

Halyomorpha picus (Hemiptera: Heteroptera: Pentatomidae): first confirmed record from Pakistan and two new junior synonyms

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Abstract

We provide the first confirmed record of *Halyomorpha picus* (Fabricius, 1794) (Hemiptera: Heteroptera: Pentatomoidea: Pentatomidae: Pentatominae: Cappaeini) from Pakistan: Islamabad Capital Territory, and provide habitus photographs and electron scanning micrographs of the male genitalia of the voucher specimens. Two species previously described from Pakistan are found to fit within the morphological variability of *H. picus* and the following two junior subjective synonyms are proposed: *Halyomorpha picus* (Fabricius, 1794) = *Halyomorpha punjabensis* Ahmad & Kamaluddin, 1977, **syn. nov.**, = *Halyomorpha azhari* Ahmad & Zaidi, 1989, **syn. nov.** The record of *Halyomorpha scutellata* Distant, 1879, from Pakistan by Sharif *et al.* (2020) is based on misidentification of a species of *Neohalys* Ahmad & Perveen, 1982 (Pentatominae: Halyini) and excluded from Pakistan fauna. Based on the analysis of female genitalia figures provided by Gadalla (2004), the record of *H. picus* from Egypt represents a misidentification of *H. halys* Stål, 1855, which extends the distribution of that invasive species to North Africa.

Key words: Hemiptera, Heteroptera, Pentatomidae, *Halyomorpha*, faunistics, taxonomy, new junior synonym, Pakistan

Introduction

Shield bugs (Pentatomidae) are the third most diverse family of Heteroptera, including nine subfamilies, 950 genera and nearly 5000 described species (Rider *et al.* 2018, Roca-Cusachs *et al.* 2021). The Pentatomidae fauna of Pakistan should be well known due to the life-long activity of Professor Imtiaz Ahmad and his collaborators and students. He published at least 201 papers dealing with morphology, anatomy and systematics of Pentatomidae, mostly based on materials from Pakistan and Indian subcontinent (e.g., Ahmad *et al.* 1974; Ahmad 1977, 1980, 1981). Despite being among the first who applied a cladistic approach in the Pentatomidae, his taxonomic papers remain problematic due to largely underestimated variability and the geographically-biased taxon sampling. His new species are often based on single or only a few specimens and were distinguished from the related taxa by minute differences, often relying on characters which are subject to variation or frequent artefacts, such as the lengths of the labium and antennomeres, or the shape and number of ductuli on the apical receptacle of spermatheca. Furthermore, the type specimens of his new taxa are mostly unavailable for study (including those which should be returned to European or U.S. museums). Also the general scarcity of the specimens from Pakistan and adjacent regions of India in museum collections makes the comparison between descriptions of I. Ahmad and his collaborators and real specimens difficult. As a result, the Pentatomidae fauna of Pakistan remains largely mysterious and await a thorough future revision (see also Ghauri 1988, Hoberlandt 1997, Salini 2019).

This unfortunate situation also concerns two species of *Halyomorpha* Mayr, 1864, described from Pakistan: *H. punjabensis* Ahmad & Kamaluddin, 1977 (based on two females from Punjab) and *H. azhari* Ahmad & Zaidi, 1989 (based on one male and one female from Islamabad) (Ahmad & Kamaluddin 1977, Ahmad & Zaidi 1989). Neither of these two species has ever been reported again since their description.

Finally, Sharif *et al.* (2020) published records of two species of *Halyomorpha* from Punjab, Pakistan: *H. scu-*