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RESEARCH ARTICLE

KARYOTYPIC AND MORPHOMETRIC ANALYSIS OF AN APHIDOPHAGOUS HOVERFLY, *EPISYRPHUS BALTEATUS* (DIPTERA: SYRPHIDAE) FROM JAMMU REGION (J&K), INDIA.

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Abstract

In the present study, the chromosomes of a predatory fly, *Episyrphus balteatus* commonly called hoverfly were studied first time from Jammu region (J&K). The larva of this hoverfly act as bio control agent for suppressing the populations of aphids. The observed diploid number of the species was 2n=10. Observed meiotic stages included diplotene and diakinesis. Mitotic anaphase was also found. The sex chromosomes include sub telocentric X and acrocentric Y chromosome. The present study regarding the chromosomes might help in the solution of taxonomic problems with in the family Syrphidae.

INTRODUCTION

Some studies about the mitotic chromosomes of higher Diptera have been provided by Metz (1916), Boyes (1959, 1961, 1963), Ullerich (1963) and others. The earliest karyotypic work regarding family Syrphidae of order diptera have been carried out by Boyes and Van Brink (1964, 1966, 1967, 1968, 1970, 1972). The present study includes the karyotypic analysis of *Episyrphus balteatus* of tribe Syrphini of subfamily Syrphinae. The general karyotypic analysis of the genus Episyrphus have been mentioned by Boyes (1964) in his report. Larvae of syrphids rank as major natural enemies and play important role in the suppression of aphid population (Ghorpade, 1981). The common hoverfly *Episyrphus balteatus* is the most abundant among the aphidophagus predatory species recorded (Ammar Alhmedi et al, 2007). Considering the economic importance of this predatory fly, chromosomal analysis has been done during present investigation.

MATERIAL AND METHOD

Adult flies were collected from the gardens of Jammu university campus during March- April 2014. Adult flies were selected for the karyotypic analysis. Males are easily identified by their holoptic eyes. After collection, anesthetized adult males were dissected to obtain their testis in distilled water. Testis is pair of minute brownish spherical bodies found in the last part of abdomen .Slides were prepared by squash method. Slides with testis were treated with 0.7% NaCl for 40 minutes. Then the tissue was stained with 2% solution of lacto aceto-orcein. Stained slides were covered with cover slip and squashed. The resulting temporary mounts were sealed with either wax or colorless nail paint. Stained slides were scanned under Olympus camera aided microscope and results were photographed under CH20i BIMF microscope attached with Sony SSC-DC378P camera under 1000x magnification.

RESULTS

The Spermatogonial metaphase of *Episyrphus balteatus* shows 10 chromosomes (fig.1) as diploid number i.e. 2n=10. The karyotype revealed 4 metacentric, 5 sub telocentric and 1 acrocentric chromosome(fig.2). Sex chromosomes were found to be heteromorphic as sub telocentric X chromosome and acrocentric Y chromosome.

The haploid chromosome number is confirmed by diplotene stages (fig.3-C) in which 5 homologous pairs were seen. Mitotic anaphase (fig.3-F) was also seen.

DISCUSSION

Episyrphus balteatus showed a chromosome number of 10 for males i.e. 2n=8+XY. The chromosomes were moderate in size. The first and the third pair seemed to be metacentric, second and fourth appeared sub telocentric. The smallest pair of chromosomes is apparently the heteromorphic sex chromosomes with sub telocentric X chromosome and acrocentric Y chromosome which is slightly shorter than the X chromosome. J. W. Boyes and J. M. Van Brink,(1964) recorded the chromosome number of different species of tribe Syrphini of sub family Syrphinae. They recorded the haploid number of genus Episyrphus (tribe syrphini) to be n=5.

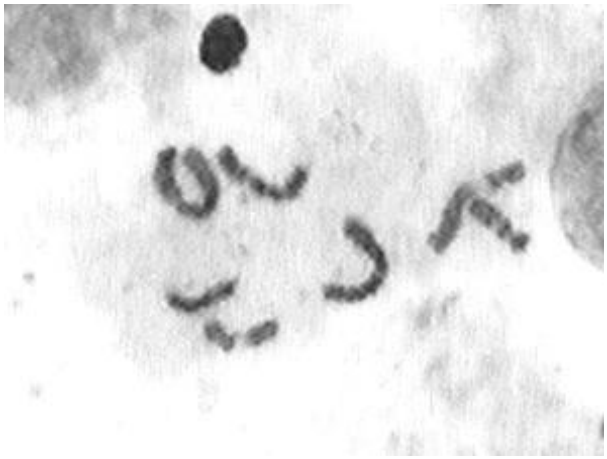


Figure 1: *Episyrphus balteatus.* Spermatogonial metaphase.

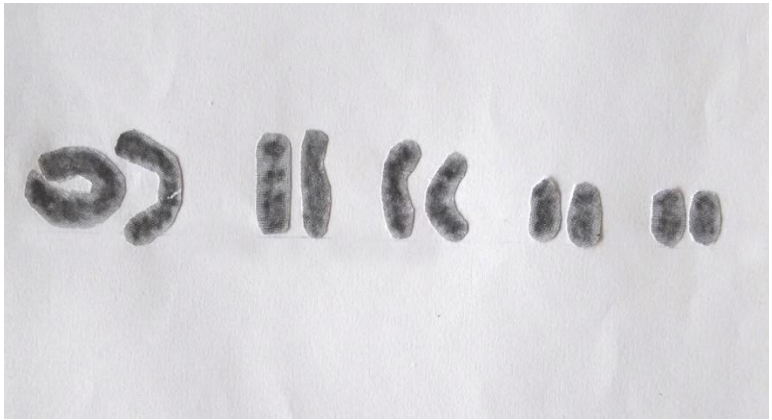


Figure 2: Karyotype of *Episyrphus balteatus.*

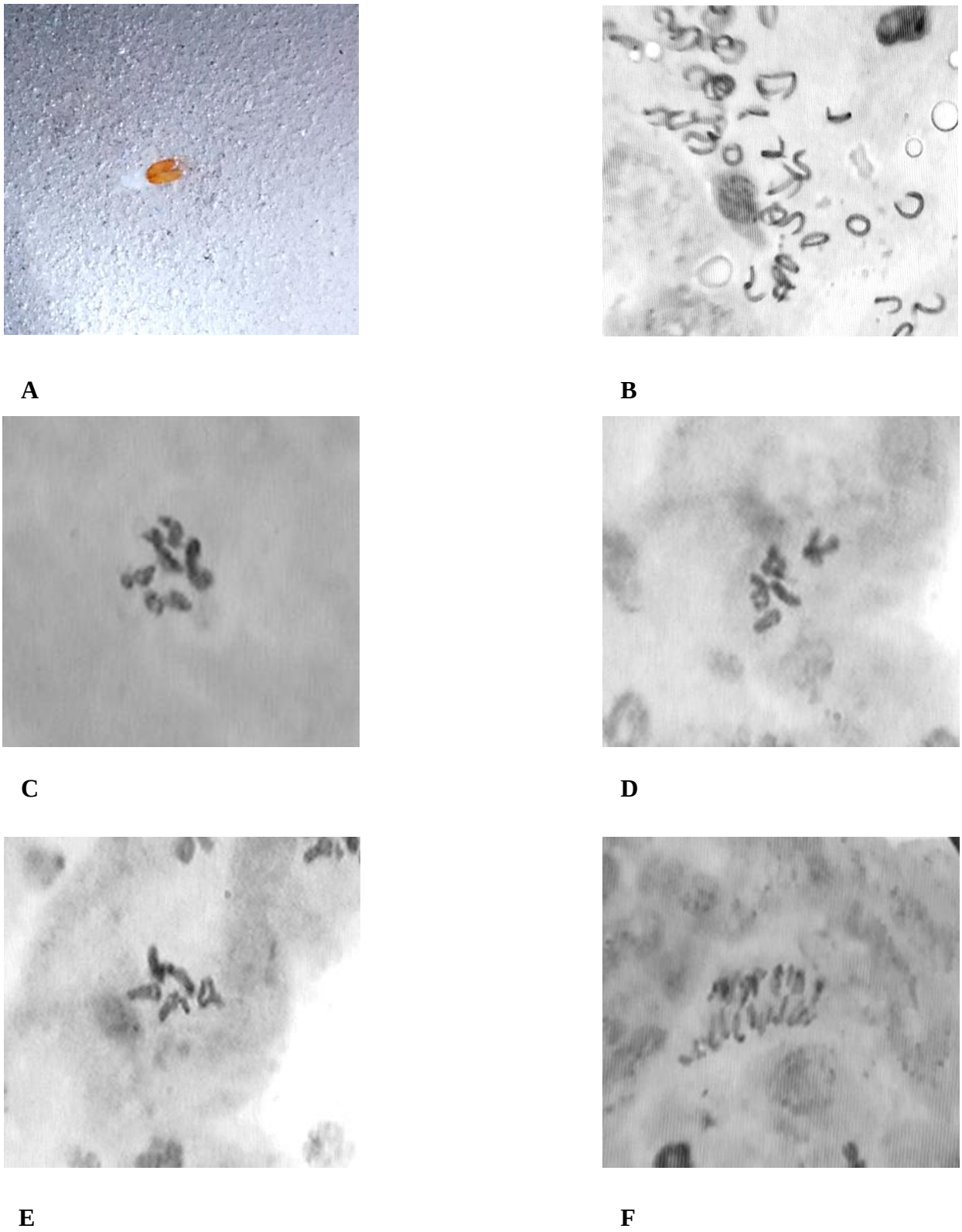
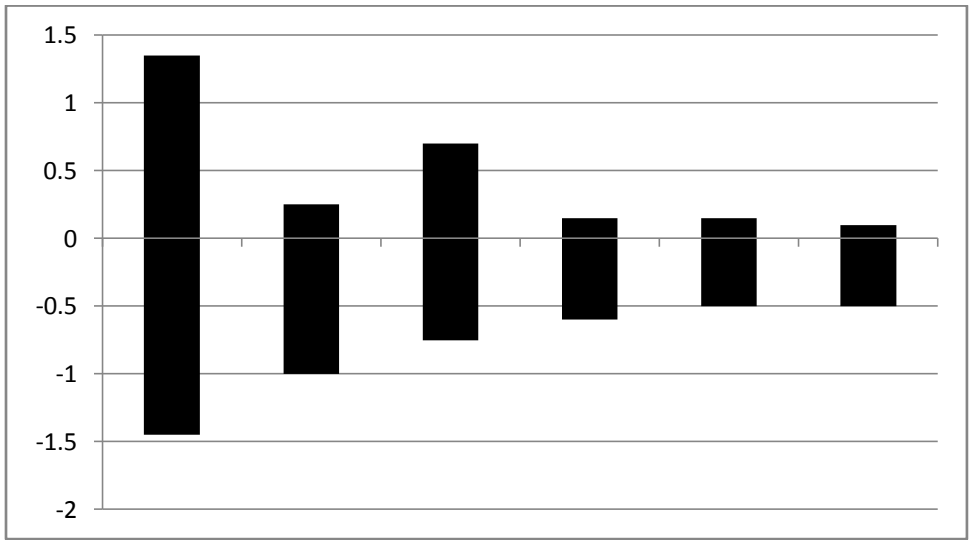


Figure 3. *Episyrphus balteatus.* A- pair of testis, B- sperms, C- diplotene, D,E - diakinesis, F- mitotic anaphase.

Table 1: Morphometric data of karyotype of male *Episyrphus balteatus* showing 2n=10 (4M+5ST+1A).

Chromosome pair number	Mean length of the short arm (p) in µm	Mean length of the long arm (q) in µm	Absolute length of the chromosome (p+q) in µm	Arm ratio (q/p)	Centromeric index	Nomenclature
1	1.35	1.45	2.80	1.07	48	Metacentric
2	0.25	1.0	1.25	4	20	Sub-telocentric
3	0.7	0.75	1.45	1.07	48	Metacentric
4	0.15	0.6	0.75	4	20	Sub-telocentric
X	0.15	0.5	0.6	3.3	25	Subtelocentric
Y	0.1	0.5	0.6	0.5	16	Acrocentric

Figure 4 Idiogram of *Episyrphus balteatus*



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REFRENCES

Alhmedi, A. et al., (2007): Aphidophagous guilds on nettle (Urtica dioica) strips close to fields of green pea, rape and wheat. Insect sciece., 14:419-424.

Boyes, J.W. and VanBrink, J.M. (1964): Chromosomes of Syrphidae.Variations in Karyotype. Chromosoma., 15:579-590.

Boyes, J.W. and VanBrink, J.M. (1966): Chromosomesn of Syrphidae. Karyotypes of five species in the tribe Sericomyiini. Chromosoma., 19:399-404.
Boyes, J.W. and VanBrink, J.M. (1967): Chromosoma of Syrphidae. Karyotypes of some species in the tribes Milesiini and Myoleptini. Chromosoma., 22:417-455.
Boyes J.W. and VanBrink, J.M. (1970): Chromosomes of Syrphidae. Microchromosomes. Chromosoma., 31:207-216.
Boyes, J.W. and VanBrink, J.M. (1972): Chromosomes of syrphidae. The tribe Pipizini. Genetica., 43:321-333.s
Ghorpade, Kumar D. and Channabasavanna, G. P. (1981): A taxonomic revision of syrphini (Diptera:Syrphidae) from the Indian subcontinent. Department of agricultural entomology, University of Agricultural sciences, Bangalore.