RESEARCH PAPER

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# Karyological studies of five species of Lepidoptera

**MEENU SADHOTRA**

P.G. Department of Zoology, University of Jammu, JAMMU (J&K) INDIA

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Cytogenetic studies making use of *in vitro* injection of colchicine and conventional Giemsa staining have been carried out on five species of Lepidoptera (butterflies and moths) belonging to three different families. Chromosomal preparations were made from brain ganglia and testis by using NaCl-acetic Carnoy-air drying method. The chromosomes bore typical dot like or elongated structures. Karyotype of the mitotic metaphase chromosomes on the basis of size and morphology showed 2n=60 in *D. chrysippus* (Linn.), 2n=54 in *E. merione* (Cram.) and 2n=62 in *D. obliqua* (Wlk.), *E. vitella* (Stoll.) and *S. mauritia* (Boisd.). Moreover, different meiotic stages from testis of these five species also confirmed their diploid number.

Key words : Lepid optera, Colchicine, Karyotype, Mitotic, Meiotic, Testis.

## INTRODUCTION

Karyological analysis of Lepidoptera has been a difficult task due to small dot-like chromosomes of similar sizes. On account of inadequate techniques in early work, sex chromosomes could not be clearly differentiated from the autosomes in a majority of the species investigated in this group. In respect to Indian Lepidoptera, only meagre data are available, namely, 8 by Gupta and Narang (1980); 30 by Rishi (1973); 45 by Mohanty and Nayak (1983); 31 by Kaur (1988) and 7 by Sharma and Bajwa (1992,1995a,b). However, the cytological data so far available, including those from neighbouring Nepal do not give satisfactory information to elucidate the cytotaxonomic relationships among lepidopteran species. Therefore, more chromosomal investigations should be done in various taxonomic groups of Lepidoptera.

In this report, the chromosomes of five species of Lepidoptera belonging to three different families were investigated with *in vitro* colchicine treatment established by Rishi *et al*.(1997).

## MATERIALS AND METHODS

Different instar larvae of the five species of Lepidoptera were collected from their respective host plants (Table 1) growing in the vicinity of Jammu University campus during April to July, 2008. Male and female specimens were fed to maturity in the laboratory. Brain ganglia and testes were processed for chromosome analysis following *in vitro* colchicine treatment (Rishi *et al.*, 1997). After this, the preparations were made by the usual NaCl-acetic Carnoy-air drying method and stained with 2% Giemsa solution.

## RESULTS AND DISCUSSION

The cells of brain ganglia of both male and female sexes as well as the male gonads yielded satisfactory results. Early metaphase plates from the brain tissue of female insects showed dot like chromosomes. Sex chromosomes could not be clearly identified in some species. Makee and Tafesh (2006) showed that sex heterochromatin could be used as sex determination and cytogenetic marker to identify sex chromosomes. Chromosomal observations on the five species of Lepidoptera dealt within the present investigation is summarized in Table 1.

As far as family Nymphalidae is concerned about 435 species are cytologically known but only 12 Indian species including the 2 species *viz*. Danaus chrysippus

**Table 1 : Karyotypic data on the five species of presently analysed Lepidoptera**

| Sr. No. | Species | Host plant | Diploid chromosome number (2n) | Haploid chromosome number (n) | Sex chromosome mechanism |
|---|---|---|---|---|---|
| 1. | *Danaus chrysippus* | *Calotropis procera* | 60 | 30 | ZZ:- |
| 2. | *Ergolis merione* | *Ricinus communis* | 54 | 27 | ZZ:ZW |
| 3. | *Diacrisia oblique* | *Raphanus sativus* | 62 | 31 | ZZ:ZW |
| 4. | *Earis vitella* | *Abelmoschus esculentus* | 62 | 31 | Unidentified |
| 5. | *Spodoptera mauritia* | *Brassica oleracea* | 62 | 31 | Unidentified |