

Fruit flies of economic importance: Karyotype studies on some *Bactrocera* spp.

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Fruit Flies

The true fruit flies (family Tephritidae) comprise over 4,000 species distributed over most of the world, and include several of the greatest potential threats to agriculture. Genus *Bactrocera* is known to be a major tropical fruit pest causing heavy losses in fruit and vegetable cultivation. Forty-three species have been described under the genus *Bactrocera* from Asia, Africa, and Australia.

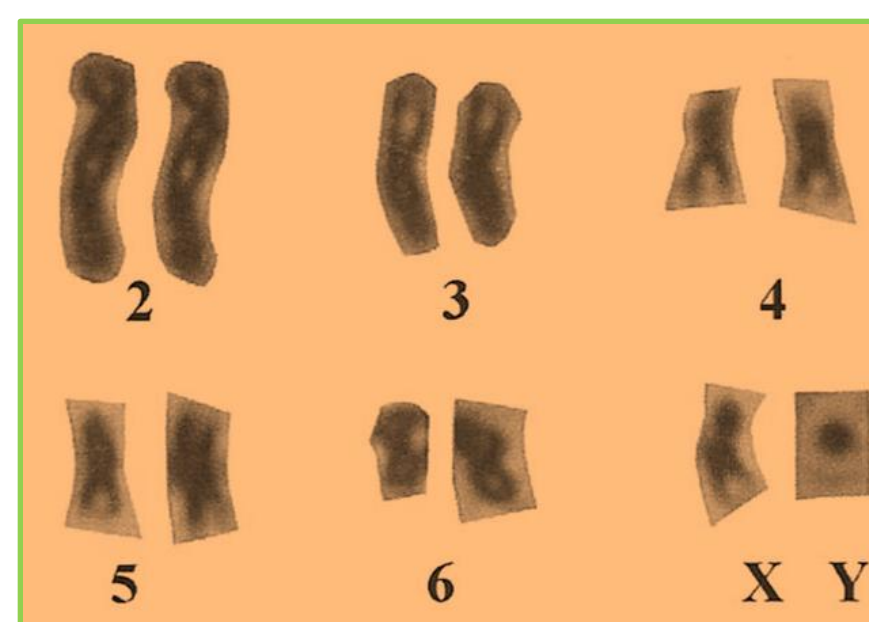
The melon fly, *Bactrocera cucurbitae* (Coquillett) is a major threat to cucurbits. It damages over 81 plant species.

Bactrocera dorsalis (Hendel), or oriental fruit fly (OFF) is one of the most destructive agricultural fruit fly pests in the Asia-Pacific areas. It is a polyphagous species attacking more than 170 types of fruits and vegetables among which are many of significant economic importance.

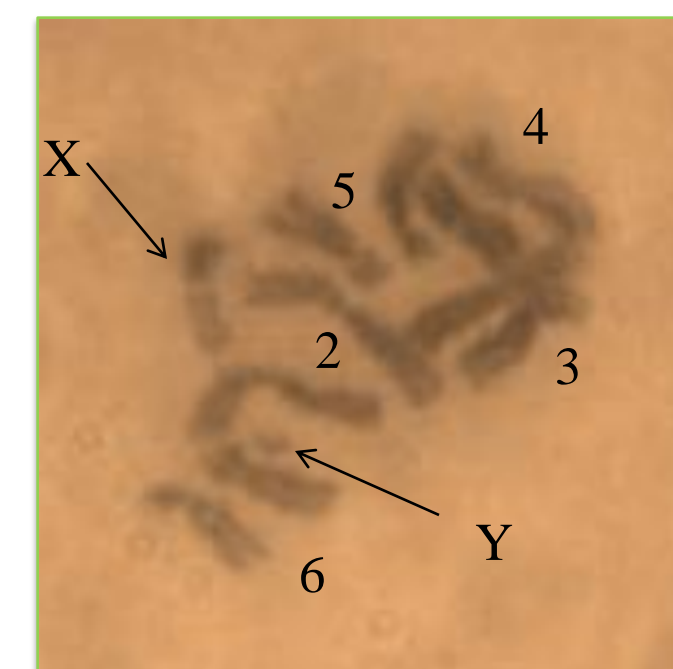
The papaya fruit fly *Bactrocera papayae* Drew & Hancock has been recorded from 193 host plant species in 114 genera and 50 families.

The carambola fruit fly *Bactrocera carambolae* Drew & Hancock has been recorded on more than 151 kinds of fruits and vegetables in Asia.

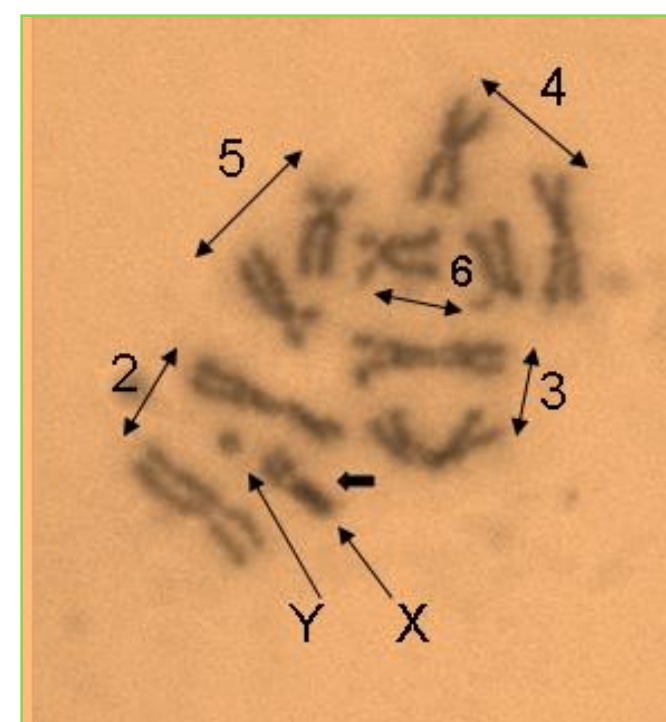
Because of their widespread agricultural impact and rapid range expansions, these fruit flies are the subject of quarantine and control efforts worldwide.



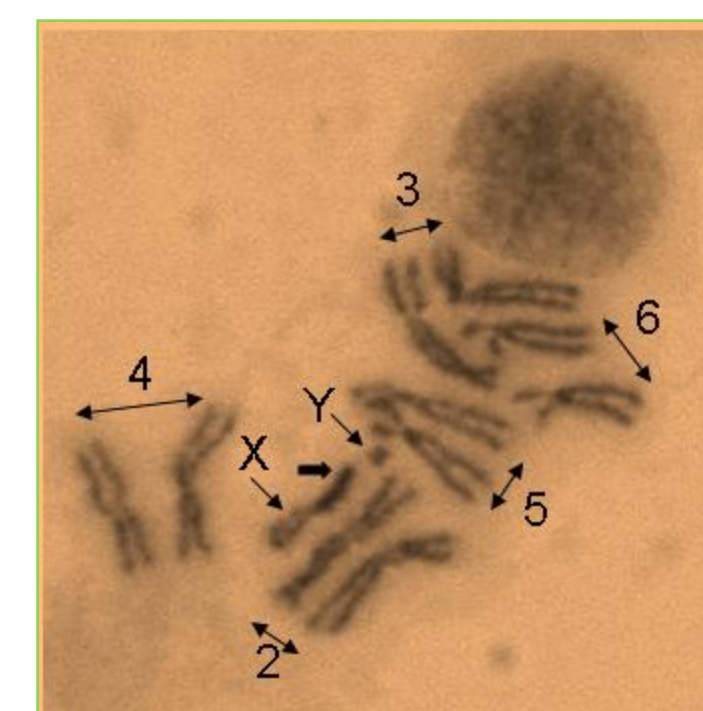
Bactrocera cucurbitae



Bactrocera dorsalis



Bactrocera papayae



Bactrocera carambolae

Aims: 1. Karyotype studies in *Bactrocera* spp.
2. Comparative studies among the tephritids
3. To develop novel control methods.

Methods: The mitotic chromosome preparations were made following the method described by Zacharopoulou (1987) and Zacharopoulou et al. 2011.

RESULTS

***Bactrocera cucurbitae*:** The mitotic metaphase karyotype of *Bactrocera cucurbitae* consists of six pairs of somatically paired chromosomes, including an XX/XY sex chromosome pair. All five autosomes are more or less submetacentric. Autosomes 4, 5, and 6 appear to be smaller and nearly equal in length, while autosomes 2 and 3 are larger and show little differences in their size. The sex chromosomes are consisting of a dot-like Y chromosome and a small submetacentric X chromosome.

***Bactrocera dorsalis* (Hendel):** The two longest (2,3) and the two shorter (5,6) autosomes are submetacentric while chromosome 4 is metacentric. The sex chromosomes (pair 1) are the smallest of the set. The X is long while the Y is dot-like.

***Bactrocera papayae* and *Bactrocera carambolae*:** Both species have six pairs of mitotic chromosomes including one pair sex chromosome. The largest two pairs of chromosomes, 2 and 3 are sub metacentric, while chromosome 4 is metacentric. These three pairs are easily identified by their chromosome length and arm ratio. The two smallest pairs are acrocentric and similar in size and centromere position. The sex chromosomes are the smallest of the set. The X chromosome is metacentric and long while the Y is a dot-like chromosome and totally heterochromatic.

Conclusion: 1. Characteristic features of metaphase chromosomes of four economically important fruit fly pests are described.
2. Chromosomal studies in the four species of *Bactrocera* would benefit the biological control system and also contribute to the evolutionary studies of dipteran species
3.. The information will be helpful for the development of SIT (sterile insect technique) strategies.

Research supported by



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