First record of the family Meenoplidae (Hemiptera: Fulgoromorpha) from Pakistan

Kamran SOHAIL[1], Muhammad USMAN[2], Yalin ZHANG[1①]

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

2. *Department of Entomology, The University of Agriculture Peshawar, Khyber Pakhtunkhwar, 25100, Pakistan*

Abstract: Pakistan has a rich fauna of planthoppers but members of the family Meenoplidae have not been reported from this region. In this study *Nisa atrovenosa* of the family Meenoplidae is recorded for the first time from Khyber Pakhtunkhwa Province of Pakistan. A morphological description and illustrations are provided.

Key words: Fulgoroidea; *Nisa atrovenosa*; taxonomy; morphology; distribution

巴基斯坦粒脉蜡蝉科一新纪录种(半翅目：蜡蝉亚目)

Kamran SOHAIL[1], Muhammad USMAN[2], 张雅林 [1①]

1. 植保资源与病虫害治理教育部重点实验室，昆虫博物馆，西北农林科技大学，陕西 杨凌 712100；

2. Department of Entomology, The University of Agriculture Peshawar, Khyber Pakhtunkhwar, 25100, Pakistan

摘要：巴基斯坦蜡蝉种类丰富，但鲜有粒脉蜡蝉科种类的报道。本文首次报道采自巴基斯坦开伯尔-普赫图赫瓦的粒脉蜡蝉科雪白粒脉蜡蝉，并提供了形态描述和特征图。

关键词：蜡蝉总科；雪白粒脉蜡蝉；分类；形态；分布

Introduction

Meenoplidae is a small family of planthoppers (Hemiptera) with about 161 described species in 23 genera (Bourgoin 2018) distributed in the tropics and subtropics of the world (Emeljanov 1984; Bourgoin 1997). It is divided into two subfamilies, Meenoplinae Fieber and Kermesinae Kirkaldy. This family was first established by Fieber (1866) with a single species from Greece. Several taxonomists have contributed to this family and increasing the number of genera and species. Kirkaldy (1906) and Muir (1925) studied the Pacific area; Distant (1906), Muir (1927) and Jacobi (1917) sampled the Ethiopian region; Kirkaldy (1907) and Woodward (1957) collected in Australia and Synave (1957) sampled in Africa; Fennah (1956; 1971; 1978) explore variety of regions; Van Stalle (1982) added species from Belgium, and Matsumura (1938) collected in Taiwan and Japan; Bourgoin (1997) added species from France. Tsuar *et al*. (1987) provided a revision of this family for Taiwan. Wilson (2010) also recorded some species from United Arab Emirates. Melichar (1903) recorded this family from the Oriental

Accepted 29 December 2018. Published 25 March 2019. Published online 19 March 2019.

① Corresponding author, E-mail: yalinzh@nwsuaf.edu.cn

region in 1903, including the type species *Meenoplus atrovenous*. Distant (1906) later placed this species within the genus *Nisia*. However, the planthopper fauna of Pakistan has been less studied. This family has not previously been recorded from Pakistan. *Nisia atrovenosa* described herein is the first record for this family from Pakistan.

Material and Methods

Fresh specimens were collected from Pakistan and deposited at the Entomological Museum of Northwest A&F University (NWAFU). Specimens mounted on card points were used for the description and illustration. Morphological terminologies for descriptions follow Tsuar *et al*. 1986. Morphological characters were observed using Olympus SZX10 stereomicroscope. Measurements of the examined characters are given in millimeters (mm). The genital segments were removed from the examined specimens and macerated in 10% NaOH for 10–12h at room temperature. The genitalia were then placed in water for a few minutes and then transferred to a depression slide filled with glycerin for further study. Illustrations were mad using Nikon SMZ1500 stereomicroscope. Photographs of the adults were taken by a Zeiss CCD, AxioCam ICc5. Adobe Photoshop was used for labeling and plate composition of the obtained images.

Taxonomy

Family Meenoplidae Fieber, 1872

Genus *Nisia* Melichar, 1903

Nisia Melichar, 1903: 53. Type species: *Meenoplus atrovenous* Lethierry, 1888.

Distribution. Australia; Carolina Islands; China; Democratic Republic of the Congo; Egypt; Fiji; France; Greece; Indonesia; Iran; Iraq; India; Israel; Italy; Japan; Ryukyu Islands; Palau; Philippines; Seychelles; Solomon Islands; South Korea; Sumatra; United Arab Emirates; United States of America; Vanuatu; Vietnam; Pakistan.

***Nisia atrovenosa* (Lethierry, 1888)** (Figs 1–12), new record to Pakistan

Meenoplus atrovenosus Lethierry, 1888: 466

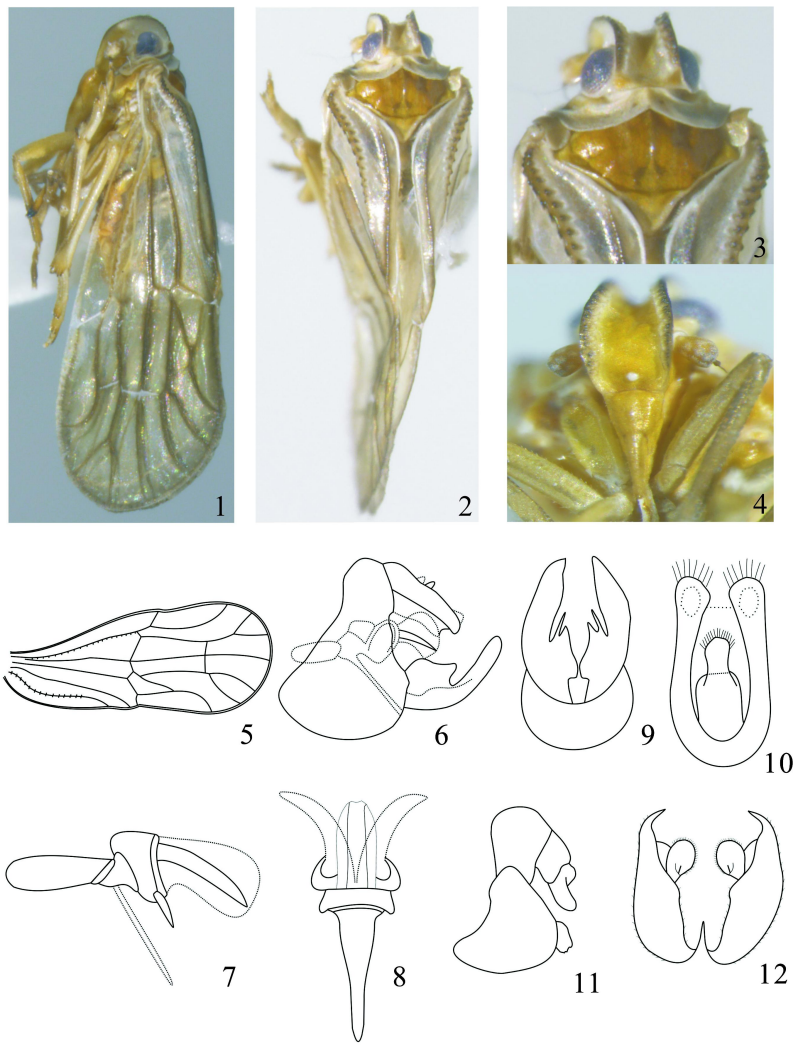
Nisia atrovenosa (Lethierry, 1888), Distant, 1906: 309.

Small sized meenoplids, body length (from apex of vertex to tip of forewing): male 2.90–3.10 mm; female 3.10–3.65 mm.

General color yellow, vertex, frons, antennae pale yellow, pronotum white, scutellum dark brown, ocelli dark, legs yellowish, tegmina white with veins brown, abdomen yellow.

In ventral view, frons longer than wide, lateral carina deeply grooved with 26 or 27 sensory pits on inner side including a few on vertex. Post-clypeus centrally longer, basally wide, Median carina not reaching basal third, rostrum with relative segments equal in length. First antennal segment wide, second segment more than 2x longer than first. Tegmina about 2xas long as wide, below Sc+R vein about 19 or 20 sensory pits (Fig. 5), and 14 sensory pits on claval vein (Fig. 5) on each side. Post tibia with 9 or 10 spines apically, basal metatarsal segment with 9 teeth, second segment with five.

Male genitalia. In dorsal view, lateral margins of anal segment nearly parallel, lateroapically each margin rounded at apex. Phallus sclerotized on both sides reaching anal segment in lateral view, apex curved down ward tapering to a slender end. At ventral margin of phallobase, tip of phallus arched at the same angle, process of phallobase bi-lobed, membranous, slightly longer than phallus (Tsuar *et al*. 1986). In lateral view genital style convex with long round lob with smooth margin (Fig. 6), a stout process dorsally at about half of lobe. In posterior view, inner margins of styles strongly sclerotized with two processes near base, inner one short, stout thumb like, outer one needle like longer than inner one.



Figures 1–12 *Nisia atrovenosa* (Figs 6-12 reproduce from Tsuar *et al*. 1986). 1. Lateral view; 2. Dorsal view; 3. Vertex, pronotum and mesonotum, dorsal view; 4. Frons and vertex, ventral view; 5. Tegmina; 6. Male genitalia, lateral view; 7. Aedeagus, lateral view; 8. Same, dorsal view; 9. Male genitalia, caudal view; 10. Male anal segment, dorsal view; 11. Female genitalia, lateral view; 12. Same, ventrocaudal view.

Female genitalia. Anal segment nearly square, anal style longer than anal segment, ventral

valvifer shorter than combined length of the two. In caudal view ventral valvifer wider in middle apically acuminate with hairs on whole valvifer with a wart-like valvula on the inner side of valvifer.

Specimens examined. 2♂2♀, **Pakistan,** Malamjabba, Swat, Khyber Pakhtunkhwa Province, N 34º50'4.01", E 72º33'19.77", 1574.03 m, 21-VI-2018, coll. Kamran SOHAIL.

Host plant. Unknown

Distribution. Carolina Islands; China (Sichuan, Zhejiang, Taiwan); Democratic Republic of the Congo (Katanga); Egypt; Fiji; France (New Caledonia); Greece; Indonesia (Jawa); Iran; Iraq; India; Israel; Italy; Japan; Morocco; Palau; Solomon Islands (South Solomons); South Korea; United States of America (Mariana islands); Vietnam (Tonkin); Pakistan.

Acknowledgements

We express our thanks to Mr. Muhammad Riaz, Syed Fahad Shah, Adnan Rehman and Haseen Ullah (Department of Entomology, The University of Agriculture Peshawar, Pakistan) for their help in insect collection. We are also thankful to Miss. Ling FENG (Key Laboratory of Plant Protection Resources and Pest Management of the Ministry of Education, Entomological Museum, Northwest A&F University, Yangling, Shaanxi) for helping in writing Chinese portion of this study. We are also thankful to the anonymous reviewers for reviving and improving the manuscript. This study was supported by National Natural Science Foundation of China (31420103911).

References

Bourgoin T. 1997. The Meenoplidae (Hemiptera: Fulgoromorpha) of New Caledonia, with a revision of the genus *Eponisia* Matsumura, 1914, and new morphological data on forewing venation and wax plate areas. *In*: Najt J & Matile L (Eds.), *Zoologia Neocaledonica 4*. *Mémoires du Muséum National d' Historie Naturelle*, Paris, pp. 197–249.

Bourgoin T. 2018. FLOW (Fulgoromorpha Lists on The Web): a world knowledge base dedicated to Fulgoromorpha. Version 8, updated 2018-11-17. Available from: http://hemiptera-databases. org/flow/. (Access 18 November 2018)

Distant L. 1906. *The Fauna of British India including Ceylon and Burma.* Rhynchota, Heteroptera-Homoptera, volume 3. Taylor and Francis, London, 309 pp.

Emeljanov AF. 1984. A contribution to knowledge of the families Kinnaidae and Meenoplidae (Homoptera, Fulgoroidea). *Entomological Review*, 64(1): 61–65.

Fennah RG. 1956. Fulgoroidea from Southern China. *Proceeding of California Academy of Sciences Series 4*, 28(13): 474–476.

Fennah RG. 1971. Homoptera: Fulgoroidea Suppl. *Insects of Micronesia*, 6(8): 584–585.

Fennah RG. 1978. Fulgoroidea (Homoptera) from Viet-nam. *Annales Zoologici Warsz*, 34(9): 237–240.

Fieber FX. 1866. Neue Gattungen und Arten in Homoptern (Cicadina Bur.). *Verhandlungen der Kaiserlich-Königlichen Zoologisch-botanischen Gesellschaft in Wien*, 16: 497–516.

Jacobi A. 1917. *Voellzkow Reise Oslafr*. pp. 529.

Kirkaldy GW. 1906. Leafhoppers and their natural enemies. *Bulletin of the Hawaiian Sugar Plant Association Division of Entomology*, 1(9): 425–429.

Kirkaldy GW. 1907. Leafhoppers Supplement. *Bulletin of the Hawaiian Sugar Plant Association Division of*

Entomology, 3: 163.

Lethierry L. 1888. *Annali del Museo civico di storia natural*, 11(6): 466.

Matsumura S. 1938. Homopterous insects collected by Mr. Tadao Kano at Kotosho, Formosa. *Institutional Matsumurana*, 12(4): 147–153.

Melichar L. 1903. *Homopteren-Fauna von Ceylon.* Verlag von Felix L. Dames, Berlin, 53 pp.

Muir F. 1925. On the genera of Cixiidae, Meenoplidae and Kinnaridae (Fulgoroidea: Homoptera). *Pan-Pacific Entomologist*, 1: 97–100.

Muir F. 1927. New species of African Meenoplidae (Fulgoroidea :Homoptera). *Annual Magazine of Natural History*, 19(9): 197–208.

Synave H. 1957. Les Meenoplidae de Madagascar (Hemiptera-Homoptera). *Naturaliste Malgache Tananarive*, 9: 141–145.

Tsuar SC, Yang CT & Wilson MR. 1986. Meenoplidae of Taiwan (Homoptera: Fulgoroidea). *Collected Papers on Homoptera of Taiwan. Taiwan Museum Special Publication series*, 6: 81–117.

Van Stalle J. 1982 Scientific results of the Belgian Mount-Cameroon Expedition (February-April 1981). 3. Fam. Cixiidae, Derbidae, Meenoplidae, Dictyopharidae, Achilidae, Lophopidae, and Tettigometridae (Homoptera - Fulgoroidea). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique Entomologie*, 54(6): 1–18.

Wilson MR. 2010. Order Hemiptera, families Meenoplidae and Kinnaridae. *Arthropod Fauana of the UAE*, 3: 126–131.

Woodward TE. 1957. Studies on Queensland Hemiptera part II Meenoplidae. *Paper University of Queensland* (*Entomology*), 1: 57–70.