

VARIATIONS IN THE MALE AND FEMALE REPRODUCTIVE ORGANS IN DIFFERENT FORMS AND HOST RACES OF *PYRRHOCORIS APTERUS* L.

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The anatomy of the male and female reproductive organs of *Pyrrhocoris apterus* (Linn.) has been detailed. Differences in the structures of the long- and short-winged forms collected on two different host plants, *Althaea rosae* (L.) Cav. and *Foeniculum vulgare* Miller, are also given in tabular form. No significant difference was observed due to difference in the host plant.

Key words: Variations, reproductive structures, forms and host races, *Pyrrhocoris apterus* L.

INTRODUCTION

Recently Ahmad *et al.* [1] gave a detailed account of the morphology of the alimentary organs, including the salivary glands of *Pyrrhocoris apterus* L. and pointed out the differences in the various parts in the short- and the long-winged forms collected on two different host plants, viz *Althaea rosae* L. Cav. and *Foeniculum vulgare* Miller, and differences in parts due to different host plants. Earlier Merele [2] described the anatomy of the male and female genital organs. Likewise Popovici [3] discussed the morphology and biology of above group.

Elsewhere Mohammad *et al.* [4] have given a detailed comparative account of the various aspects of the male and female reproductive organs in seven widely separated species of *Pyrrhocoris* and *Dysdercus* groups of Ahmad and Abbas [5]. The different forms of *P. apterus* (winged and wingless) on *A. rosae* and *F. vulgare* appear different in their structure of the male and female reproductive organs (Table 1). However, no appreciable difference was noted due to their different host plants. It is therefore suggested that winged and wingless forms might represent different seasonal forms showing different conditions of their reproductive systems depending upon their reproductive activity in that season.

MATERIALS AND METHODS

Adults were collected on *Althaea rosae* and *Foeniculum vulgare* respectively from Sariab in Baluchistan during July-August and were brought to the Zoological laboratory of Karachi University. For anatomical studies freshly killed specimens were dissected in chilled water under a Leitz binocular microscope. After removing the

overlying viscera, diagrams of the structures were made using an ocular grid on graph paper to the given scales.

RESULTS

Description of reproductive organs of P. apterus:
Male (Fig. 1,2). The male reproductive organs include a pair of large testes, each with seven testicular follicles; the seminal vesicles are comparatively smaller, usually spherical or elongate, posteriorly placed near vas deferens; the latter are much larger, S- or V- shaped, posteriorly opening into bulbus ejaculatorius; at the base of vas deferens there are a pair of large tubular mesadenia surrounded by a peritoneal membrane opening through a duct into bulbus ejaculatorius; the latter has an investing sac that protrudes dorsally. The ductus ejaculatorius is straight, opening directly into the aedeagus.

Female (Fig. 3,4). Terminal filaments distinct; seven ovarioles in each ovary; calyx usually large and broad; lateral oviducts larger or shorter than the common oviduct, not confluent medially; common oviduct of variable width; spermatheca with relatively smaller oval spermathecal bulb, pump region usually long tube-like and convoluted, proximal end of the duct never opening into distal duct. Table 1 gives the differences in the various structures in winged and wingless forms. No significant difference was observed due to difference in the host plant.

DISCUSSION

The forms of *P. apterus* (winged and wingless) generally agree with other members of Pyrrhocoridae (Mohammad *et al.* [4]). The winged and wingless forms of *P. apterus*, however, differ significantly in the shape of their

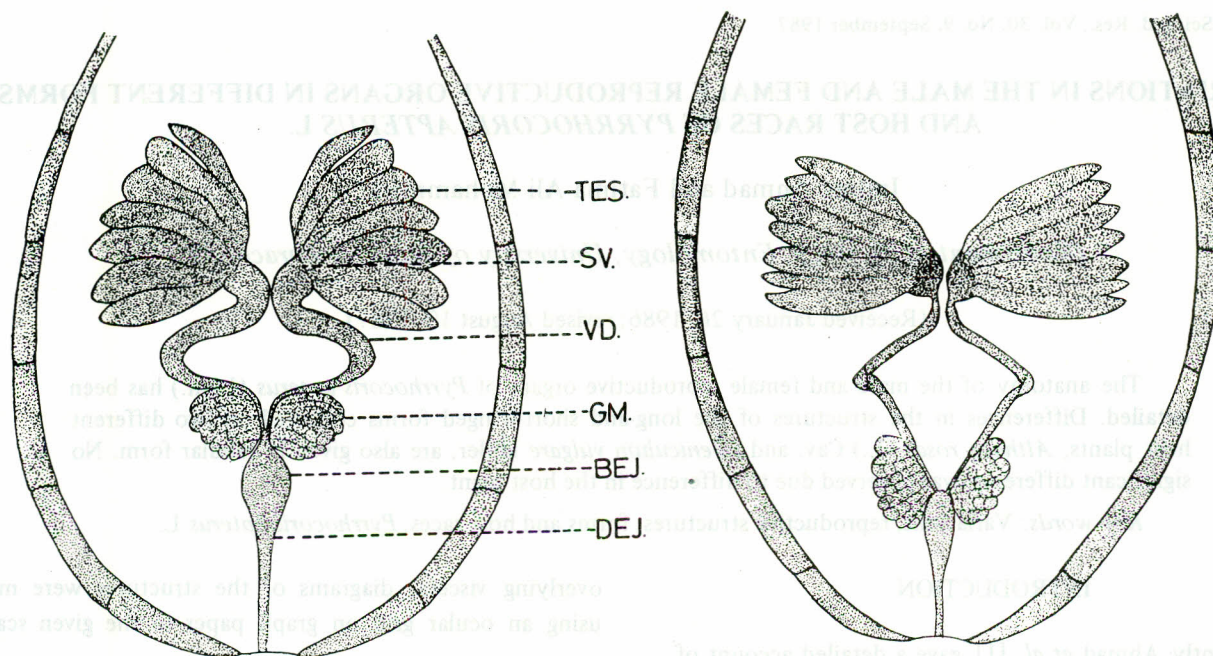


Fig. 1

Fig. 2

0.5mm.

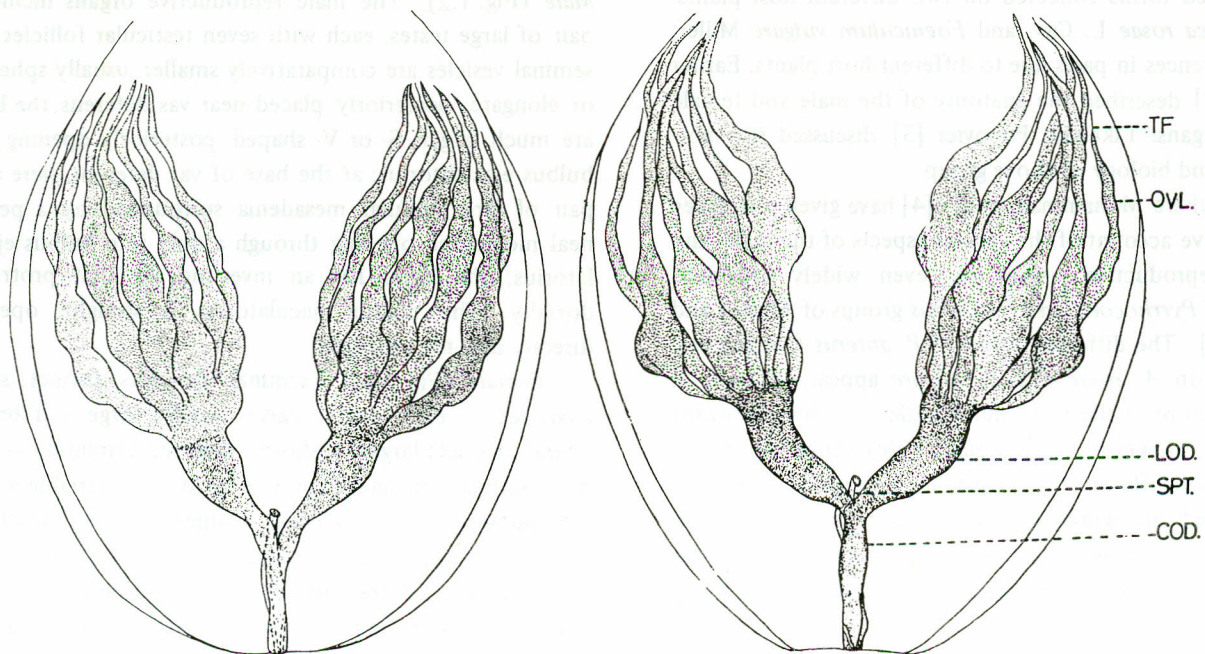


Fig. 3

Fig. 4

0.5mm.

Fig. 1-4. *Pyrrhocoris apterus* (Linn.). Male and female reproductive organs, dorsal views.

1. *P. apterus* male reproductive organs (winged form)
2. *P. apterus* male reproductive organs (wingless form)
3. *P. apterus* female reproductive organs (winged form)
4. *P. apterus* female reproductive organs (wingless form)

Table 1. Variations in the male and female reproductive organs in the different forms of *P. apterus*.

| Name of organs | Winged forms (Fig. 1,3) | Wingless forms (Fig. 2,4) |
|---------------------------------|--|---|
| <i>Male:</i> | | |
| Testes. | Much larger and swollen, lotus-shaped, testicular follicles of different shape and size. | Smaller and elongated, more or less bud-shaped, testicular follicles in each testis usually of almost same shape and elongated. |
| Length | 1.40 ± 0.112 | 1.32 ± 0.067 |
| Width | 1.92 ± 0.126 | 1.72 ± 0.53 |
| Seminal vesicle | Seminal vesicle oval | Seminal vesicle anteriorly spherical |
| Vas deferens | S-shaped, thick, anteriorly much smaller, gradually tapering posteriorly, length equal to that of the length of ductus ejaculatorius and bulbus ejaculatorius combined | V-shaped, comparatively thin from anterior to posterior end of uniform width; usually twice the length of ductus ejaculatorius and bulbus combined. |
| Accessory glands (Mesedenia) | Mesadene accessory glands large, compact, tubular and rounded | Comparatively smaller in size and fan-shaped |
| Bulbus and ductus ejaculatorius | Bulbus ejaculatorius comparatively long with pear-shaped investing sac; ductus ejaculatorius long, thick and straight | Bulbus ejaculatorius comparatively short with egg-shaped investing sac; ductus ejaculatorius short, thin and straight. |
| <i>Female:</i> | | |
| Ovary | Terminal filaments distinct but much smaller, calyx very large and broad | Terminal filaments much larger, calyx smaller, and less broad. |
| Length | 2.92 ± 0.221 | 2.32 ± 0.100 |
| Width | 1.33 ± 0.096 | 0.83 ± 0.042 |
| Lateral oviduct | Lateral oviduct usually slightly longer than the common oviduct, usually narrowed. | Lateral oviduct slightly shorter than the common oviduct, comparatively expanded. |
| Common oviduct | Usually uniformly narrowed, of uniform width from anterior to posterior | Very slightly tapering anteriorly at the junction of lateral ducts, expanded. |

reproductive organs, viz. the winged forms have much large lotus-shaped testes, swollen testicular follicles, S-shaped thick and swollen vas deferens and large rounded mesadenia. In this form reproductive activity appears significantly great. On the other hand wingless forms have comparatively smaller and elongate testes, thin and elongate follicles and comparatively smaller fan-shaped mesadenia. The wingless males have reduced reproductive activity for they are attached to their host plants permanently and being flightless cannot search for the females. Zera on Gerrids and Solbreck on Lygaeids have also discussed wing dimorphism and their consequences and the topic has extensively been reviewed by Poff in a recent issue of evolution (Wheeler, personal communication).

The wingless females have large terminal filaments in their more bulging ovaries and expanded lateral and

common oviducts. This clearly shows that the wingless females are the main reproductive forms, and their large ovaries certainly indicate their potential for increased fecundity.

No significant difference in the reproductive organs of either sex was observed due to difference in the host plant. Ahmad *et al.* [1] noted the differences in the alimentary organs and salivary glands due to difference in host plants because of different dietary requirements and adaptations in different host races. The present study supports the findings of Ahmad and Rokhsana [6] that there is only one species i.e. *P. apterus* in the Pakistanian Baluchistan, and that structural variations noted in the winged and wingless forms living on different host plants just represent different populations of a continuous gene pool.

KEY TO THE LETTERS

| | |
|-----|------------------------------|
| BEJ | Bulbus ejaculatorius |
| COD | Common oviduct |
| DEJ | Ductus ejaculatorius |
| GM | Accessory glands (mesadenia) |
| LOD | Lateral oviducts |
| OVL | Ovariole |
| SV | Seminal vesicle |
| TES | Testes |
| TF | Terminal filaments |
| VD | Vas deferens |

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