e-ISSN: 2455-667X

Annals of Natural Sciences
(Peer Reviewed and UGC Approved International Journal)
Vol. 3(2), June 2017: 76-79
Journal's URL: http://www.crsdIndia.com/ans.html
Email: crsdIndia@gmail.com

Annals of Natural Sciences

ORIGINAL ARTICLE

Studies of Genitalia of an Important Indian Odonata- *Orthetrum pruinosum neglectum (Rambur)*

Amita Parihar and Sunil Kumar Jain
Department of Zoology, Agra College, Agra
Email: amita.singh.parihar@gmail.com

ABSTRACT

This research work deals with description of the comparative study of genitalia of Indian Odonata in relation to taxonomy of the dragonflies and damselflies, and are cosmopolitan is distribution all over the world. These insects are very commonly seen during the post monsoon months near the water borne areas. In India all plains and hills are rich in Odonata. Of all insects the Odonata are probably the most familiar to us. They from a conspicuous feature of the average Indian Landscape and are common to all parts even the most arid areas.

Key words: *Genitalia, Indian Odonata, Orthetrum pruinosum neglectum*

Received: 18th March 2017, Revised: 24th May 2017, Accepted: 26th May 2017

How to cite this article:
Parihar A. and Jain S.K. (2017): Studies of Genitalia of an Important Indian Odonata- *Orthetrum pruinosum neglectum (Rambur)*. Annals of Natural Sciences, Vol. 3[2]: June, 2017: 76-79.

INTRODUCTION

Very little is know about the detail of the genitalia of Indian Odonata. Our Knowledge of the Indian Odonata is largely derived from the work of Freser. The main aim of the Indian Odonata, In order to evaluate the genitalia as a systematic character, moreover, the comparative study of these insects will help us to trace the inter-relations of the groups more clearly than the other external characters of which the current classification is based. The best months for the collection of the specimens of these insects in India are May, June, September, November, These are amphibiotic in nature i.e. the larval stage of these insects is passed in water and the second phase is aerial. The genitalia especially of male are unique insects. They have to sets of copulatory of mating apparatuses, The first set which is primary in nature, and found as in other insects on the ninth sternum, While the second set regarded as Secondary complex is located ventrally on the second and the apical part of third abdominal segments On the second sternum is a genital fossa in which the complex are lodged and its walls are supported by a complex scleratized framework. The depression communication posteriorly with a small sac, the penis vesicle the penis and serve to guide and retain ovipositor in position during mating, Great variation of families.

The present study however is not an attempt to base a new system of classification on one set of characters. It is well understood that an accurate classification of Odonata will only be possible if many characters are studied in detail. The presented study can be regarded as preliminary investigation in this field. It is very much necessary to examine many more characters other than genitalia in order to establish a correct system of classification in Odonata.

MATERIAL AND METHODS

Representatives of thirty one genera and thirty nine species were studied since the specimens used were mostly dried; they were first put in a relaxing box for 24 hours or more. When the Tissues and sclerotic structures were sufficiently soft, the copulatory complex of male was raised with a needle , the second and the third abdominal segments were cut laterally and the whole cut portion with copulatory complex was then separated. The second and the third segments with copulatory complex were than immersed in 10 percent alcoholic caustic potash solution 2-16 hours, this was found preferable to boiling in casuistic potash solution which was too drastic. Further treatment consisted of removing the the muscular tissues and washing in water. After washing, the material was passed through alcoholic series for dehy dration. In the beginning it was found difficult to orientate all parts of the genitalia in exactly corresponding position but after few attempts a successful method was devised to mount the entire complex over slide in exactly corresponding position but after few attempts a successful method was devised to mount the entire complex over slide in exactly corresponding position. Due to the thickness of the material it is difficult to mount on an ordinary slide. Cavity slides and plastic rings may be used in mounting. It was specially difficult to mount the penis, since it is curved in most peculiar manner. Except a few, all the complexes were mounted from ventral aspect, in a position to show their structure more clearly.

For the primary copulatory complex the anal ends of the male and female were cut by the seventh segment and treated as above. Generally the whole complex was mounted in situ, But in some cases the second and the third sterna together with genital lobes were put apart with the help of forceps, and the hamules were folded outwards and laterads on the second sternum with the help of needles and the penis was removed, To show the sclerotic framework and a ns penis sheath more clearly and also their inter-relation with the hamules. In some cases whole complex was taken out, Leaving the second and third sterna with genital lobes than the hamules were folded outwards in order to make the complex clearly visible. All the separated penises were mounted laterally while the primary complex ventrally. The whole primary and secondary complex were then figured with a camera Lucida. In those cases where the penis were removed, The Sclerotic framework together with penis sheath and hamules were drawn separately from the penis.

RESULTS AND DISCUSSION

Under subfamily Libellulinae the *genital parts of Orthetrum Pruinosum neglectum (Rambur)* species was studied and draw with the help of camera lucida (Plate-1).

PRIMARY COPULATORY COMPLEX:

MALE:

1. The Supra-Anal Appendages (SAA): The supra- anal appendages are short with uniform diameter throughout except at the apices which are conical and spinous. Each supra-anal appendage is 2.0 mm long with eight black, teeth like tubercles (T) on the outer and lateral margin and covered with hairs (HA).

2. The Infra-Anal Appendage (IAA): The infra-anal appendage is oval, with broad and rounded middle portion and short and narrow apex with two protuberances (PR). It is 1.8 mm long, heavily coated with hairs (HA).

FEMALE:

1. The Supra-Anal Appendages (SAA): The supra-anal appendages are short and 1.0 mm long, with black spines (SP) at their apices. Each supra-anal appendage is elongated, tube-like structure, broader proximally narrower distally. Each supra-anal appendage is heavily coated with hairs (HA) except the apices.

2. The Vulvar Scales (VS): The vulvar scales are large, extending forward upto the anterior margin of the ninth sternum (ST), deeply cleft at the apex and are heavily coated

with hairs (HA). The rudimentary median gonapophyses (MG) are located on the ninth sternum, on eihter side of the mid-ventral line.

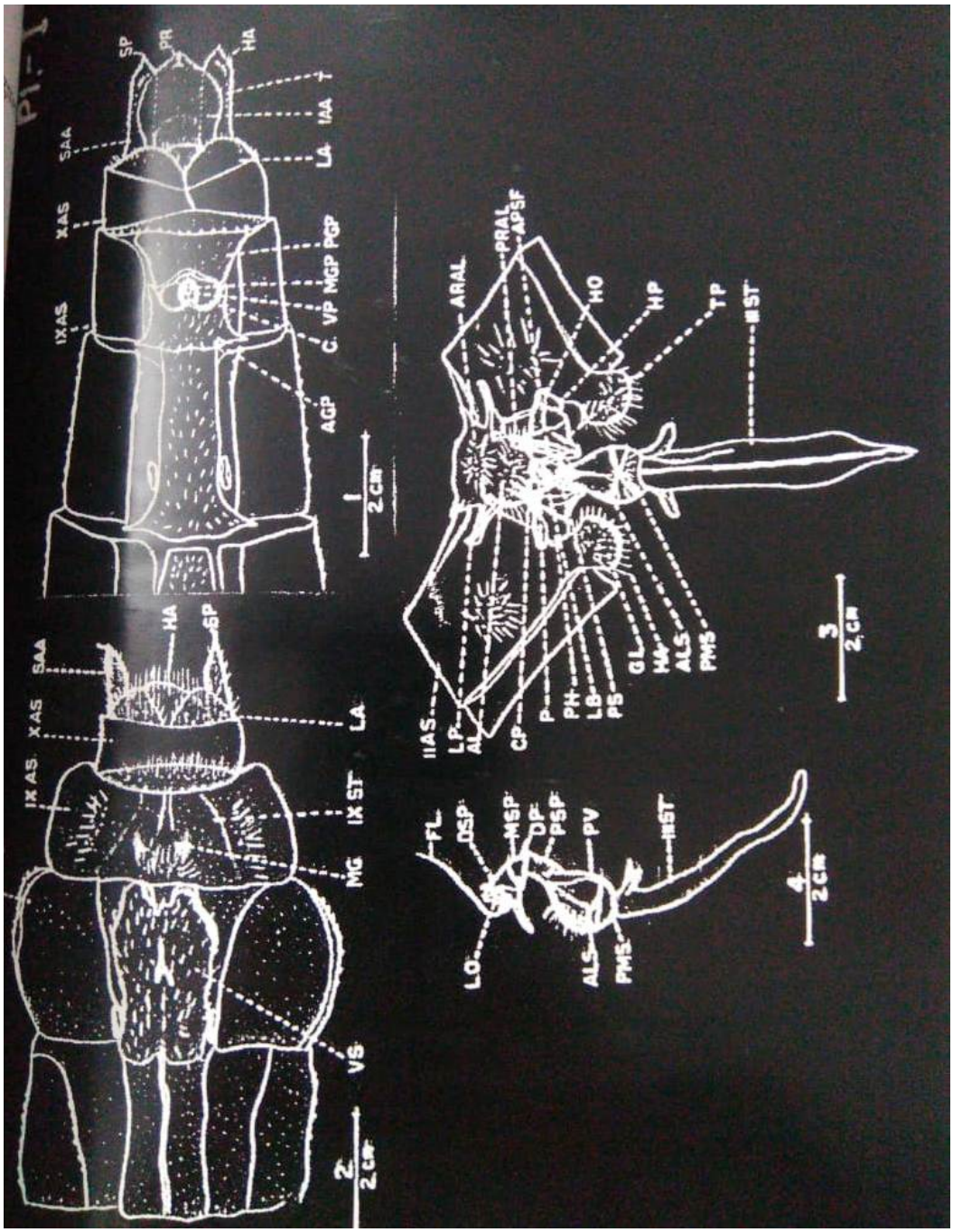

Plate 1: Showing genital parts of *Orthetrum pruinosum neglectum (rambur)* (Fig. 1: Ventral view of primary appendages; Fig. 2: Ventral view of eighth, ninth and tenth abdominal segments of female; Fig. 3: Ventral view of secondary anal appendages with genital fossa and penis; Fig. 4: Lateral view of penis)

Abbriviation:

AGP= Anterior Genital Plate; AL= Anterior Lamina; ALS= Antero Lumber Scelerite; APSF= Anterior Portion of Supporting Framework; ARAL= Anterior Region of Anterior Lamina; AS= Abdominal Segment; BC= Bar of Chitin; C= Coxite; CP= Conical Process; GF= Genital Fossa; GL= Genital Lobe; HA= Hair; HP= Hooked Portion; IAA= Infra Anal Appendages;

LA= Lamina Anal; LB= Lateral Bar; LO= Lobe; LP= Laminar Process; MGP= Male Gonopore; MSP= Median Segment of Penis; PGP= Posterior Genital Plate; PH= Posterior Hamulke; PSP= Posterior Segment of Penis; PV= Penis Vesicle; S= Spur; SP= Spine, ST= Sternum; S= Spur; VP= Vestigial Penis; VS= Vulvular Scale

SECONDARY COPULATORY COMPLEX:

1. The Anterior Lamina (AL): The anterior lamina is well developed and more elongated than broad. It is clearly demarcated into two regions. The posterior region of the anterior lamina (PRAL) is more sclerotized and larger in size than the anterior region of the anterior lamina (ARAL) and furnished with long hairs (HA). The anterior margin of the anterior lamina (AL) is slightly notched while the posterior margin is nearly straight. The posterior corners are produced into prominent conical processess (CP).

2. The Supporting Framework: The anterior portion of the supporting framework (APSF) is well evolved and somewhat W-shaped structure, having prominent dorsal processes (DP) at their lateral bars (LB). The posterior protion of the framwork (PPSF) is poorly developed, thin bar of chitin (BC).

3. The Hamules: The posterior hamules (PH) are very stout but short. The hooked portion (HP) bears a blunt headed black hook (HO) at the terminal end and nearly equal in size with that of the truncated protion (TP). The cleft between the two protion of the hamules is very shallow.

4. The Penis Sheath (PS): The penis sheath is less sclerotised and forceps-like with a rounded apex and somewhat straight arms (AR).

5. The Penis Vesicle (PV): The penis vesicle is flask-shaped, very broad at the base, narrow apically. The postero-median sclerite (PMS) is small while the two antero-lateral sclerites (ALS) are large and furnished with few long hairs (HA).

6. The Penis: The penis is clearly demarcated into three segments. The proximal segment of the penis (PSP) is longer than the two segments and bears a dorsal process (DP) at the distal end. The median segment of the penis (MSP) is very short and simple while the distal segment of the penis (DSP) is highly complicated having many small lobes (LO), a long process and whip-like flagellum (FL).

7. The Genital Lobes (GL): The genital lobes (GL) are very broad, rounded at apices and heavily clothed with long hairs (HA).

REFERENCES

1. Bartenef (1915): Libellulidae. Insects Neuropters. Fauna De la Russe, pp. 1-352
2. Bedjanic M. (1994): Records of some little Known and a new sympetrum species for the odonata fauna of slovania (Anisoptera: Libellulidae) Notulae odonato logical, 4(3): 51.
3. Goddard M. (1896): On the second abdominal segment in a few Libellulidae. Proc. Amer. Philadelphia Soc., 35: 205-212.
4. Prasad S.N. and Srivastava B.K. (1960 a): The morphology of the male reproductive organs of Bradinopyga geminate Rambur (Odonata: libellulidae). Ibid, pp. 74-75.
5. Prasad S.N. and Srivastava B.K. (1960 b): The morphology of the female reproductive organs of Bradinopyga geminate Rambur (Odonata: libellulidae). Idib, pp. 76-77.
6. Rathke M.H. (1832): De Libellularum partibus genitalibus. Konigsber, pp.1-38.
7. Siebod C.T.H. (1842): Sur la mode de reproduction des Libellulines. Rev. Zool., pp. 283-288.
8. Snodgrass R.E. (1957): A revised interpretation of the external reproductive organs of male insects. Ibid, 135(6): 1-60.
9. Tillyard R.J. (1925): Origin of the Australian and NewZealand, insects Faunas. Rep. Auastra. Ass. Adv. sci. Sydney, 16: 407-413.
10. Tuxen S.L. (1956): Taxonomist's glossary of genitalia in insects. Copnhagen: Ejnar Munksgaard (Odonata) (by F.C. Fraser), pp. 25-30.
11. Williamson E.B. (1906): Copulation of Odonata. Ibid, 17: 143-148- Note by Philip P. Calvert, pp. 148-150.