RESEARCH PAPER Asian Journal of Bio Science, Vol. 4 Issue 2 : 183-186 (October, 2009 to March, 2010)

Diversity of butterflies and moths based on cytogenetics from J&K, India

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(Accepted : June, 2009)

Butterflies and moths belong to order Lepidoptera which is the second largest order of insects. These insects are of great importance particularly in the larval stages as the majority of species demolish the foliage and shoots of trees and crops, bore into stems, attack underground parts and several species are injurious to timber. Diversity of ten species of butterflies have been undertaken in the present research work, as the phylogeny of Lepidoptera has presented many problems which the taxonomists have faced from time to time. Along with the diversity, the cytogenetic study of some species have also been made so as to reveal the cytological basis of diversity. It was revealed that the chromosomal polymorphism, to some extent, is responsible for the biodiversity occurring in various families at various levels.

Key words : Diversity, Cytogenetic, Polymorphism, Families

INTRODUCTION

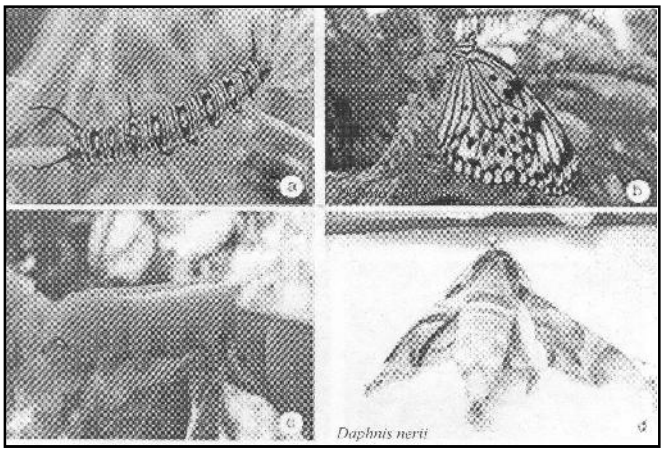
The Lepidoptera (butterflies and moths) are the second most species rich order of insects, with about 1,70,000 recognized species and perhaps 3,00,000 still undescribed. Diversity of Lepidoptera at the species level with experts giving estimates of described and undescribed species numbers for all the major groups of Lepidoptera. Almost all Lepidoptera species are dependent on angiosperm plants as larval food plants. This association has long been known to be evolutionary conserved but fossil based age estimates suggest that Lepidoptera diversified long after their host plants diversified. Many of them are serious pests of agriculture. They can serve as model systems for studying the action of natural selection in the wild since we know much about their ecology, natural history, physiology and behaviour. They are large enough to study in the field yet small enough to grow easily in lab colonies.

MATERIALS AND METHODS

The larvae of Lepidopteran species were collected from their respective host plants from different regions of Jammu. Caterpillars were dissected, some were made to emerge as adults and some adults were collected directly and killed in killing bottle containing ethyl acetate and stretched on board for identification. Chromosomal preparations were made using somatic as well as germinal tissues. Gonads and brain ganglia from the larvae were given hypotonic treatment 0.7% NaCl (0.01% Colchicine) and sodium citrate solution for 30 minutes (Rishi *et al.*, 1997). The material was fixed in Carnoy's fixative, subsequently dabbed and stained with 2% Giemsa and proceeded for slide preparation.

RESULTS AND DISCUSSION

The present study was undertaken with the objective to explore and document the collected species of Lepidoptera and to work out their chromosomal cytology. During the course of present study, ten species along with cytogenetic number were recorded from different locations of Jammu Province of Jammu & Kashmir state (Table 1) and (Fig. a-t). Besides, chromosomal studies of some species have also been investigated (Fig. 1, 2, 3, 4, 5, 6 and 7). Since Lepidoptera possesses immense potential in terms of biodiversity, the widespread discord in naming morphological features of different groups was seen as one reason behind the loss of interest in



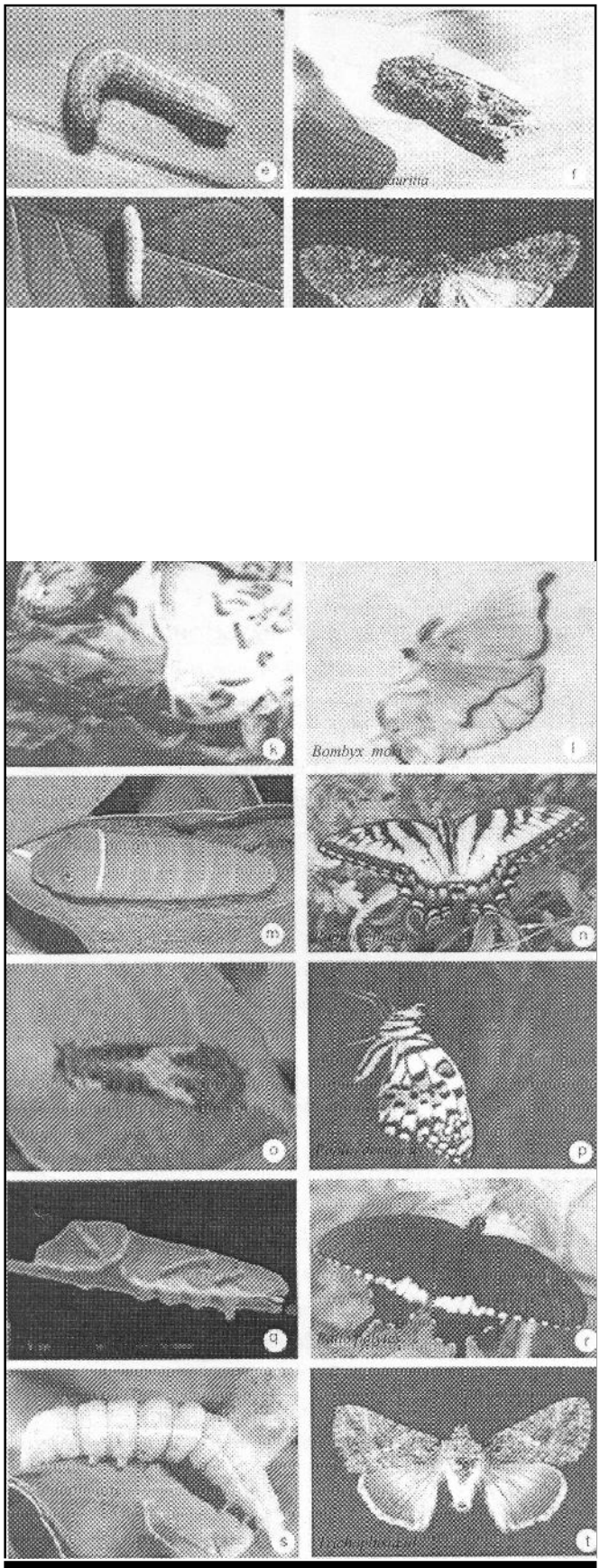
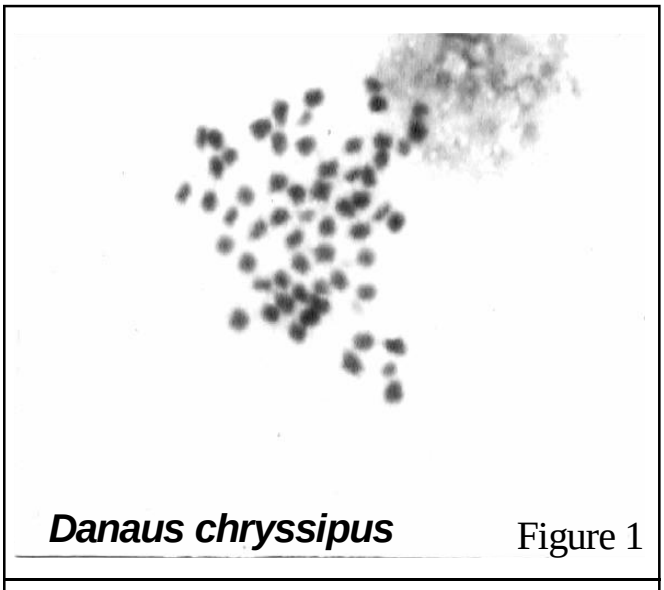
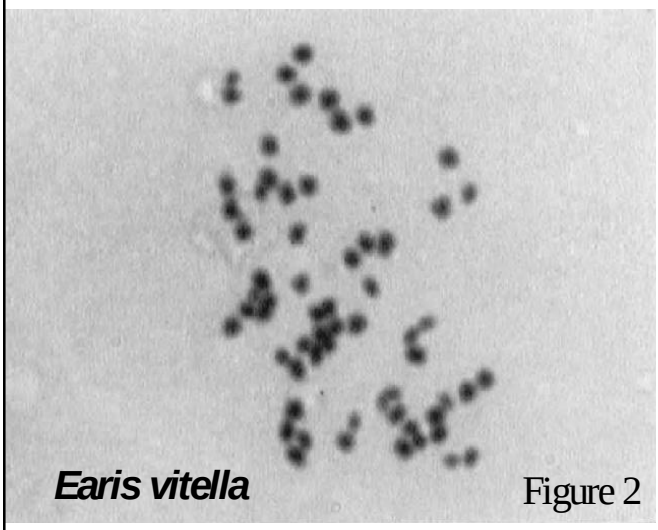


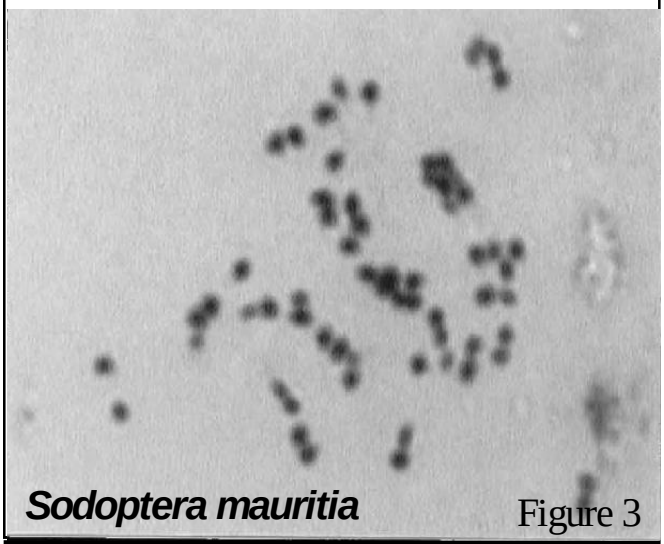
Fig. : a to t



Danaus chryssipus Figure 1

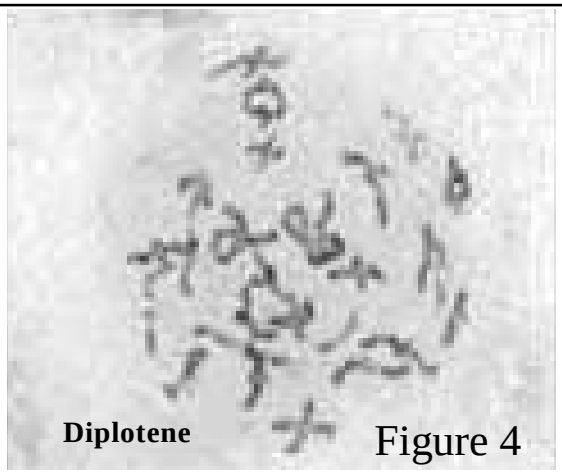


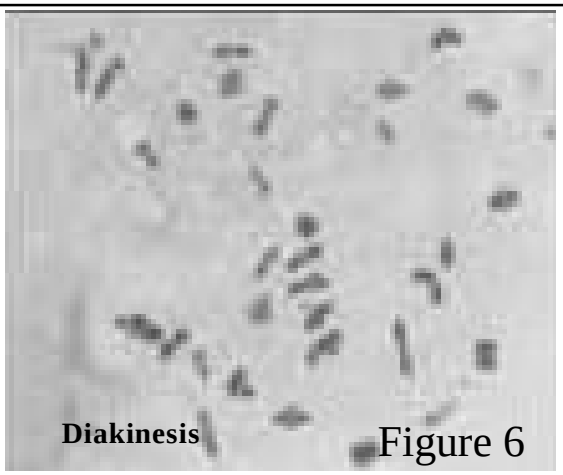
Earis vitella Figure 2

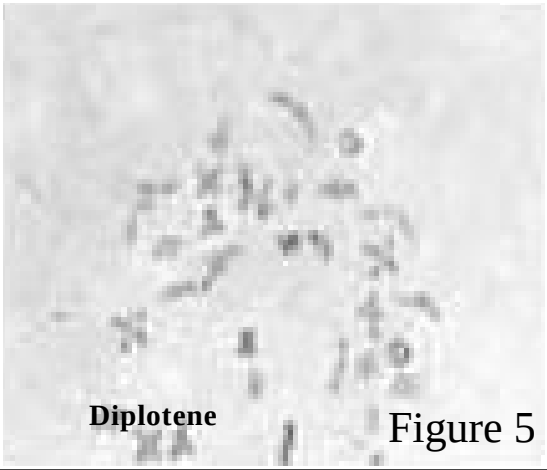


Sodoptera mauritia Figure 3

Fig. 1, 2, 3 : Spermatogonial metaphase showing holocentric nature of lepidopteran chromosomes







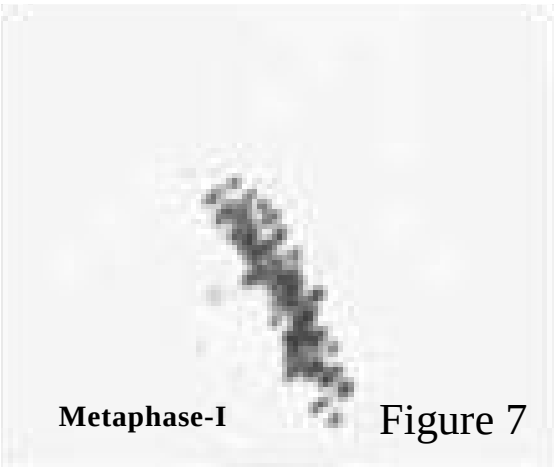


Fig. 4, 5, 6, 7 : Meiotic stages

Table 1 : List of different species of Lepidoptera analysed during present study (2007-2008)

Name of the species	Family	Host plant	Place of collection	Diploid number
Danaus chryssipus	Nymphalidae	*Calotropis procera*	Jammu	60
Daphnis nerii	Sphingidae	*Prunus alba*	Jammu	62
Spodoptera mauritia	Noctuidae	*Brassica oleracea*	Jammu	62
Spodoptera exigua	Noctuidae	*Brassica oleracea*	Udhampur	62
Earis vitella	Noctuidae	*Abelmoschus esculentus*	Jammu	62
Bombyx mori	Bombycidae	*Morus alba*	Jammu	62
Papilio glaucus	Papilionidae	*Citrus aurantifolia*	Jammu	62
Papilio demoleus	Papilionidae	*Citrus aurantifolia*	Jammu	62
Papilio polytes	Papilionidae	*Citrus aurantifolia*	Jammu	62
Trichoplusia ni	Noctuidae	*Brassica nigra*	Udhampur	62

morphometric data, even within Lepidoptera the names of homologous features are different in different superfamilies. The necessity of standardizing names cannot be overstated. These studies will help in cytotaxonomy and suggests further lines of inquiry into possible ecological and genetic basis that could eventually permit synthesis of evolutionary processes among and within the species. Lepidoptera was the most dominant insect recorded with 46 species while studying insect diversity in Pinderi forests of Western Himalayas (Joshi *et al.*, 2008). 27 species belonging to 5 families and 15 genera were reported from ten localities of Distt. Bagh

of Azad Kashmir through out the year 1998 (Khan *et al.*, 2003).

REFERENCES

Joshi,P.C., Kumar, K. and Arya,M. (2008). Assessment of insect diversity along an altitudinal gradient in Pinderi forests of Western Himalaya, India. *J. Asia-Pacific Ento.*, **11**: 5-11.

Khan, M.R., Ahmed, R., Khan, M.R., Hayat, A. and Khalid, M.(2003). Diversity of Butterflies from District Bagh, Azad Kashmir. *Pakistan J. Biological Sci.*, **6** (24): 2007-2009.

Rishi, S., Sahni, G. and Rishi, K.K. (1997). Female heterogamety and localized centromeres in Papilio demoleus Lin. (Lepidoptera : Papilionidae). *Chr. Sci.*, **1** : 109-113.