

## A Photographic Map of *Drosophila hydei* Polytene Chromosomes

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**Abstract.** A photographic map of polytene chromosomes of *Drosophila hydei* has been constructed after applying microdissection techniques.

### Introduction

Cloning of DNA fragments from the *Drosophila* genome and the intensive study of the function of these fragments raise the problem to locate their chromosomal derivation on cytological map of polytene chromosomes. Drawn maps of polytene chromosomes, such as Bridges's map for *Drosophila melanogaster* (Bridges, 1935) and Berendes's map for *Drosophila hydei* (Berendes, 1963) provide the most precise localization data. However, even experienced scientists have had difficulties to compare details of the chromosomes as they are seen under the microscope with those in drawn maps. Therefore, photographic maps of polytene chromosomes from salivary glands (Lefevre, 1976), and fat body (Richards, 1980) were recently published. These photographic maps may serve as interpreters between drawn maps and real chromosomes. – A photographic map of salivary gland polytene chromosomes from *Drosophila hydei* was constructed by us, using the micromanipulation technique of Ananiev and Barsky (1978).

### Material and Methods

A wild type stock of *Drosophila hydei* (Tübingen) was kindly supplied by Dr. Hennig. Polytene chromosomes were isolated from salivary glands of third instar larvae in 60% acetic acid using a micromanipulation technique published earlier (Ananiev and Barsky, 1978). The stretched chromosomes were air dried and stained with 2% aceto-orcein in 40% acetic acid for 2 h. Then the preparations were rinsed in glacial acetic acid, air dried and mounted. The chromosomes were photographed using an Orthoplan microscope (Leitz) with the 100×1.32 Pl apo objective. Each chromosome in the map was constructed from fragments of different chromosomes from different larvae.

Temporary preparations of polytene chromosomes were obtained using ordinary squashing technique. The preparates were photographed using a phase contrast Orthoplan microscope with an objective  $40 \times 0.75$  Phaco.

## Results and Discussion

One of the most characteristic features of *Drosophila hydei* chromosomes is terminal attachment of certain telomeric regions as has already been noted by Berendes (1963). The contact is so tight that the chromosomes may form an unbroken ribbon in some nuclei and it is difficult to identify their ends. There are different combinations of telomere-associations in different nuclei though the third chromosome is more often separated from the others. At the same time there are many ectopic pairing threads connecting intrachromosomal regions of this chromosome and thus hampering the chromosome stretching in the course of micromanipulation. Two photographs with higher magnification show the telomeric (Fig. 1) and centromeric regions (Fig. 2) of the chromosomes. Some additional features of the chromosomes which may help their identification are: the weak staining of the X-chromosome in males as expected from the hemizygous state (cf. Mukherjee and Beermann, 1965); a large puff situated not far from the centromeric region of the 4th chromosome (section 76) and weak points in the sections 11 and 16 of the X-chromosome, sections 24, 30 and 38 of the second chromosome, sections 54, 57, 66 and 68 – of the third chromosome, sections 73, 79 and 85 of the fourth chromosome and sections 102, 113 and 121 of the fifth chromosome.

The polytene chromosomes were stretched up to 100 mm (Fig 3). Such stretching provides the separation of the majority of the bands (Ananiev and Barsky, 1978). The numbering of bands in the whole genome and in its regions is rather arbitrary as has been noted by many authors. Estimates of the band number in the permanent preparations of stretched chromosomes showed that we could definitely count about 75% of bands presented in Berendes' map (Berendes, 1963) in each chromosome. The difference may be due to the fact that Berendes drew the map on the basis of the analysis of many chromosomes while a photograph represents only one typical chromosome in which some bands may not be seen due to the puffing or some other reasons.

The photographic maps of *D. hydei* chromosomes were subdivided into sections according to Berendes' map. We have met some difficulties in identification of sections in the middle parts of chromosomes 2, 3, 4 and 5 and in the telomeric region of chromosome 3. Some of these regions were almost untranslatable, and we subdivided these regions rather at will, according to prominent landmarks. Distinct regions of chromosomes obtained from different nuclei can, however, be easily identified by comparing them with the photographic map of stretched chromosomes.



Fig. 1. Centromeric parts of polytene chromosomes of *D. hydei*

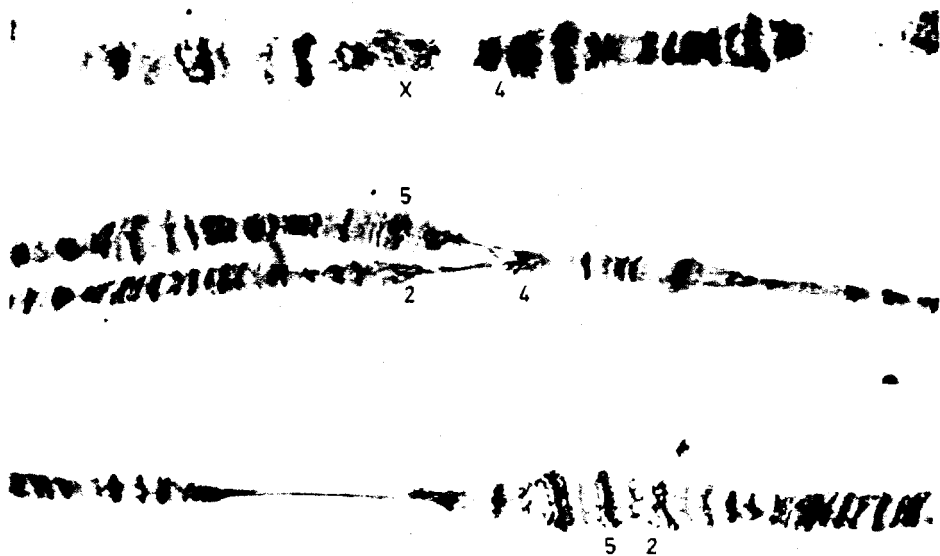


Fig. 2. Telomeric parts of polytene chromosomes of *D. hydei*

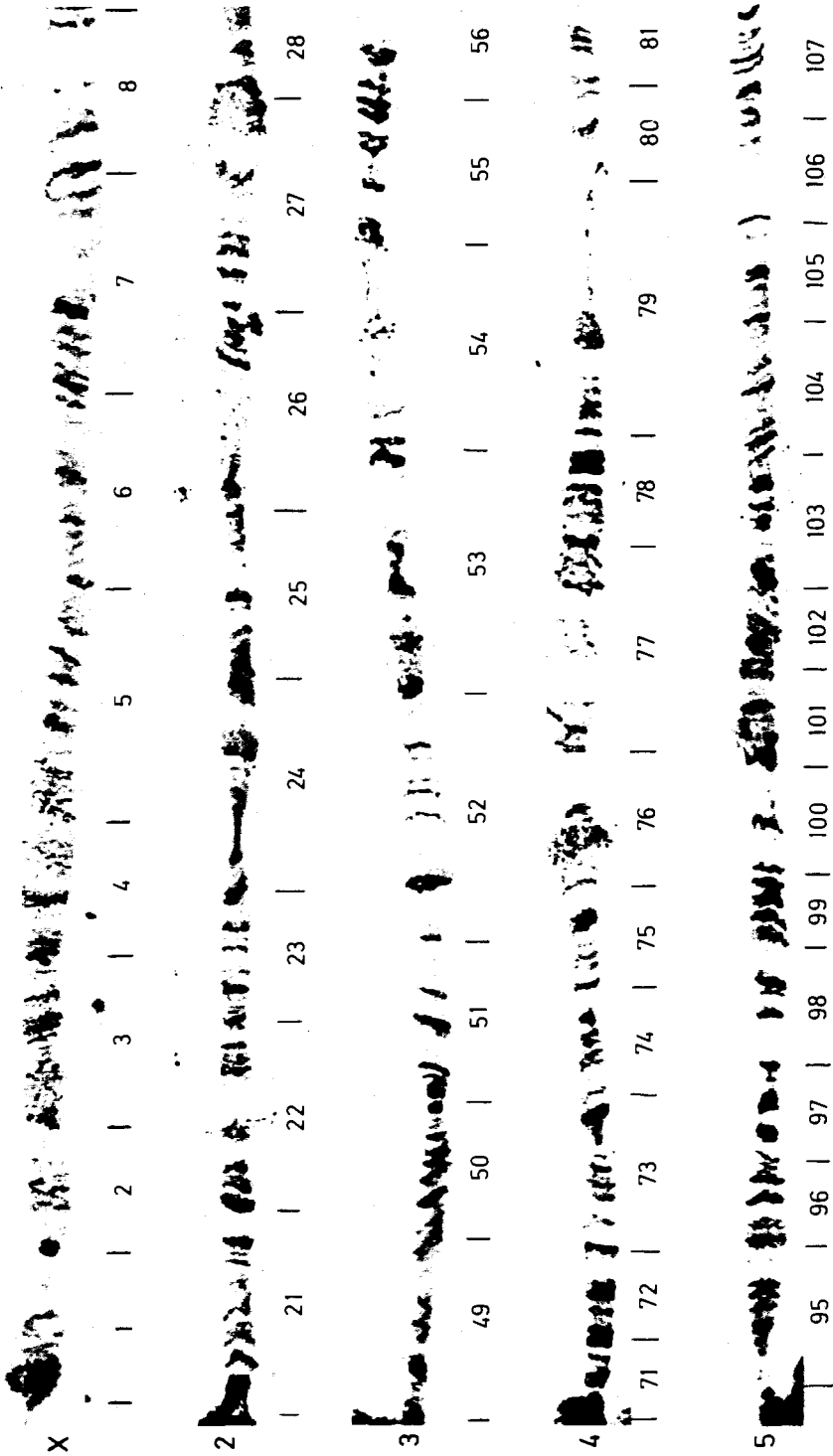
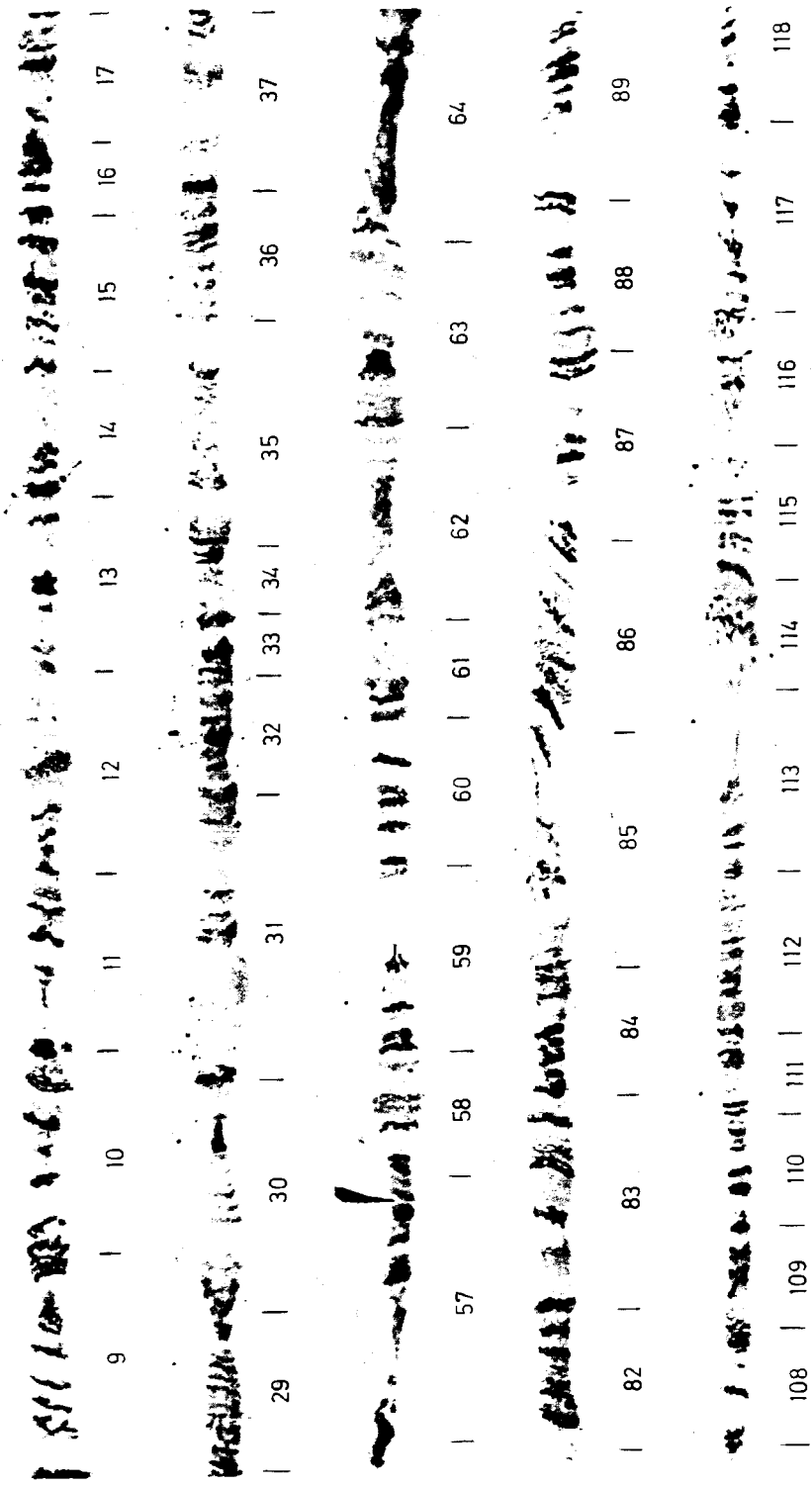


Fig. 3. Photographic map of polytene chromosomes of *Drosophila hydei*



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