

MELANAGROMYZA OBTUSA — A SUITABLE SYSTEM FOR THE STUDY OF POLYTENE CHROMOSOMES

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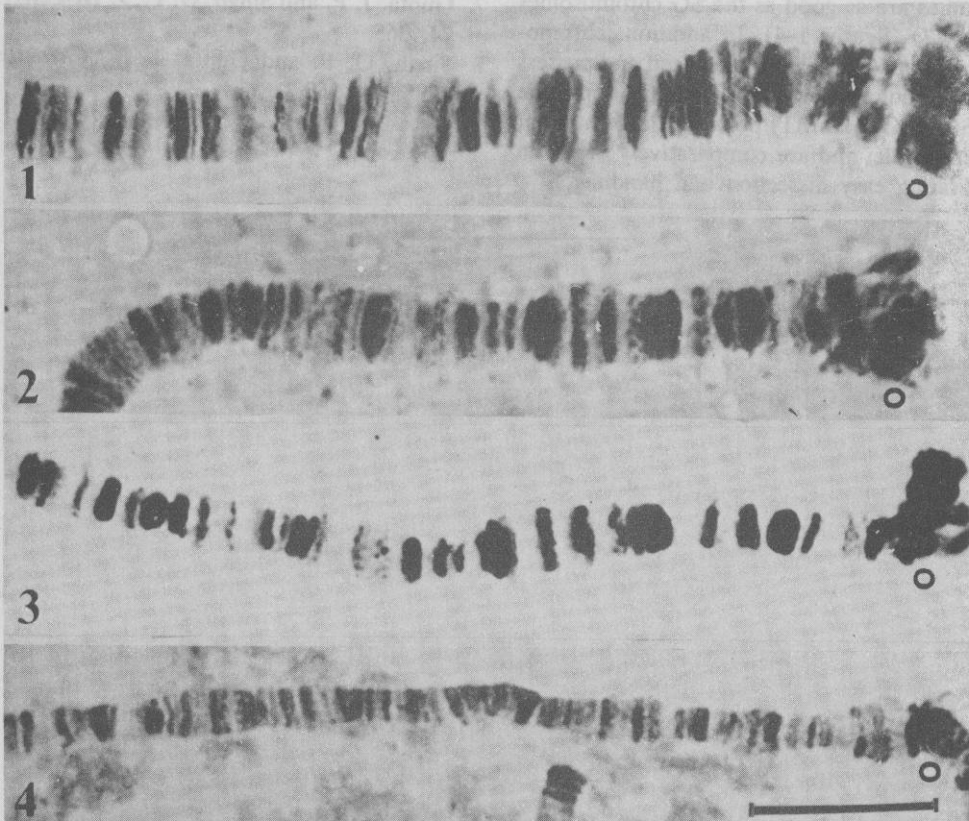
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POLYTENE chromosomes (PC) have been reported in many families of Diptera both in larval tissues, destined for histolysis at metamorphosis (e.g. salivary gland, midgut, rectum, fat body and muscle cells) and in larval tissues, that persist intact into the imago (e.g. Malpighian tubules and brain)¹. Further, it has been realized that the polytene chromosomes, though they occur in several larval tissues, they attain their largest size in salivary gland (SG) cells in most of the dipterans. Because of their large

size and ease of preparation the SG chromosomes have been the major objects of several cytogenetical studies. However, due to the presence of less polytenized nuclei in larval tissues other than SG, the PC are thin, sticky and difficult to prepare and reproduce. As a result, very little is known about comparative accounts of PC of different tissues.

Since long, several systems (such as *Drosophila*, *Chironomus*, *Rhynchosciara*, mosquito etc) have been tried and studied²⁻⁴ to some extent but the information gained so far is fragmentary and inconsistent.

Recently, we have come across *Melanagromyza obtusa*, a dipteran species of the family Agromyzidae. *M. obtusa* is a serious pest on an important pulse crop (*Cajanus cajan*. Pigeonpea), in the Oriental region, particularly in India, Java and Malaya, and causes substantial damage to both pods and grains⁵. While studying its genetic constitution⁶⁻⁸ it was



Figures 1-4. Photomicrographs of a section of polytene chromosomes from 1. Salivary gland; 2. Midgut; 3. Malpighian tubule cells of *Melanagromyza obtusa*; 4. Salivary gland of *Drosophila malerkotliana* (all at the same magnification). Circles at the right represent the centromeric positions of the Chromosomes. Bar represents 10 μ .

noticed that in addition to SG some other larval tissues such as midgut (MG) and malpighian tubules (MT) also possess adequately large and well-reproducible PC.

The mitotic karyotype of this species comprises five pairs of rod-shaped chromosomes (Acrocentric) and one pair of dot-like chromosomes. The *X* and *Y* chromosomes represent one of the five pairs of rods, the *Y* being heterochromatic and deeply stained⁶.

The polytene nuclei consist of five long euchromatic arms and a very short strand. Similar to Chironomid and other Agromyzid species, *M. obtusa* also do not possess a clear common chromocentre. In the absence of a common chromocentre all chromosome elements lie freely within the nucleus⁶.

The most striking feature noticed in this species is the occurrence of considerably large PC not only in SG but also in MG and MT. The MG and MT chromosomes are as good as the SG chromosomes of *Drosophila* (figures 1-4). In addition, chromosomes are compact and moderate-sized and possess distinct morphology for quick identification. The tissues (SG, MG, and MT) possess a large number of polytene nuclei and are comparatively bigger in size facilitating easy dissection and handling.

With these unique properties, *M. obtusa* is found to be a suitable material for a detailed comparative study of band-interband and puffing patterns in different tissues as well as at different stages of development. Further, it would be good material for the study of gene response against different experimental treatment in tissues having different physiological requirements.

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