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Description of a New Species of Oriental Genus *Halys* (Pentatomoidae: Pentominae: Halyini) from Lahore, Punjab, Pakistan

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ABSTRACT

A new species *H. mulberriences* of oriental genus *Halys* is described from Lahore and compared with its closely allied species *H. sulcatus* (Thunberg 1783). The description includes external morphology; external and internal male and female genitalia and scent gland apparatus. Illustration of all diagnostic characters is given. This is also a first record of *Halys* species from Lahore, Punjab, Pakistan.

INTRODUCTION

The genus *Halys* Fabricius (1775) is a cosmopolitan genus, found in many oriental regions of Africa, America, Asia and Australia. Being a type genus of tribe halyini, from very beginning the status of its Asian species has been challenged by many workers and till to date eight species including this new species are described from different areas of Asian countries, mostly from India. Since 1775 the synonymization, and transfer of different *Halys* species to other genera had been carried out by many researchers, but the addition of new species was very slow (Thunberg, 1873; Westwood, 1837; Chopra, 1974; Abbasi and Ahmad, 1975; Ghauri, 1988; Memon *et al.*, 2006; Sheikh *et al.*, 2011). Ghauri (1988) first time did a thorough and detailed work on the type specimens of Asian species, in which he added a new species *H. shaista* from South India but at the same time synonymyzed, transferred and changed the status of many *Halys* species. He synonymized both *magnus* Chopra (1974) and *qidrii* Abbasi and Ahmad (1975) (which was a synonym of *magnus*) with *H. sulcatus* and *dentatus* Fabricius (1775) with *serrigera* and accepted the validity of only four species, *H. shaista, H. serrigera, H. sulcatus* and *H. serricolis.* Ahmad et al (1998) transferred se*ricollis* to *Neohalys* Ahmad and Parveen (1982) on the basis of strong resemblance in male genital characters particularly the paramere which is one of the most diagnostic characters in Halyini. Memon *et al.* (2002) disagreed with the symonymy of *serrigera* and *denatatus* by Ghauri (1988) and, maintained the independent status of both species.

Till 2005 only five Asian species of this genus were described or recorded from different parts of India, except *qadrii* which was recorded from Bangladesh (former East Pakistan) but none of them was recorded from any Pakistani areas. Memon *et al.* (2006) first time not only described their new polymorphic species *H. sindillus* from Hyderabad, Sindh, but also recorded *H. sulcatus* from the same locality, and some other areas like Shahdad Kot, and Jamshoro, Sindh, Pakistan, which was also a new record not only from Sindh, but also of Pakistan. After that Sheikh *et al.* (2011) also added a new species *H. spinosus* from Miani Forest, Sindh.

This new species *Halys mulberriences* is not only an addition in this cosmopolitan genus but also a first record from Punjab province of Pakistan, which was not explored before. The description of this species is based on the external morphological characters (body color, measurement of body parts, scent gland apparatus), external and internal male and female genitalia.

MATERIALS AND METHODS

During expedition for the species of genus *Halys* thirteen specimens of new species *H. mulberriensis* were collected from different localities of Lahore, Punjab, on *Morus alba* L. The male genitalia of holotype and female genitalia of allotype were dissected as to compare this new species with its allied species *H. sulcatus.* The male genital capsule was removed from body by dipping it into the hot water for a minute and boiled the pygophore in 10% KOH for 25-30 min following the methods described by Ahmad (1986) and Ahmad and McPherson (1998). After that paramere and aedeagus were removed gently, and aedeagus was inflated and studied under

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dissecting stereomicroscope. For examining the female genitalia, the abdomen was removed after softening it by dipping it in the hot water. Then the abdomen was also boiled in 10 % KOH for 10 min and spermatheca was exposed by opening the terga as described by Memon and Ahmad (2002a) and Memon *et al.* (2006). The external genital plate was studied as described by Schaefer (1968). The measurement of different body parts is in millimeters. Measurements of various parts of the body were taken by ocular micrometer following the technique of Memon and Ahmad (2001). All the illustrations were made by ocular graticule Stereo-Binocular microscope.

Terminology for the inflated aedeagus and paramere follows that of Ahmad and McPherson (1998) and Memon *et al.* (2006)

Halys mulberriensis, new species
(Figs. 1, 2)

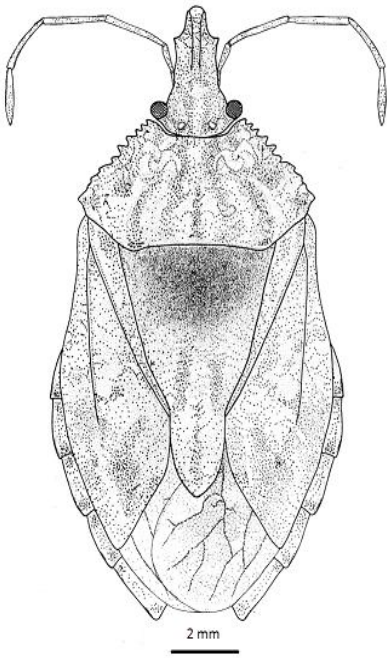

Fig. 1. *Halys mulberriences* sp. n dorsal view.

Body color

The body including antennal segments except 3rd, 4th and distal most part of fifth, labium excluding 4th segment, entire pronotum, scutellum except basal portion, corium and clavus, connexiva excluding basal and distal portion of each connexivum adjacent to their joints, venter of abdomen, legs excluding distal portion of tibiae and claws, yellowish ochraceous, thickly punctate with brown, eyes and membrane of hemelytra light brown; ocelli pale ochraceous, basal portion of scutellum and veins of membrane of hemelytra black; 3rd antennal segment with brownish tinge, 4th fully and distal most part of 5th antennal segments, basal portion of each connexivum adjacent to their joints, distal portion of tibiae and tarsi and claws are brownish black with reddish tinge.

Head

Paraclypei slightly shorter than clypeus, apically acute, lateral margins slightly sinuate with distinct tooth on anterior portion; length of antennal segment I 1.0 mm, II 2.4 mm, III 2.2 mm, IV 2.2 mm, V 1.8mm, antennal formula I < V < IV = III < II; labium reaching to middle of 6th abdominal segment, length of labial segments I 4.2 mm, II 4.8 mm, III 4.8 mm, IV 4.0 mm, labial formula IV < I < II = III; bucculae anteriorly rounded, completely enclose basal segment of labium.

Thorax

Lateral margins of pronotum completely dentate except humeral angles, dentine on posterior portion slightly less prominent, anterior angles acutely produced but not extending beyond eyes, humeral angles quite acute; length of pronotum 4.0 mm, width 10.0 mm; scutellum reaching to fifth abdominal tergum, with u-shaped apical lobe, subacute at apex; length of scutellum 8.6 mm, and width at base 5.8 mm; metathoracic scent gland ostioles (Fig. 2A) ovate, obliquely placed with well-developed sword-shaped peritreme with anterior margin a little concave, evaporatoria very well-defined; membrane of hemelytra almost equal to tip of abdomen.

Length of body Holotype ♂ 21.4 mm
Range ♂: 21-24 mm (05 specimens)

Male genitalia

Pygophore, dorsoposterior margin with shallow cavity (Fig. 2B), medially excavated with comparatively less emarginated median lobes, prominently subround, ventroposterior margin of pygophore (Fig. 2C) with quite deep cup-shaped cavity, laterally sinuate, medially produced into knob-like projection; lateral lobes subrounded with subtruncated apical margin with depression in middle; paramere (Fig. 2D) L-shaped, stem long almost straight without inner spine, blade very broad leaf-like, with triangular distinct inner spine, and small comparatively less prominent apical spine; inner margin of blade proximally prominent, roundly projected and swollen; inflated aedeagus (Fig. 2E,F) with pair of dorsal membranous conjunctival appendages with more or less consistent width throughout, apices produced thinly like-

spine, pair of ventrolateral conjunctival appendages with inner margin concave, highly sclerotized penial lobes, U-shaped and broad at apices, vesica tube-like and a little shorter than penial lobes.

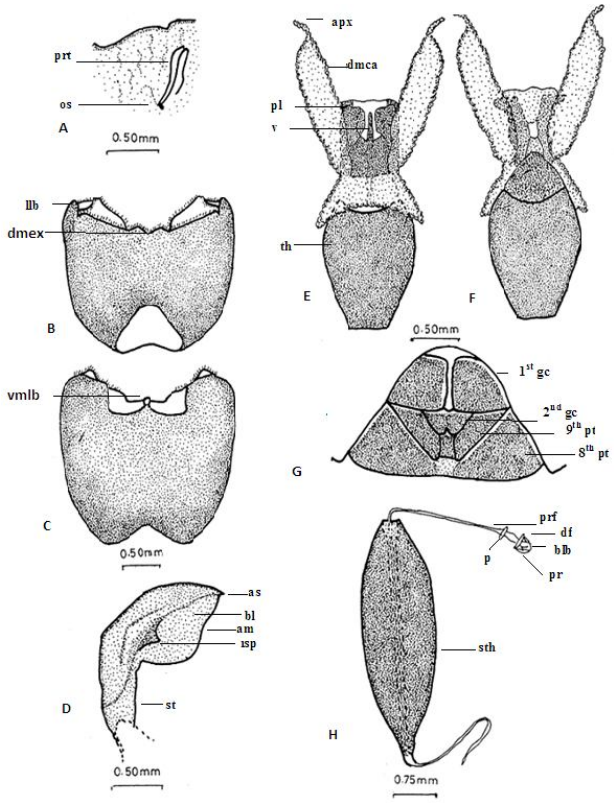

Fig. 2. Male and female genitalia of *H. mulberriences* sp. n; A, scent gland apparatus; B, male pygophore dorsal view; C, pygophore ventral view; D, Paramere; E, aedeagus dorsal view; F, aedeagus ventral view; G, Female Terminalia; H, spermatheca and its bulb.

Female genitalia

Female external genital plate (Fig. 2G), first gonocoxae somewhat quadrangular in shape, with outer margin a little convex and posterior margin straight; 2nd gonocoxae ovate with posterior margin medially notched; eighth paratergite triangular with posterior margin a little convex spermathecal bulb (Fig. 2H) small and ovate with three finger-like processes, two small and one large.

Comparative note

This species *H. mulberriensis* closely resembles to *H. sulcatus* by having paraclypei with distinct tooth, same form of dentation on lateral margins of pronotum, very broad leaf-shaped blade, with inner margin projected outwardly, but different in having paraclypei equal to clypeus, inner spine of blade very prominent and triangular and the most prominent character of this species is the apical potion of dorsal conjunctival appendages which is very thin, spine like; spermathecal bulb with finger-like processes, two small and one large, while in *sulcatus* paraclypei shorter than clypeus, inner spine of parameral blade less prominent, conjunctival appendages short, almost rectangular and apical margin broad and straight; spermathecal bulb with three sub equal process

Type material:

Holotype ♂ Lahore, Punjab, Pakistan: on *Morus alba* L. 14-05.1974, Allotype 1 ♀ same locality with same data collected by M.A. Aslam, deposited at Natural History Museum, University of Karachi (NHMUK), Sindh, Pakistan.

Other material examined

04 ♂ and 07 ♀ Pakistan: Punjab, Lahore, on *Morus alba* L. 14-25, 05.1974 collected by M.A. Aslam, deposited at NHMUK.

Etymology

This species is named after its host plant.

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