

**A Cytogenetic Study on the *Gambusia affinis* Population
from India**

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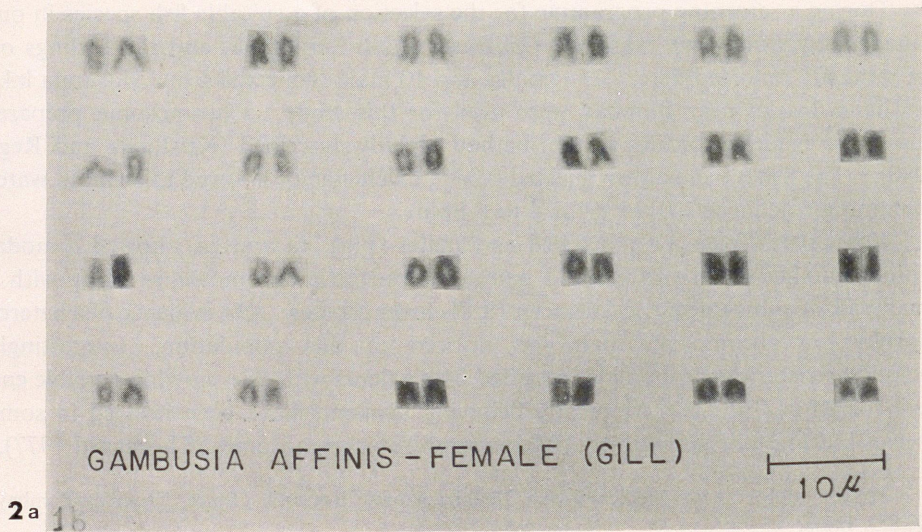
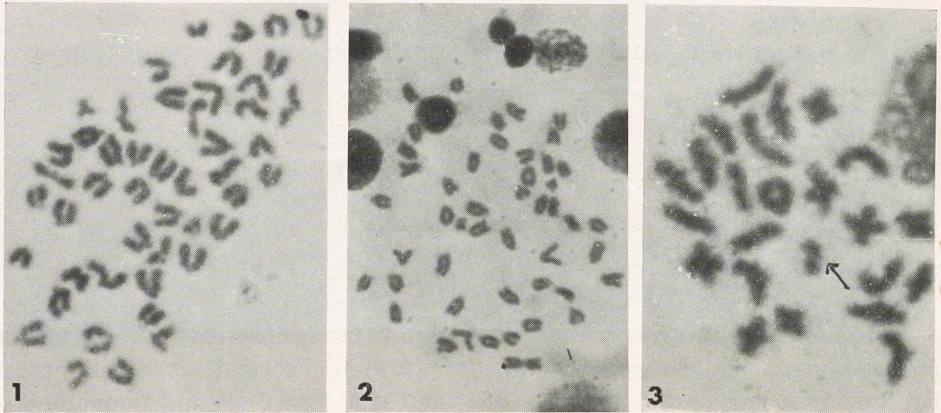
Gambusia affinis popularly known as mosquito fish is not native to India but an introduced one. Archival records of the introduction of these fishes in India reveal that these were introduced in India in 1914 and 1930 from Italy and Siam and distributed all over the country by Malaria Survey of India (personal communication).

Cytogenetic investigations have already been carried out in certain populations of *Gambusia affinis* from different parts of the world. Thus Chen and Ebeling (1968) had reported a WZ-ZZ sex determining mechanism with a $2n=48$ in *Gambusia affinis* specimens from California and Texas. However, Cataudella and Sola (1977) had reported absence of such heteromorphic chromosomes in *G. affinis* population from Italy. A recent publication by Black and Howell (1979) clearly established that the presence of heteromorphic sex chromosomes in *G. affinis* is dependent upon the subspecies examined. These authors discovered that the *Gambusia affinis* population exhibiting female heterogamety was actually *Gambusia affinis affinis* ($2n=48$) and *Gambusia affinis holbrooki* ($2n=48$) does not contain heteromorphic sex chromosomes on either sex. An earlier study on *Gambusia affinis* population from India by Sharma *et al.* (1960), however, does not confirm to any of these reports. These authors had reported $2n=46$ in *G. affinis* population from India. Hence it was felt necessary to reinvestigate in more detail the *G. affinis* population from India.

During a screening programme for the selection of a suitable fish species in our mutagenicity studies we examined *Gambusia affinis* karyotypes and the findings on the same are reported here. 15 females and 10 males collected from Masunda lake in Thane district near Bombay were used for this study. Chromosome preparations were made according to the method already described (Krishnaja and Rege 1980). The fishes were either injected 0.04% colchicine or allowed to swim in water containing colchicine 0.0125% for 4 to 6 hours.

Karyotypes from males as well as females (Figs. 1a and 2a) showed a modal diploid number of $2n=48$ with 23 pairs of acrocentric chromosomes along with a small pair of submetacentric (metacentric?) chromosomes. No evidence of a heteromorphic sex chromosome pair was noticed in this population. Interestingly meiotic preparations from males revealed 24 bivalents with one showing possible end to association (Fig. 3). Atypically behaving bivalents have been noticed in some species lacking morphologically differentiated sex chromosomes (Thorgaard 1977).

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The *Gambusia affinis* specimens studied by us were later on identified as *G. affinis holbrooki* by British Museum London (personal communication). Our studies clearly reveal the absence of female heterogamety in *G. affinis holbrooki* with a $2n=48$ as reported earlier (Cataudella and Sola 1977, Black and Howell 1979), and is in conformity with the fact that *G. affinis holbrooki* was the species introduced in India for distribution in antimalarial work (personal communication).

Acknowledgements

We are thankful to Mr. James Chambers, British Museum (Natural History), London, for kindly identifying the *G. affinis* specimens and to Dr. A. K. Dutta of Zoological Survey of India, Calcutta for providing information about the introduction of *G. affinis* in India.

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Figs. 1-3. 1-1a, metaphase spread ($2n=48$) and its karyotype from a male *Gambusia affinis holbrooki* tissue-gill. 2-2b, metaphase spread ($2n=48$) and its karyotype from a female *Gambusia affinis holbrooki* tissue-gill. 3, metaphase I from testis of *Gambusia affinis holbrooki* showing the 24 bivalents (arrow indicates end to end association).

