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ME Hassan

Zoological Survey of India, 'M'
Block, New Alipore, Kolkata,
India.

Paramita Mukherjee

Zoological Survey of India, 'M'
Block, New Alipore, Kolkata,
India.

B Biswas

Zoological Survey of India, 'M'
Block, New Alipore, Kolkata,
India.

Report of aggregation behavior in sweet potato bug, *Physomerus grossipes* (Fabricius) (Hemiptera: Coreidae) from Nasik, Maharashtra on *Gardenia latifolia* plant

ME Hassan, Paramita Mukherjee and B Biswas

Abstract

Heavy infestation of sweet potato bug, *Physomerus grossipes* (Fabricius) recorded from Maharashtra on *Gardenia latifolia* plant. Several clusters of *Physomerus grossipes* (Fabricius) were recorded for the first time from the upper branches of the *Gardenia latifolia* plant (about 20 ft.). Measurements of different body parts and ratios were calculated as additional diagnostic characters and to understand the significance of aggregation behavior.

Keywords: Hemiptera, Coreidae, *Physomerus grossipes*, aggregation behavior, Maharashtra.

Introduction

Physomerus grossipes (Fabricius) is endemic to southeast Asia and commonly known as "sweet potato bugs", as it feeds on sweet potato and related species (Ames *et al.* [2]). All stages of *Physomerus grossipes* (Fabricius) were found on Convolvulaceous and Leguminous plants, sucks the juices from the stems, cause wilt and wither, and the fruit fail to develop or decompose before reaching maturity. This sweet potato bug was also reported from several species of Ipomoea (*Ipomoea aquatica*, *I. triloba*), *Bacilla rubra*, cowpea (*Vigna catjang*), *Clitofia ternate*, and beans (*Phaseolus vulgaris*) (Miller [9]). The nymphs and adults pierce the stems and petioles of sweet potato and suck the plant sap causing stunting and wilting. The coreid bugs were most abundant from January to April and least abundant from July to August (Ronato and Esguerra [10]). Aland *et al.* [4] has collected *Physomerus* sp. from Amba Reserved Forest, Western Ghats, Maharashtra.

Phenomenon of aggregation and congregation are very common among heteropteran bugs, particularly among Coreidae, Pentatomidae, Dinidoridae, Rhopalidae, Blissidae which may be mediated by pheromones for the purpose of mating or parental care. Blatt [5] reported an unusually large aggregation of the western conifer seed bug, *Leptoglossus occidentalis* (Coreidae) around door jambs, windows and in cracks within the concrete walls a manufacturing plant in the southern interior of British Columbia. Hundreds of bugs were aggregated around heating exhaust ports (608 males and 457 females). Small aggregations of *L. corculus* (Say) have been observed in the southern USA and overwintering aggregations of other Hemipteran bugs.

In India, Mamlayya and Aland [8] recorded aggregation of 400-500 pentatomid bug, *Catacanthus incarnates* on *Delonix regia* at the campus of Shivaji University, Kolhapur, Maharashtra. A massive infestation of *Cyclopelta siccifolia* (Westwood), a Dinidoridae bug has been recorded from a 20 m tall *Pongamia glabra* tree in Pune district of Maharashtra. Adesso *et al.* [1] has recorded multigenerational aggregations in the southern chinch bug, *Blissus insularis* Barber (Blissidae). Aggregations of > 6,000 swallow bugs, *Oeciacus vicarius* Horvath (Cimicidae), have been reported in Washington (Zack [11]). Present study deals with heavy infestation of sweet potato bug, *Physomerus grossipes* (Fabricius) on *Gardenia latifolia* plant from Maharashtra from upper branches of the plant (Fig.12).

Materials and Methods

This study is based on the materials collected during field survey from Nasik District of Maharashtra. The specimens were collected from 20 ft. *Gardenia latifolia* plant and preserved

Correspondence:

ME Hassan

Zoological Survey of India, 'M'
Block, New Alipore, Kolkata,
India.

in 70% alcohol followed by set & pinned. Measurements and photographs of the specimens and the different parts of the body were taken with the aid of Leica M 205A. All measurements are in millimetres. The specimens are deposited in the National Zoological Collection of Zoological Survey of India, Hemiptera Section, Kolkata.

Results and Discussion

Genus *Physomerus* Burmiester, 1835

1835. *Physomerus* Burmiester, *Handb.*, 2: 341.

Type species: *Physomerus grossipes* Fabricius

Diagnosis: Head produced in front of antenniferous tubercles with anterior area impressed on each side of the central lobe; fourth segment of the antennae very little shorter than the third; pronotum with the posterior margin in front of scutellum truncate; mesosternum centrally sulcate; claval suture about as long as the apical margin of corium; veins of membrane longitudinal, not reticulate; posterior femora incrassated and distinctly spinous or tuberculate.

Distribution: Oriental region.

Physomerus grossipes (Fabricius, 1794)

1794. *Physomerus grossipes* (Fabricius, 1794), *Ent. Syst.*, 4: 135.

1835. *Physomerus grossipes*, Burmiester, *Handb.*, 2 : 341.

1803. *Lygaeus calcar*, Fabricius, *Syst. Rhyng.*, p. 214.

1834. *Coreus (Cerbis) oedymerus*, Burmiester, *Nov. Act. Ac. Leop.*, 16: 296.

1871. *Physomerus delineatus*, Walker, *Cat. Het.*, 4: 59.

1902. *Physomerus grossipes*, Distant, *Fauna Brit. India, Rhynchota*, 1: 383-384.

2013. *Physomerus grossipes*, Prabakar, *Rec. zool. Surv. India*, 113 (4): 103-128.

Description Colour: Body brownish yellow in colour, pilose (Fig.1); a central line extending from head, pronotum and scutellum, two lateral lines on pronotum (Fig.3), margins and veins of corium, body beneath and legs pale yellowish brown; segments of connexiva dark brown with rounded yellowish spots; spiracles on ventral side of abdomen black in colour (Fig.6); a subapical annulation to hind femora, basal and apical areas of posterior tibiae and tarsi dark brown (Fig.6); antennae dark brown, finely hirsute; body beneath with small scattered tuberculous black points and stigmata; genital capsule brownish yellow, pubescent (Fig.8).

Structure: Head wider than long, longly produced in front of antenniferous tubercles (Fig.2); antennae four-segmented, fourth segment very little shorter than third, second segment longest (Fig.2); rostrum long, four-segmented, reaching the intermediate coxae, third segment shortest, first segment longer than second and fourth segments (Fig.4); pronotum wider than long with posterior margin in front of scutellum truncate (Fig.3); scutellum about as long as broad; membrane not extending beyond abdomen (Fig.1); legs pubescent with spines, hind femora strongly incrassated, tapering at base, finely longitudinally tuberculate on upper and outer area, obtusely spinous beneath, hind tibiae slightly curved at middle with a somewhat long spine ex-centric in position and tilted towards base followed by a series of spines and serrate at apex in male (Fig.6) whereas in female with a series of

small spines; abdomen nearly three times longer than broad and pilosed (Fig.6).

Male genitalia: Pygophore (Fig.9) 1.4 times longer than wide, base rounded with anterior margin subrounded, outer margin rounded, posterior half hairy, lip relatively shorter, sub-straight, about 1/3 to the maximum width of pygophore; paramere (Fig.10) with short stem having medially prominent round outer margin and long setae, blade narrower with sub-rounded apex provided with short setae, longest setae on apex of blade is 1/4th the width of paramere, outer and inner margins sinuate; aedeagus (Fig.11) with phallosoma large and wide, basal plate with pivot.

Female genitalia: 1st gonocoxa small, longer than broad, outer lateral margin sinuate, apex narrow and subacute, inner margin straight, 8th paratergite triangular with lateral margins sinuate, apex narrow and subacute, inner margin obliquely straight, 9th paratergite subtriangular with apex narrow and subacute, smaller than 8th paratergite, outer lateral margin substraight and inner margin slightly concave, hairs on 7th, 8th and 9th paratergites (Fig.7).

Measurements

Body parts	Male (♂) (in mm)	Female (♀) (in mm)
Body length (BL)	21.13	19.39
Head length (HL)	1.66	1.47
Maximum width of head across eyes (HW)	2.18	2.03
Inter-ocular distance (IOD)	1.29	1.09
Length of 1 st antennomeres (A1)	3.52	2.76
Length of 2 nd antennomeres (A2)	4.26	3.77
Length of 3 rd antennomeres (A3)	2.97	2.51
Length of 4 th antennomeres (A4)	2.72	2.69
Pronotum Length (PL)	4.77	4.52
Pronotum Width (PW)	5.96	5.31
Scutellum Length (SL)	2.38	2.19
Scutellum Width (SW)	2.21	2.13
Length of abdomen (ABL)	13.90	11.74
Width of abdomen (ABW)	5.22	5.00
Length of 1 st rostral segment (R1)	1.57	1.44
Length of 2 nd rostral segment (R2)	1.35	1.12
Length of 3 rd rostral segment (R3)	0.91	0.89
Length of 4 th rostral segment (R4)	1.47	1.39
Length of fore coxa (LFC)	0.79	0.75
Length of fore-trochanter (LFTr)	0.93	1.01
Length of fore femora (LFF)	3.13	3.33
Length of fore tibia (LFT)	3.69	3.42
Length of fore tarsus (LFTa)	2.26	2.13
Length of fore claw (LFCL)	0.30	0.30
Length of mid coxa (LMC)	0.98	0.82
Length of mid-trochanter (LMTr)	1.08	1.10
Length of mid femora (LMF)	3.83	3.46
Length of mid tibia (LMT)	4.34	3.94
Length of mid tarsus (LMTa)	2.35	2.14
Length of mid claw (LMCL)	0.32	0.31
Length of hind coxa (LHC)	1.26	0.94
Length of hind-trochanter (LHTr)	1.89	1.35
Length of hind femora (LHF)	7.22	4.87
Length of hind tibia (LHT)	7.01	5.98
Length of hind tarsus (LHTa)	2.47	2.16
Length of hind claw (LHCL)	0.40	0.32

Ratios

Indices	Male (♂)	Female (♀)
Length of head/width of head across eyes (HL/HW)	0.76	0.72
Length of pronotum/width of pronotum (PL/PW)	0.80	0.85
Width of head/ width of pronotum (HW/PW)	0.36	0.38
Length of scutellum/width of scutellum (SL/SW)	1.03	1.02
Length of scutellum/width of pronotum (SL/PW)	0.40	0.41
Length of 1 st antennal segment/ length of 2 nd antennal segment (A1/A2)	0.82	0.65
Length of 1 st antennal segment/ length of 3 rd antennal segment (A1/A3)	1.18	1.09
Length of 1 st antennal segment/ length of 4 th antennal segment (A1/A4)	1.29	1.02
Length of fore femora/ length of fore tibia (LFF/LFT)	0.84	0.97
Length of mid femora/ length of mid tibia (LMF/LMT)	0.88	0.87
Length of hind femora/ length of hind tibia (LHF/LHT)	1.02	0.81
Length of 1 st rostral segment/ length of 2 nd rostral segment (R1/R2)	1.16	1.28
Length of 1 st rostral segment/ length of 3 rd rostral segment (R1/R3)	1.72	1.61
Length of 1 st rostral segment/ length of 4 th rostral segment (R1/R4)	1.06	1.03

Material examined: 107♂, 124♀, India: Maharashtra, Nasik, Nasik road, near Dada Saheb Phalke Smarak, 5.III.2013, Coll. M.E. Hassan and party (Lat.: 19.98563 N, Long.: 073.81867 E).

Distribution: India: Maharashtra (Nasik), West Bengal, Sikkim, Assam, Meghalaya. Elsewhere: SriLanka, Nicobar Islands, Myanmar, South East Asia, Indonesia, throughout Peninsular Malaysia, Guam, Hawaii, Northern Mariana Island, Philippines and Vietnam.

Host: *Gardenia latifolia*.

Summary

Present study deals with aggregation behavior in sweet potato bug, *Physomerus grossipes* (Fabricius) (Hemiptera: Coreidae) from Nasik, Maharashtra on *Gardenia latifolia* plant. Several clusters of *Physomerus grossipes* were recorded for the first time from the upper branches of the *Gardenia latifolia* plant (Fig.12), which need to be further studied to unfold their micro and macro niches.

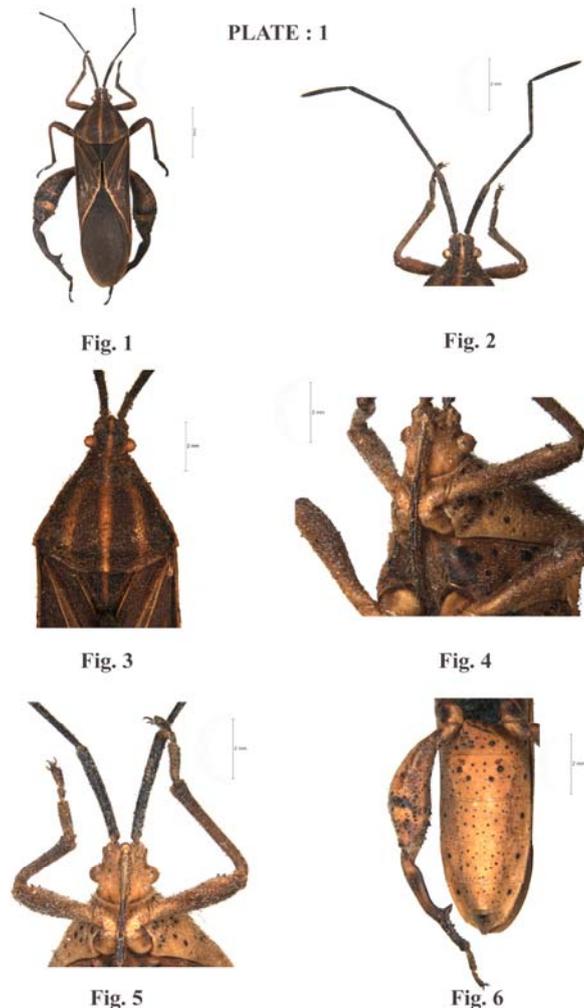


Plate 1: Figures 1-6: *Physomerus grossipes* (Fabricius)- 1. Dorsal view of male; 2. head with antennae, dorsal view; 3. head and pronotum, dorsal view; 4. lateral view of rostrum; 5. forelegs, ventral view; 6. abdomen and hindleg, ventral view.

PLATE : 2

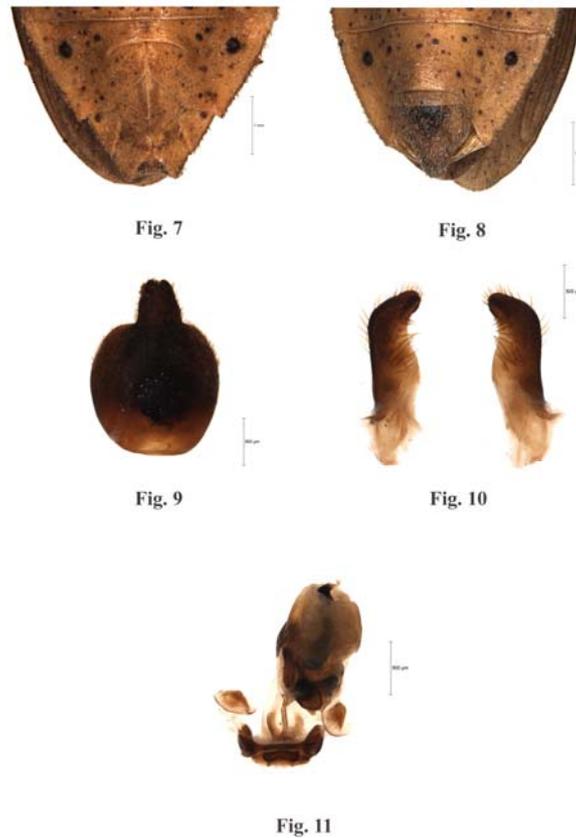


Plate 2: Fig 7-11: *Physomerus grossipes* (Fabricius) - 7. abdominal tip of female, ventral view; 8. abdominal tip of male, ventral view; 9. pygophore, dorsal view; 10. parameres, lateral view; 11. aedeagus, dorsal view.

Plate 3:



Plate 3: Fig 12: *Physomerus grossipes* (Fabricius) - Several specimens forming cluster on upper branch of *Gardenia latifolia* plant.

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