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COMPARATIVE MORPHOLOGY OF MALE AND FEMALE REPRODUCTIVE ORGANS OF SOME PYRRHOCORIDS (HEMIPTERA: TRICHOPHORA) OF PAKISTAN AND ITS BEARING ON CLASSIFICATION

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Aspects of the comparative morphology of male and female reproductive organs of *Pyrrhocoris apterus* (L.) and *Scantius distanti* Ahmad and Zaidi are compared with other pyrrhocorids. The phylogenetic value of these characters in the family Pyrrhocoridae is evaluated.

Key words: Comparative morphology, Reproductive organs, Pyrrhocorids, Classification.

Introduction

Ahmad and Mohammad [1] gave a detailed account of the morphology of the reproductive organs including mesadene glands of *Pyrrhocoris apterus* (L.) and pointed out the differences in various parts in winged and wingless forms (unpublished data). Earlier Seidel [2], Ludwig [3], Weber [4], Miller [5], Qadri [6], Woodward [7], Pendergrast [8], Miyamoto [9,10], Kumar [11,12] and Abbasi [13] worked on different aspects of male and female reproductive organs of different pyrrhocorids in which these were also used to ascertain phylogenetic positions. But, so far, a little attention has been given to the comparative morphology of male and female reproductive organs in this relatively large family [12]. Therefore, a comparative statement of the above characters is presently given in Tables 1 and 2 for 7 species to demonstrate the importance of these characters and to suggest that on this basis, a study of much broader spectrum be undertaken to resolve problems with phylogenetic relationships [14].

Materials and Methods

Adult, male and female *Scantius distanti* Ahmad and Zaidi were collected on grass from Karachi University Campus and *P. apterus* from Sariab in Baluchistan on Fennel (*Foeniculum vulgare* L.) and holly hock (*Althea rosaea*) (L.) Cav. and return to the Karachi University Zoological Laboratory. They were dissected in chilled water. Five specimens of each sex of the above taxa were dissected to determine the variation limits. Drawings of male and female reproductive organs were made after removing the overlying viscera and using an eye piece ocular grid under a Leitz binocular microscope. The scales are noted on the figures.

Results and Discussion

General account of reproductive organs of Pyrrhocoridae.

Male reproductive organs (Figs. 1,2). These organs include a pair of large rosette or bud-like testers, each with seven testicular follicles; seminal vesicles each placed posteriorly near a vas-deferens, of different forms; vasa deferentia of different shape and size, connecting testes to bulbus ejaculatorius; mesadene accessory glands represented by a mass of short wide tubules, bound together to base of vas deferens by peritoneal membrane, opening through a common duct into bulbus ejaculatorius, latter with investing sac protruding, dorsally; ductus ejaculatorius straight, opening directly into aedeagus.

Female reproductive organs (Fig. 3). Terminal filaments distinct or indistint; seven ovarioles in each ovary; calyx small or large, lateral ducts different in shape and length compared to common duct; latter usually broad; spermathecal bulb usually small, spermathecal duct relatively long. In Table 1, the above characters are compared in *P. apterus*, and *S. distanti* in Table 2, the differences are compared in 5 other spp. reported in the literature.

The presence of seven testicular follicles and seven ovarioles, Weber [4], Qadri [6], Woodward [7], Miyamoto [9,10] , Pendergrast [8], Kumar [11,12], Abbasi [13] and present studies, anteriorly located seminal vesicles, presence of mesadene accesory glands, complex bulbus and a spermatheca usually with a small bulb and a relatively long duct appear to be generalized features of Pyrrhocoridae.

P. apterus, with a large rosette testes and larger vas- deferens appears unique in comparison to *Dysdercus koenigii* (F.), *D. fasciatus* (Signoret), *D. cingulatus* (F.), *Dindymus* sp., *S. distanti* and *Probergrothius nigricornis* Stal. Similarly the comparatively smaller seminal vesicles of *P. apterus* also isolate it in the above taxa. *D. cingulatus* with straight and oval seminal vesicles appears distinct from *D. fasciatus* and *D. koenigii* with large cup or tumour-shaped seminal vesicles and the anteriorly narrow and posteriorly thick and wavy bulbus ejaculatorius in *D. cingulatus* and *D. fasciatus* appear their synapomorphies as in *D. koenigii* small relatively thin vas-deferens, and thin and straight ductus ejaculatorius are probably its autapomorphies.

TABLE 1. COMPARATIVE ACCOUNTS OF REPRODUCTIVE ORGANS IN *P. APTERUS* AND *S. DISTANTI*.

	P. apterus (L.), (Figs. 1, 3)	*S. distanti* Ahmad and Zaidi (Fig. 2)
MALE		
Name of the organs		
Testes	More or less rosette in form, with 7 testicular follicles without pigmentation.	Petal-like, with 7 testicular follicles, without pigmentation.
Seminal vesicles	Small, elongate in form.	Moderate sized, spherical in form.
Vas deferens	Large, "S" or V-shaped, thick or moderate sized, width different.	Large, more or less hook-shaped, thick anteriorly and very thin posteriorly.
Accessory (measedene) gland	Large, compact, tubular, rounded or funnel-shaped	Larger, compact, tubular, broadly round.
Bulbus and ductus ejaculatorius	Equal in size, oval in shape.	Shorter than ductus. ejaculatorius, bulbus anteriorly swollen and round.
FEMALE		
Ovary	Terminal filaments distinct, seven ovarioles in each ovary, calyx very large and broad.	Terminal filaments distinct, seven ovarioles in each ovary, clayx large and broad.
Lateral oviducts	Larger than the common duct, common oviduct more or less confluent.	Shorter than the common oviduct, medially not confluent.
Common oviduct	Usually broad, of uniform width from anterior to posterior.	Gradually tapering posteriorly.
Spermatheca	Spermathecal bulb oval, pump region long, tube-like and convoluted, proximal end of the duct never opening into distal duct, without accessory gland.	Spermathecal bulb oblong, pump region elongate, rod-like, proximal duct, never opening intotal duct, without accessory gland.

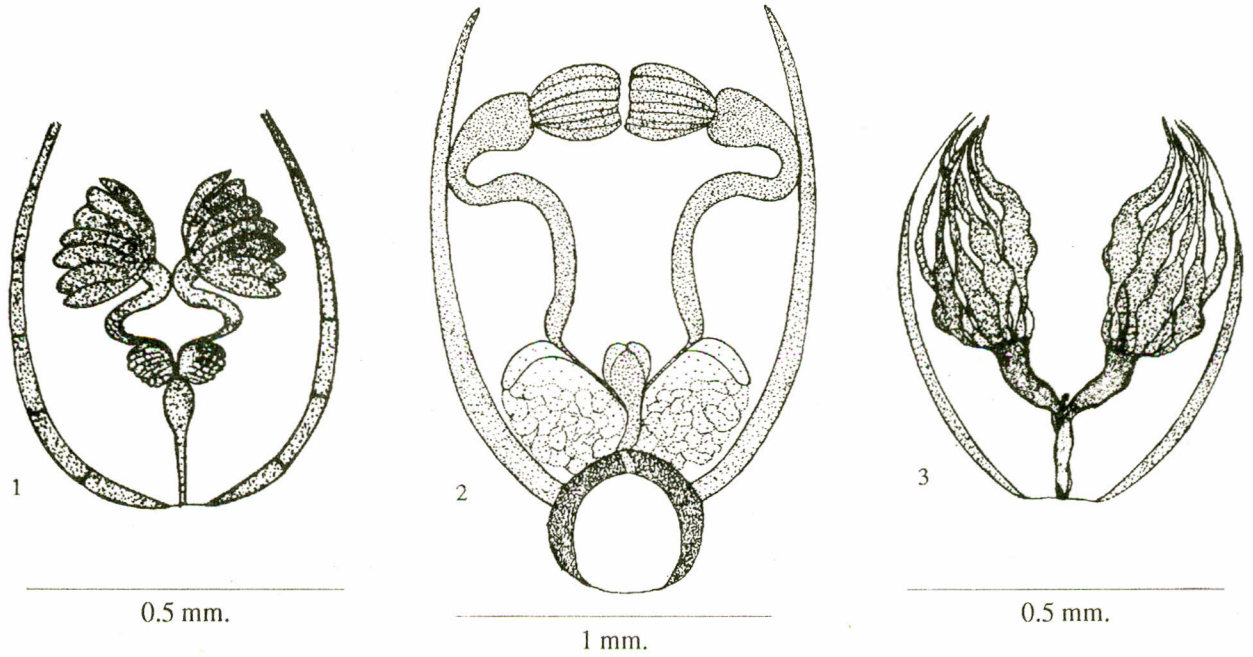
TABLE 2. COMPARATIVE MORPHOLOGY OF REPRODUCTIVE ORGANS OF SOME PYRRHOCORIDS.

Species	No. of testicular follicles ovarioles	Shape of testes	Shape of ovary	Seminal vesicles	Vas deferens	Mesadene accessory gland	Bulbus ejaculatorius	Ductus ejaculatorius
Dindymus sp.[12]	7	Broad square shaped	—	Small, slightly swollen	Moderate in size, slightly curved, usually of uniform width	Large, tubules tubules short and wide	Equal in length with ductus ejaculatorius oval	Apically curved.
P. nigricornis Stal [11]	7	Elongate broad, rectangular	Terminal filaments distinct, calyx large & broad, lateral ducts much shorter than the common oviduct	Small, curved	Relatively large wavy, and of not uniform width	Short, tubules short and wide	-do-	Very thin, straight.
D. cingulatus (F.)[6]	7	Elongate, somewhat broad	—	Small, oval	ovary small, very thin and of uniform width	large, tubules short and wide	Shorter than ductus ejaculatorius, broadly rounded	Anteriorly narrow, posteriorly thick, curved

(Contd....)

(Table 2, continue)

D. fasciatus (Signoret) [8]	7	Elongate, ovoid	–	Large tumour-like	Small and relatively thick	Large, tubules short and wide	Shorter than ductus ejaculatorius, shape irregular	
D. koenigii (F.) [13]	7	Bud-like	Terminal filaments indistinct calyx very short and comparatively narrowed, lateral ducts shorter	Very large cup-like	Much shorter in size, very thin and of uniform width throughout its length.	large, compact tubular, oval in shape	larger than ductus ejaculatorius and broadly oval in shape.	Thin and straight



Figs. 1-3. Male and Female reproductive organs; dorsal view: (1). *Pyrrhocoris apterus* (L.), male. (2). *Scantius distanti* Ahmad and Zaidi, male. (3). *Pyrrhocoris apterus* (L.), female.

In *S. distanti* small petal-like tastes, with moderate sized seminal vesicles and large sac-like bulbus probably also reflect its autapomorphies.

Among the rest of the taxa, viz. *Dindymus* sp., *P. nigricorins* and *S. distanti*, the first two appear closer to each other having broad, squared or rectangular testes, and accessory mesadene glands short, with short and wide tubules. *P. nigricornis* is separated from *Dindymus* sp. with vasa relatively large, wavy and of not uniform width. *S. distanti* belongs to the Pyrrhocoris group and *Dindymus* spp. and *Probergrothius* spp. belong to the *Dysdercus* group of Ahmad and Abbas [15]. The present results therefore, appear to support their findings.

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