Short Communication

SOME ASPECTS OF INTERNAL ANATOMY OF *ACANTHOSOMA FORFEX* DALLAS (PENTATOMOIDEA: ACANTHOSOMATIDAE) WITH REFERENCE TO PHYLOGENY

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Abstract

Aspects of internal anatomy of alimentary organs, scent apparatus and reproductive organs of *Acanthosoma forfex* Dalllas of the family Acanthosomatidae are desoribed and illustrated and the results are compared with those of the other members of the family reported in the literature.

Introduction

The systematic position of the family Acanthosomatidae is disputed for it has been treated as a tribe, a subfamily and a family by various authors (Distant 1902, Kirkaldy 1909, China and Miller 1955, 1959, Kumar 1962, 1974, McDonald 1966 and Ahmad and Moizuddin 1985, 1988 and Schaefer and Ahmad 1987). The characters of the internal anatomy have proved important phylogenetic tools within the superfamily Pentatomoidea (Miyamoto 1961, Ahmad and Khan 1973 and Ahmad *et al.* 1979), but surprisingly only a little attention has been given with reference to the members of the family Acanthosomatidae except by Brindley (1930), Pendergrast (1957), Miyamoto (1961), McDonald (1966) and Ahmad and Moizuddin (1985, 1988b). Taking into consideration the disputed systematic position and that little information is available on internal anatomy of Acanthosomatidae the present work was undertaken. The alimentary organs, scent apparatus and male reproductive organs of *Acanthososma forfex* Dallas are described and illustrated and the results are compared with those reported in the literature and in this light the relationships of the included taxa are briefly reviewed.

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Sindh Univ. Res.Jour. (Sci.Sr) *Vol.21(1)*: 50 – 55 (1989)

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Materials and Methods

The adult specimens of *A. forfex* were collected on Wild rose from Murree (Punjab) and Gilgit, Northern areas of Pakistan, and were brought to Professor M.A. H. Qadri Research Institute, University of Karachi, for rearing. The internal anatomical studies were carried out on two freshly killed specimens. Dissections were made in water under "Wild" binocular microscope. For dissections, diagrams and measurements the conventional procedures especially those used by Ahmad and Moizuddin (1977, 1985 and 1988b) and Moizuddin and Ahmad (1974) were followed.

Description

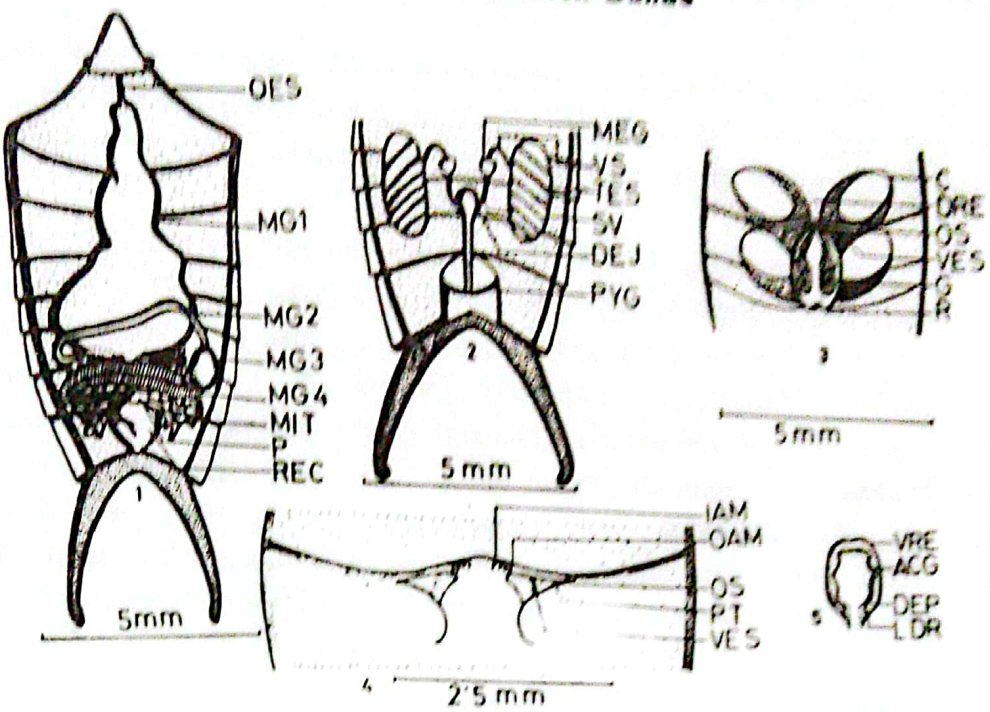
Alimentary organs (Fig. 1): Oesophagus narrow, short, less than $\frac{1}{4}$th of midgut-1, whitish, bulbus region short; midgut-1 moderately long, sacklike, anterior portion narrow and irregular, medially constricted, posterior portion bulging, slightly projecting on left side, yellowish; midgut-2 elongate and narrow, tubular, lying on midgut-1, yellowish; midgut-3 almost oval, short, lying on right side of body cavity posteriorly at midgut-1, connected to midgut-4 direcly; midgut-4 narrow and uniform tube with two rows of gastric caeca, slightly curved, greyish, connected to pylorus directly; pylorus short, squareshaped, greyish; malpighian tubules much elongate; rectum short, napiform, deep yellowish.

Male reproductive organs (Fig. 2): Testes oval, seven folicles, very much compact; vasdeferens short, narrow, curved, anteriorly attached with sides of testes, at junction narrow, whitish; mesadene accessary glands small cuplike, spongy in appearance, whitish; seminal vesicle short tube, uniform, moderately wide, almost straight, whitish; median bulbus ejaculatrious small, slightly oval, whitish.

Scent apparatus (Figs. 3-5): Glands elongate, leaflike, passing beyond $\frac{3}{4}$th of reservoir; latter oval, margin smooth, yellowish, posteriorly slightly bilobed; accessory gland narrow tube, slightly curved; valvular apparatus with short outer arm and lunate inner arm.

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Acanthosoma forfex Dallas



KEY TO THE LETTERING

ACG - Accessory gland, C - Calyx DEJ - Ductus ejaculatorius DEP - Ventral deprssion of the reservoir DRE - Duct of the reservoir G - Gland IAM - Inner arm of the reservoir LDR - Lateral duct of the reservoir MEG - Accessory gland, mesadenia. MGI - Midgut-1 MG2 - Midgut-2 MG3 - Midgut-3 MG-4 - Midgut-4 MIT - Malpighian tubules OAM - Outer arm of valvular apparatus OES - Oesophagus OS - Ostiole P - Pylorus PT - Proximal part of vestibule PYG - Pygophore R - Reservoir REC - Rectum SV - Seminal vesicle TES - Testis VES - Vestibule VRE - Reservoir, ventral view. VS - vasdeferens.

ILLUSTRATION OF FIGURES

Figs. 1-5, *Acanthosoma forfex* Dallas; 1, Alimentary organs; 2, Male reproducrive organs; 3, scent apparatuss, entire dorsal view; 4, scent apparatus showing lateral duct of the reservoir, valvular apparatus and the vestibules, enlarged dorsal view; 5, scent reeservoir, showing accessory gland, ventral view.

Discussion

Leston (1958a, 1958b) on the basis of a large number of characters including Karyotypes, recognized within the superfamily Pentatomoidea two groups, the more advanced higher Pentatomoidea, which included Eumenotidae, Dinidoridae and Pentatomidae, and the less advanced Lower Pentatomoidea, comprising

Urostylidae, Acanthosomatidae, Scutelleridae, Cydinidae and Plastaspidae.

Although Miyamoto (1961) and Kumar (1962) atleast in part disagree with the above opinion, but McDonald (1966), Ahmad and Khan (1973) and Ahmad and Moizuddin (1977, 1985) have generally supported Leston (1958a, 1958b).

The cuplike mesadene accessory glands in male reporductive organs in *A. forfex* appear similar to that reported by Pendergrast (1957) in *Rhopalimorpha abscura* White and *Acanthosoma haemorrhoidale* (L.) and by Ahmad and Moizuddin (1985, 1988b) in *Sastragala murreeana* Distant, *S. neoelongata* Ahmad and Moizuddin and in *Ameenocoris pakistanensis* Ahmad and Moizuddin of Acanthosomatidae and resemble those of Cydnidae, Plataspidae and Scutelleridae (Pendergrast 1957, Moizuddin and Ahmad 1974, 1975, 1979, and Ahmad and Moizuddin 1980, 1981). The above structures strongly support the action of Leston (op. cit.) of including Acanthosomatidae among lower Pentatomoidea.

The presence of masadene accessory glands in male reproductive organs and convoluted accessory glands on ventral side of scent gland reservoir in *A. forfex* although relate it to members of Pentatomidae (Brindley 1930, Pendergrast 1957, Ahmad and Khan 1973), but presence of two rows of gastric caeca on midgut-4, seven testicular follicles and absence of ectadene glands and ectodermal sac in male reproductive organs in the former, clearly separates it from the latter.

Miyamoto (1961) working on comparative morphology of alimentary organs of Heteroptera, included three species of *Acanthosoma* in Acanthosomatidae but figured only *A. labiduroides* Jakvolev. He noted midgut-1 anteriorly narrow and posteriorly bulging, midgut- 2 elongated and narrow, midgut-3 lying on right side of midgut-1 and midgut-4 attached to pylorus directly in *A. labiduroides* which correlates with the present findings in *A. forfex* and confirms the generic relations. On the other hand, midgut-3 oval, without gastric caeca, connected to midgut-4 directly and midgut-4 narrow and uniform, have been noted in *A. forfex* in comparison to midgut-3 oblong with two rows of gastric caeca, connected to midgut-4 by a short and narrow tube and midgut-4 broad and medially expanded as figured by Miyamoto (1961) in *A. labiduroides*, clearly distinguished the two species from each other.

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