



Further Studies on Female Genitalia of Three Species of genus *Trithemis* Brauer from North-West India

Jagbir Singh Kirti¹, Simarjit Kaur² and Archana Singh¹

¹Department of Zoology & Environmental Sciences, Punjabi University, Patiala-147002 (Punjab) INDIA

²Zoological Survey of India, New Alipore, Kolkata- 700053(West Bengal) INDIA

(Corresponding author: Simarjit Kaur)

(Received 28 June 2018, Accepted 25 January, 2019)

(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: Taxonomic studies have been conducted on the species of genus *Trithemis* Brauer to study their female genitalia. The diagnosis of these species has been updated by incorporating female genitalic attributes.

Keywords: *Trithemis*, female genitalia, subgenital plate.

How to cite this article: Kirti, Jagbir Singh, Kaur, Simarjit and Singh, Archana (2019). Further Studies on Female Genitalia of Three Species of genus *Trithemis* Brauer from North-West India. *Biological Forum – An International Journal*, 11(1): 126-130.

INTRODUCTION

The genus *Trithemis* Brauer was proposed on a type species *aurora* Burmeister by Brauer in 1868. After this, many species were added later on under it by various workers. Besides this, some eminent workers like Laidlaw (1914), Fraser (1920, 1936, 1955), Lieftinck (1954) and Pinhey (1956, 1962, 1970), Clausnitzer (2001) and Dijkstra (2007) also studied this genus. In India, 3 species and a single subspecies, namely *T. pallidinervis* (Kirby), *T. festiva* (Rambur), *T. aurora* (Burmeister) and *T. kirbyi kirbyi* Selys are known to occur. In the present studies, the genus is represented by 3 species as the subspecies is confined to the West Coast of India (Fraser, 1936). The female genitalia of all the three species have been studied and illustrated.

MATERIAL AND METHODS

The adult representatives of dragonflies were collected with the help of insect collecting net from different localities of North-Western states of India i.e. Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab and Uttarakhand during different seasons. They were killed with ethyl acetate vapors in the killing bottle, and in case of teneral specimens were put alive into triangular paper packets and starved to death. The dead specimens were then bristled, pinned, stretched, dried and preserved. To examine the female genitalic structures, the last three abdominal segments were cut off either from the fresh specimens or dried ones. However, in latter case, the dragonflies were relaxed in insect relaxing box for 12 hours before detaching the abdomen. The separated abdomen segments were treated with 10% KOH to dissolve the muscles and to soften the chitin. The potashed material was washed in distilled water containing few drops of acetic acid.

The dissection of abdomen was done in 50 % alcohol to have a clear view of different genitalic attributes. After proper dehydration, the material was preserved in vials containing a mixture of ethyl alcohol and glycerine in the ratio of 4:1. The sketches of the genitalia were made with the help of a graph eye piece under binocular at different magnifications.

The terminology given by Chao (1953) and Miller (1991) was followed for the names of the different parts of genitalia.

RESULTS

KEY TO THE SPECIES

1 Legs very long, hind femora extending up to apical end of second abdominal segment, pterostigma bicolorous; superior anal appendages, basal half yellow and apical half black.....

..... *pallidinervis* (Kirby)

-Legs not unusually long, hind femora extending up to end of thorax; superior anal appendages black..... 2

2 Base of hind wing with dark brown spot; neuration bright yellow to brown; sub genital plate with margin concavely notched, deeply chitined and projecting ventralwards.....*aurora* (Burmeister)

-Base of hind wing with dark reddish brown spot; neuration black; sub genital plate with apex broadly and shallowly notched medially.....*festiva* (Rambur).

Taxonomy

Trithemis pallidinervis (Kirby):

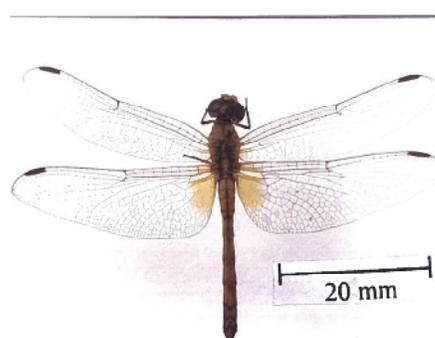
Anal segment: Superior anal appendages shortly conical, twice as long as abdominal segment ninth, basal half yellow and apical half black; subgenital plate highly sclerotized, almost black, minutely emarginated at apical border.



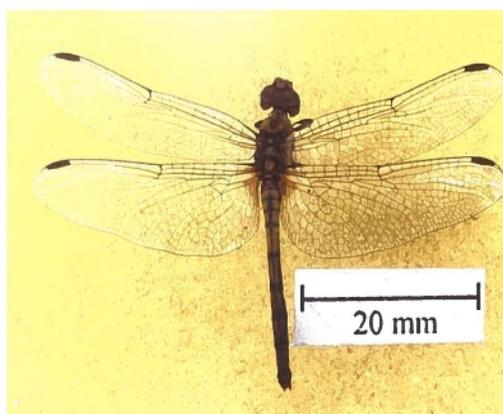
1



2



3



4

Plate-1 (Figures 1-4): 1. *Trithemis pallidinervis* (Kirby) female, 2. *Trithemis aurora* (Burmeister) female with apical spots on wings, 3. *Trithemis aurora* (Burmeister) female with lacking apical spots on wings, 4. *Trithemis festiva* (Rambur) female.

Measurements:

Fore wing	Hind wing	Abdomen
29-36 mm	30-32 mm	26-28 mm

Remarks: *Trithemis pallidinervis* (Kirby) is a very common species found throughout India. It breeds in stagnant water bodies and usually rest on the top of

small vegetation or twigs of the bushes. The species can be easily distinguished from other Indian species of the genus by possessing long spidery legs extending up to the apical end of second abdominal segment, bicolourous pterostigma and unlike other species, both the sexes are alike.

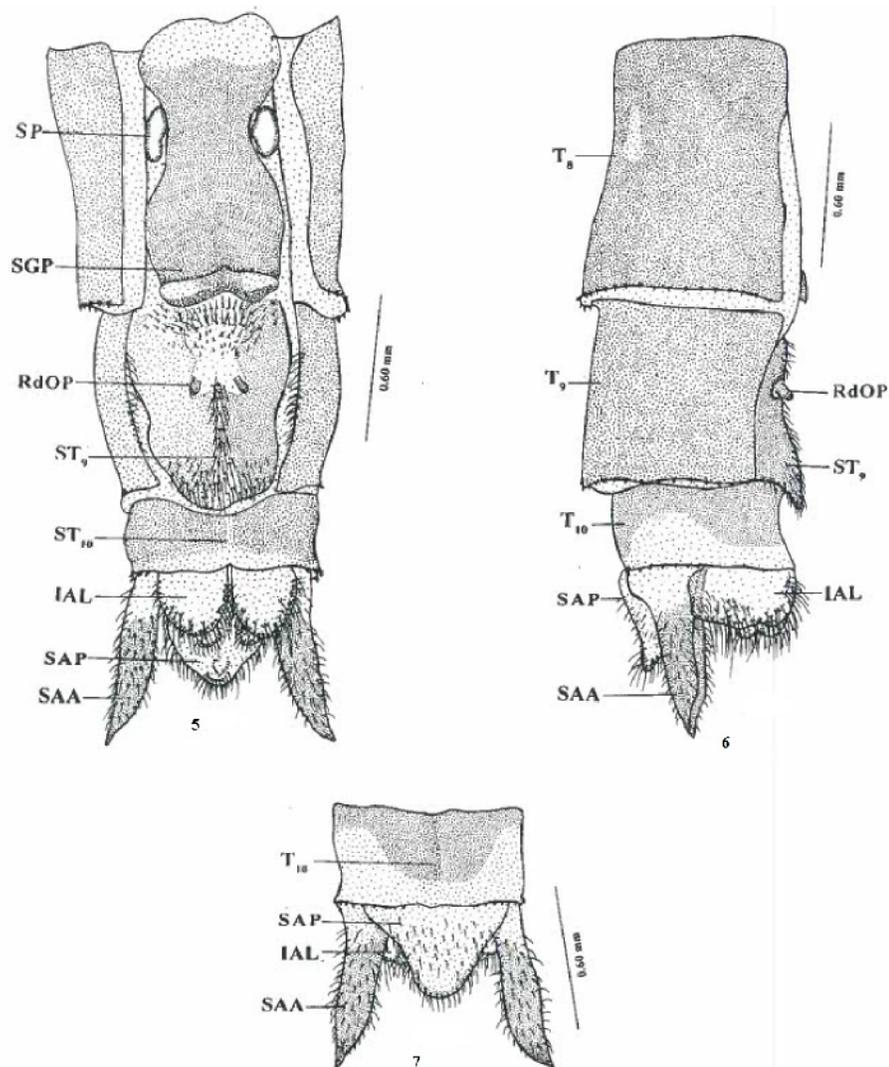


Plate-2. (Figures 5-7): *Trithemis pallidinervis* (Kirby) female genitalia 5. Ventral view, 6. Lateral view, 7. Dorsal view.

***Trithemis aurora* (Burmeister)**

Anal segment: Superior anal appendages black, half of abdominal segment ninth, long and slender with acuminate apex; ninth sternite bearing seate along middorsum; subgenital plate with margin concavely notched deeply chitinized and projecting ventral wards.

Measurements:

Fore wing	Hind wing	Abdomen
25-30 mm	24-29 mm	19-23 mm

Remarks: The large number of specimens were collected from Renukalake (Himachal Pradesh), Bhimtal and Naukuchiatal (Uttarakhand). Out of the 40 female individuals collected from different localities, only 2 females agree with the description provided by

Fraser (1936) in having wings broadly tipped up to middle of pterostigma (Fig. 2) while rest were having wings with apices hyaline (Fig. 3).

***Trithemis festiva* (Rambur)**

Anal segment: Black, shortly conical; superiors twice as long as segment tenth, outer border straight, inner border converging at apex to form a black spine, besotted with long, black setae; subgenital plate with apex broadly and shallowly notched medially.

Measurements:

Fore wing	Hind wing	Abdomen
25-30 mm	24-29 mm	21-24 mm

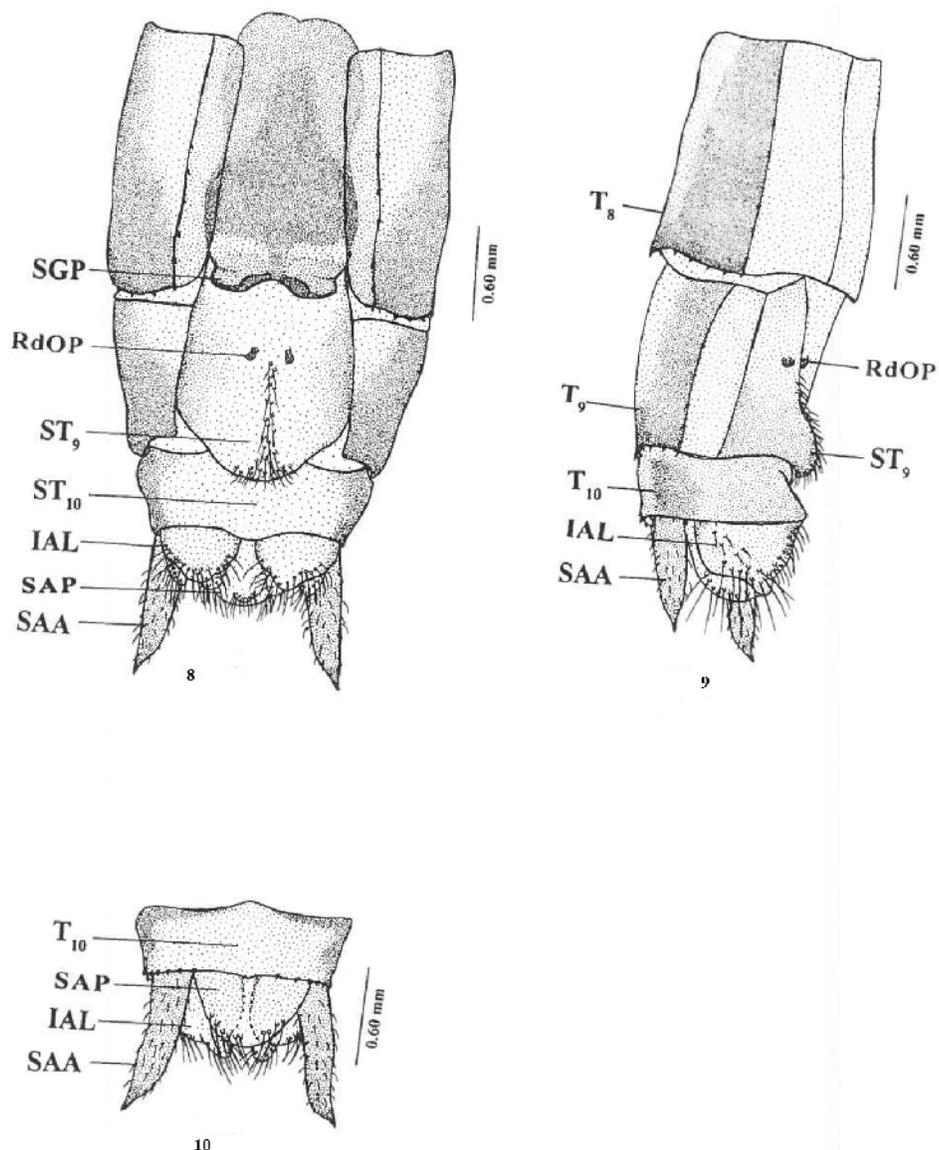


Plate-3. (Figures 8-10): *Trithemis aurora* (Burmeister) female genitalia 8. Ventral view, 9. Lateral view, 10. Dorsal view.

Remarks: Females of this species are slightly less common as the authors have only 5 female representatives out of the total 55 individuals. Prasad and Kumar (1978) studied intraspecific variations in this Indian species from different localities of Western Himalaya. The authors fully agree with the observations and noticed similar kind of variations.

The variations in the size and color of both male and female specimens are a common feature in the members

of the genus *Trithemis* Brauer. Therefore, on the basis of genitalia, the females of the above three species can be distinguished by using the characters like superiors of anal segment and shape of sub genital plate.

Abbreviations: IAL- Inferior anal lamina, RdOP- rudiments of ovipositor, SAA- superior anal appendage, SAP- superior anal plate, SGP- subgenital plate, ST₉ & ST₁₀- abdominal sternites, T₈, T₉, T₁₀- abdominal tergites.

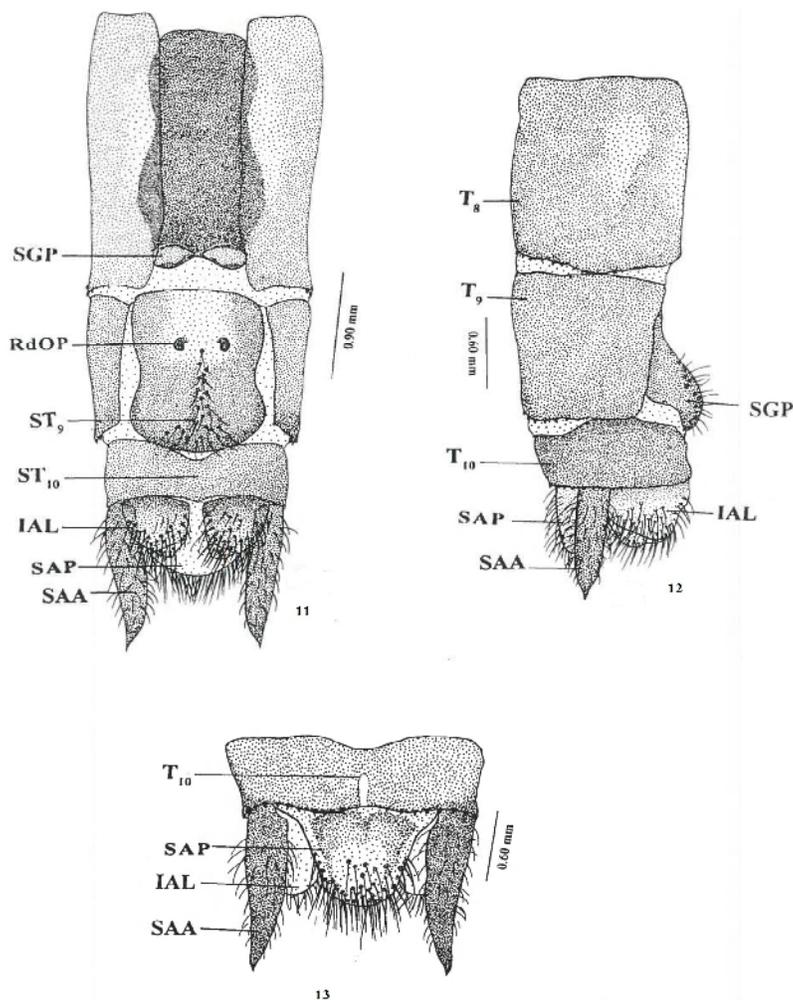


Plate-4. (Figures 11-13): *Trithemis festiva* (Rambur) female genitalia 11. Ventral view, 12. Lateral view, 13. Dorsal view.

REFERENCES

- Chao H.F. (1953). The external morphology of the dragonfly *Onychogomphus ardens* Needham. *Smith Miscellaneous Collection*, **122**: 1-56.
- Clausnitzer, V. (2001). Notes on *Trithemis bifida* and *T. donaldsoni* (Odonata: Libellulidae). *International Journal of Odonatology*, **4**, 179-189.
- Dijkstra, K.D.B. (2007). The name-bearing types of Odonata held in the Natural History Museum of Zimbabwe, with systematic notes on Afrotropical taxa. Part 1: introduction and Anisoptera. *International Journal of Odonatology*, **10**, 137-170.
- Fraser, F.C. (1920). Indian dragonflies. Part VI. *Journal of Bombay National History Society*, **26**: 451-455.
- Fraser, F.C. (1936). Fauna of British India including Ceylon and Burma. Odonata. London: Taylor and Francis Ltd.
- Fraser, F.C. (1955). Odonata. Exploration Parc National Upemba. *Mission G F de Witte*, **38**, 1-34.
- Laidlaw, F.F. (1914). Zoological results of the Abor Expedition 1911-1912 Odonata. *Records of Indian Museum*, **8**: 335-349.
- Lieftinck, M.A. (1954). Handlist of Malaysian Odonata. *Treubia Buitenzorg*, **22**: 1-202.
- Miller P.L. (1991). The structure and function of the genitalia in the Libellulidae (Odonata). *Zoological Journal of the Linnaeus Society*, **102**: 43-73.
- Pinhey, E.C.G. (1956). Some dragonflies of east and central Africa and a rarity from Mauritius. *Occasional Papers Coryndon Memorial Museum*, **4**, 17-41.
- Pinhey, E. (1962). Some notes on the dragonflies (Odonata) of Mauritius. *Proceeding of Royal Entomological Society of London*, **31**: 195-221.
- Pinhey, E. (1970). Monographic study of the genus *Trithemis* Brauer (Odonata: Libellulidae). *Memoirs of the Entomological Society of Southern Africa*, **11**, 1-159.
- Prasad, M. and Kumar, A. (1978). Studies on the intraspecific variations in *Trithemis festiva* (Rambur) (Odonata: Libellulidae). *Journal of Bombay National History Society*, **77**: 238-246.