.00963801.1108.255>
- Vilbaste, J. (1975) On some species of Homoptera Cicadinea described by V. Motschulsky. *Eesti NSV Teaduste Akadeemia Toimetised, Bioloogia*, 24 (3), 228–236.
- Wilson, M.R. (1989) New synonymy in rice-associated leafhoppers of the genera *Nephotettix* and *Cofana* (Homiptera, Homoptera, Auchenorrhyncha, Cicadellidae). *Entomologist's Monthly Magazine*, 125, 135–137.
- Zhang, Y.L. (1990) *A taxonomic study of Chinese Cicadellidae (Homiptera)*. Tianze Press, Yangling, Shaanxi, China, 218 pp.

APPENDIX 1. Checklist of *Nephotettix* worldwide.

Nephotettix afer Ghauri, 1968: 643.

Type(s): BMNH, ZMUH.

Distribution: Angola, Ethiopia, Kenya, Madagascar, Malawi, Nigeria, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe, Congo.

Nephotettix cincticeps (Uhler), 1896: 292.

Type(s): USNM.

Distribution: Chinese mainland, Japan, Taiwan.

Nephotettix malayanus Ishihara & Kawase, 1968: 119.

Type(s): EUMJ.

Distribution: Chinese mainland, India, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand.

Nephotettix modulatus Melichar, 1912: 115.

Type(s): ZMUH.

Distribution: Angola, Central African Republic, Chad, Egypt, Ethiopia, Gabon, Kenya, Madagascar, Malawi, Morocco, Nigeria, Senegal, Sudan, Tanzania, Tunisia, Uganda, Congo, Zaire.

Nephotettix nigropictus (Stål), 1870: 740.

Type(s): NHRS.

Distribution: Australia, Bangladesh, Chinese mainland, Ethiopia, India, Laos, Malaysia, Micronesia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam

Nephotettix parvus Ishihara & Kawase, 1968: 121.

Type(s): EUMJ.

Distribution: Bangladesh, Chinese mainland, India, Malaysia, Pakistan, Singapore, Sri Lanka, Thailand, Taiwan.

Nephotettix sympatricus Ghauri, 1971: 502.

Type(s): BMNH.

Distribution: Sri Lanka.

Nephotettix virescens (Distant), 1908: 291.

Type(s): BMNH.

Distribution: Bangladesh, Chinese mainland, India, Pakistan, Thailand.