

STUDIES ON THE MALE ACCESSORY GENITAL STRUCTURES OF *NEUROTHEMIS FULVIA* (DRURY), *NEUROTHEMIS INTERMEDIA INTERMEDIA* (RAMBUR) AND *NEUROTHEMIS TULLIA TULLIA* (DRURY) FROM WESTERN HIMALAYA (ODONATA : LIBELLULIDAE SYMPETRINAE)

MAHABIR PRASAD

*Zoological Survey of India, Calcutta*

ABSTRACT

Male accessory genital structures of the *Neurothemis fulvia* (Drury), *Neurothemis intermedia intermedia* (Rambur) and *Neurothemis tullia tullia* (Drury) from Western Himalayas along with the key have been dealt with in this paper.

INTRODUCTION

The organs which are actually concerned with sexual mating and deposition of eggs are known as genitalia. The genital structures of the Odonates are peculiar, because they have two sets of male genitalia, the primary and the secondary or accessory genitalia situated on the ventral aspects of ninth and tenth and on the ventral surface of entire second and apical portion of third abdominal segments respectively. The secondary or accessory male genitalia shows the same variation and functions as the primary genitalia in the other group of insects. Kennedy (1916a, 1916b and 1917) has dealt with the comparative study of penes in the suborder Zygoptera and suggested that the detailed monographic study of the entire group of Zygoptera might reveal how far the male genitalia would show the true relationship between species and genera. Fraser (1936) has given brief descriptions of male genitalia of the dragonflies while dealing with the detailed external morphology in the Fauna of British India. Cowley (1937), while studying the genitalia of the family Chlorocyphidae, suggested that genitalia should be used along

with the other characters in the taxonomic study of this group. Fraser (1940 and 1956) has also described in detail the penes of the family Gomphidae as well as structure and function of different parts of generalized male and female genitalia of the order Odonata.

The detailed description of primary and secondary copulatory complex in *Neurobasis chinensis chinensis* (Linn.) and *Megalestes major* Selys has been given by Khan (1974 and 1976). Recently Prasad (in press) has also made a detailed study of male accessory genital structure in the genus *Trithemis* Braver from Western Himalaya. The male accessory genital structure of the species of genus *Neurothemis* has not been studied so far. The male accessory genital structures of the *Neurothemis fulvia* (Drury), *Neurothemis intermedia intermedia* (Rambur) and *Neurothemis tullia tullia* (Drury), collected from the Western Himalaya have been described in this paper. The taxonomically important genital parts are the following :

1. Fenestra (Fen) (=genital fossa, Khan, 1977)
2. Anterior lamina (Al)
3. Posterior lamina (Pl)

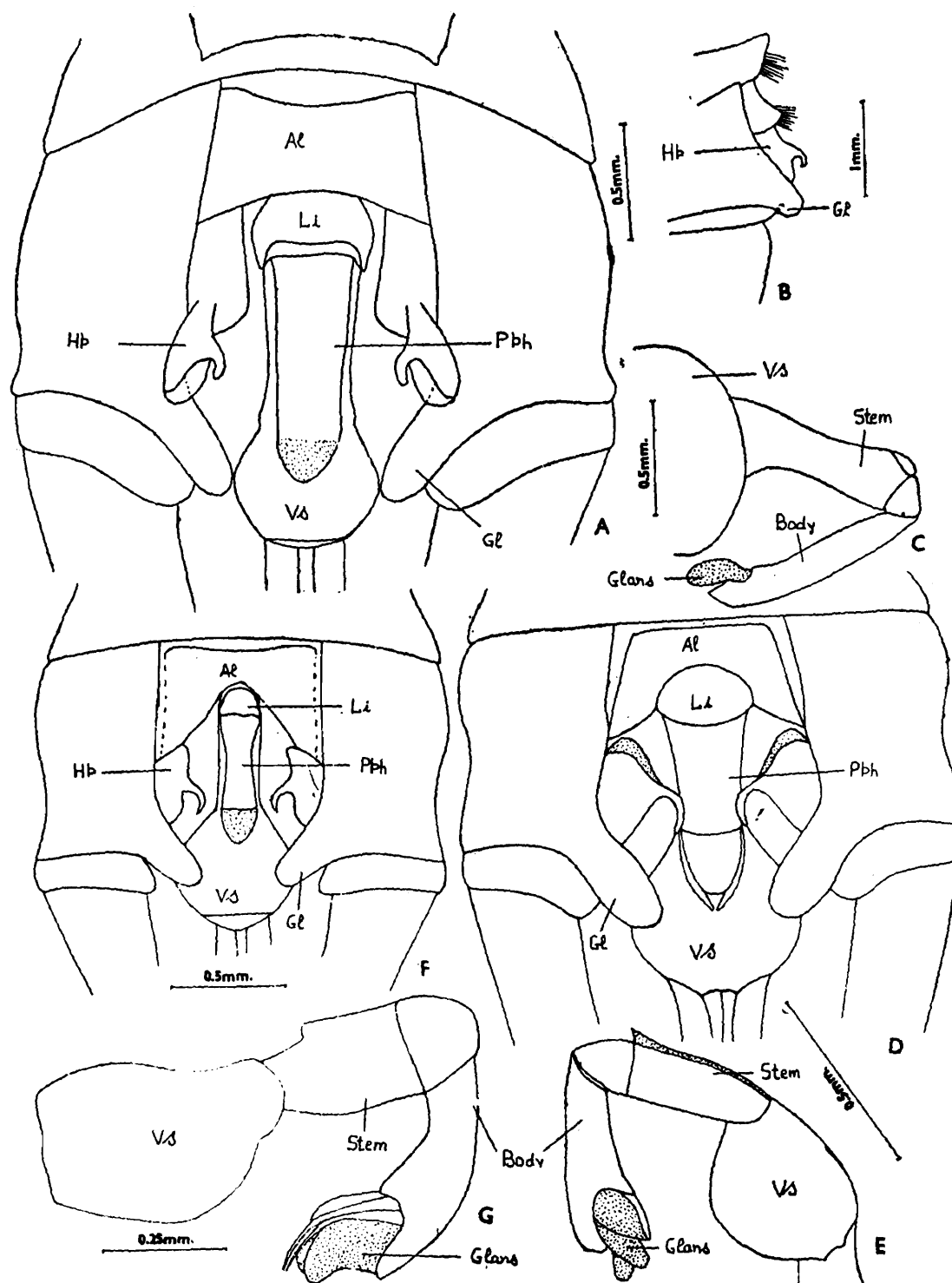


Fig. 1. (A-C) Male accessory genital structures of *Neurothemis fulvia* (Drury) : (A) Ventral view ; (B) lateral view ; (C) prophallus and Vesicula spermalis ; (D & E) Male accessory genital structures of *Neurothemis intermedia intermedia* (Rambur) : (D) Ventral view ; (E) prophallus and vesicula spermalis ; (F & G) Male accessory genital structures of *Neurothemis tullia tullia* (Drury) : (F) Ventral view ; (G) prophallus and vesicula spermalis.

4. Ligula (Li)
5. Prophallus (Pph) (=intromittent organ, Snodgrass, 1935 ; penis, Khan, 1974)
6. Hamulus posterior (Hp)
7. Genital lobe (Gl)
8. Vesicula spermalis (Vs) (=sperm receptacle, Snodgrass, 1935 ; penis vesicle, Khan, 1974).

**Neurothemis fulvia (Drury)**

(Fig 1, A-C)

Anterior lamina is depressed, highly arched and hood-shaped structure. Ligula is broad squarish in outline but posteriorly has a deep groove. Hamulus posterior are small and some what broad structure. Hamular hook is also small, curved and pointed at the tip. Genital lobe is narrow, long, oval in shape with rounded apex. Prophallus is very long and tubular. It is divided into stem, body and glans. Glans of prophallus has one pair of flagella with pointed tips. Vesicula spermalis is broad and flask shaped.

**Neurothemis intermedia intermedia (Rambur)**

(Fig. 1, D & E)

Anterior lamina is hood-shaped and slightly arched in the middle. Ligula is broad and semi-circular in outline. Genital lobe is highly depressed from both the sides and dilated near the apex of the lobe. Apex of the genital lobe is rounded. Hamulus posterior is broad at the base and somewhat triangular in outline. Hamular hook is long, highly curved with rounded tip. Prophallus is divided into stem, body and glans. Glans of prophallus is tubular and rounded at the margins. It has one pair of very small flagella with rounded tips. Vesicula spermalis is flask-shaped with two small pointed teeth like projections at the base (as in the diagram).

**Neurothemis tullia tullia (Drury)**

(Fig 1, G & H)

Anterior lamina is hood shaped and deeply arched. Ligula is somewhat conical in outline. Genital lobe is small, cylindrical and slightly curved with rounded apex. Hamulus posterior is broad at the base and tapers into a hamular hook. Hamular hook is highly curved with acutely pointed tips. Prophallus is divided into stem, body and glass. Glans of prophallus is somewhat triangular in outline and slightly depressed in the middle, and obtusely pointed at the margin. It has one pair of flagella which is long and acutely pointed at the tip. Vesicula spermalis is flask shaped.

KEY TO THE SPECIES

1. Hamular hook long and acutely pointed at the tips, glans of prophallus somewhat triangular in outline and slightly depressed in the middle  
..... *tullia tullia* (Drury)  
Hamular hook short, curved and with blunt tips, glans of prophallus tubular and rounded at the margins.... 2.
2. Genital lobe narrow long and oval, vesicula spermalis without any teeth like projection at the base..... *fulvia* (Drury)  
Genital lobe long, highly depressed from both the sides and dilated at the apex, vesicula spermalis with a small pointed teeth like projection at the base.....  
..... *intermedia intermedia* (Ramb).

ACKNOWLEDGEMENTS

The author is thankful to the Director,, Zoological Survey of India, Calcutta for permission to carry out this work. Thanks are also due to Dr. B.S. Lamba, Deputy Director, and Dr. Asket Singh, Superintending Zoologist, Zoological Survey of India, Dehra Dun for laboratory facilities and proper guidance.

REFERENCES

COWLEY, J. 1937. The penis of the Chlorocyphidae (Odonata) as a group character. *Trans. R. ent. Soc.*, 86 : 1-18.

FRASER, F. C. 1936. *The Fauna of British India including Ceylon and Burma* (Odonata). 3 : 11—461. Taylor and Francis, London.

FRASER, F. C. 1940. A comparative study of the penes of the family Gomphidae. *Trans. R. ent. Soc.*, 90 : 541—550.

FRASER, F. C. 1956. In Tuxen, S. L. *Glossary of genitalia in insects* : 25—30.

KENNEDY, C. H. 1916a. Notes on the penes of Zygoptera, 1—8. *Ent. News.*, 27 : 325—330.

KENNEDY, C. H. 1916b. Notes on the penes of Zygoptera 1—3. *Ent. News.*, 28 : 9—14

KENNEDY, C. H. 1917. Notes on the penes of Zygoptera, No. 3, the penes in *Neoneura* and related genera. *Ent. News.*, 28 : 289-294.

KHAN, B. A. 1974. The copulatory complex of *Neurobasis chinensis chinensis* (Linn.) (Agridae : Zygoptera). *J. Bombay nat. Hist. Soc.*, 71 : (1) : 124-130.

KHAN, B. A. 1976. The copulatory complex of *Megalestes major* Selys (Coenagriidae : Zygoptera). *Rec. zool. Surv. India*, 69 : 249-254.

PRASAD, M. Studies on the male accessory genital structure of the genus *Trithemis* Brauer (Odonata : Libellulidae : Tritheminae). *J. Bombay nat. Hist. Soc.*, (in press).

SNODGRASS, R. E. 1935. *Principles of Insect morphology*. 1-667 pp, figs. 319, New York (Mc Graw Hill Book Co.).