Mahasagar-Bulletin of the National Institute of Oceanography, 18(1), 1985, 75–77.

# CHROMOSOMAL STUDIES IN *PENAEUS AZTECUS* IVES PRAWN LARVAE

USHA GOSWAMI
*National Institute of Oceanography, Dona Paula, Goa - 403 004, India.*

ABSTRACT

Larvae of prawn *Penaeus aztecus* showed a diploid number of 88 chromosomes. The karyotype formula is 18 sM + 18 M + 52 A. The chromosomes have a size range of 0.30 to 3.12 μm

**Key-words :** Karyology, *Penaeus aztecus*.

Earlier, Niiyama (1948), Malecha (1976) and Milligan (1976) described chromosome number in some species of commercially important prawns. The present paper gives an account of karyotypic details studied in the *Penaeus aztecus* IVES prawn larvae, reared at National Marine Fisheries Station (NMFS) Galveston, Texas and supplied to the author by courtesy of scientists in the station.

The prawn larvae were collected from the rearing tanks at NMFS, Galveston, Texas, U.S.A. and fixed in a mixture of absolute alcohol and glacial acetic acid (3:1) for 20–30 minutes and then were preserved in 70% alcohol. The squash preparations were made after staining the larvae in Gomori's haematoxylin. Karyotypic details were studied under 16 x oil immersion objective. Nomenclature of Kirpichnikov (1981) was followed for identification of the different chromosome types.

The larval somatic cells showed 88 chromosomes, in the size range of 0.35 — 3.12 μm (Table I). The chromosomes are divided into 3 major size groups. Group I (Pair 1–10) has the size range of 1.25 — 3.12 μm; Group II (11 to No. 18) has the size range of 0.55 — 1.05 μ m and the last Group III includes all the remaining pairs with size range of 0.35 to 0.55 μm.

The karyotype formula comprise 18 submetacentric, 18 metacentric and 52 acrocentric chromosomes (Fig. 1). The homologous pair No. 1–4, 7–8, 10–11 and 16 are submetacentric. Pair No. 1, 7 and 8 have the usual J-shape whereas pair No. 3, 4 and 10 have peculiar pot and polyp-like shapes. Chromosomes of pair No. 7 showed a differential staining behaviour, one homologue being lightly stained than the other. Chromosomes of Pair No. 1 and 5 show satellites. The metacentric chromosomes were cross shaped (Pair No. 9, 10, 12, 14 & 17) V-shaped (No. 13) and dumb bell shaped (Nos. 6, 21 & 28) The remaining all were small acrocentric conical rods or dots like.

The studies confirmed the diploid number to be 88 in the prawn larvae of *Penaeus aztecus* and the karyotype formula as 18 sM + 18 M + 52 A. The homologous pair No. 7 showed some relationship with the sex-mechanism. It

**Table I.** Karyotypic details in *Penaeus aztecus* prawn larvae.

| Homologous pair No. | Length of arms (μm) L | S | Arm Ratio L/S | Average total length (μm) | *Chromosome type |
|---|---|---|---|---|---|
| Group I | | | | | |
| 1 | 2.22 | 0.90 | 2.46 | 3.12 | sM |
| 2 | 1.38 | 0.49 | 2.86 | 1.87 | sM |
| 3 | 1.04 | 0.48 | 2.14 | 1.52 | sM |
| 4 | 0.90 | 0.48 | 1.86 | 1.38 | sM |
| 5 | 0.69 | 0.69 | 1.0 | 1.38 | M |
| 6 | 0.69 | 0.69 | 1.0 | 1.38 | M |
| 7 | 0.97 | 0.41 | 2.33 | 1.38 | sM |
| 8 | 0.83 | 0.41 | 1.99 | 1.25 | sM |
| 9 | 0.83 | 0.41 | 1.99 | 1.25 | sM |
| 10 | 0.83 | 0.48 | 1.71 | 1.31 | sM |
| Group II | | | | | |
| 11 | 0.69 | 0.35 | 2.0 | 1.04 | sM |
| 12 | 0.49 | 0.48 | 1.0 | 0.97 | M |
| 13 | 0.49 | 0.48 | 1.0 | 0.97 | M |
| 14 | 0.35 | 0.34 | 1.0 | 0.69 | M |
| 15 | 0.55 | — | — | 0.55 | A |
| 16 | 0.28 | 0.27 | 1.0 | 0.55 | M |
| 17 | 0.28 | 0.27 | 1.0 | 0.55 | M |
| 18 | 0.55 | — | — | 0.55 | A |
| Group III | | | | | |
| 19 | 0.42 | — | — | 0.42 | A |
| 20 | 0.42 | — | — | 0.42 | A |
| 21 | 0.21 | 0.20 | 1.0 | 0.41 | M |
| 22 to 27 | 0.42 | — | — | 0.42 | A |
| 28 | 0.21 | 0.20 | 1.0 | 0.41 | M |
| 29 to 44 | 0.35 | — | — | 0.35 | A |

* sM = submetacentric M = metacentric A = acrocentric

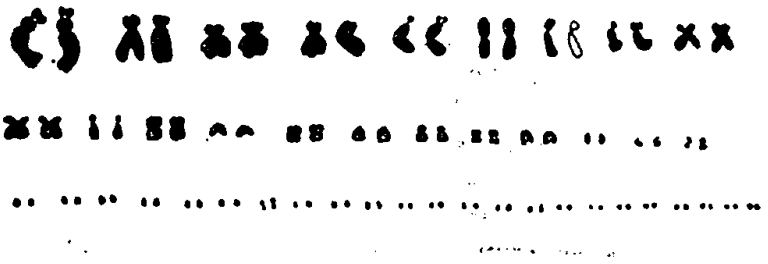

Fig. 1. Karyogram of *Panaeus aztecus* prawn larvae (Pair no. 1 – 44).

is inferred that the chromosomal pairs, No. 1 & 5 with regular occurrence of the satellites and 3, 4 & 10 with peculiar shapes can be used as marker chromosomes in identifying the larvae of *P. aztecus* and the hybrids.

ACKNOWLEDGEMENTS

The author is grateful to Dr. V.V.R. Varadachari, Director, NIO, Goa for the laboratory facilities and to Dr. T.S.S. Rao, Head, BOD for encouragement. Thanks are due to the scientists of NMFS Texas for providing the material, to Dr. Jim Lester of Houston University at Clear Lake City, Texas, for help and to Dr. A.H. Parulekar, NIO, Goa for suggestions.

REFERENCES

Kirpichnikov, V.S. 1981. Genetic bases of fish selection. Springer-Verlag, Berlin Heidelberg, New York 401 pp.

Malecha, R.S. 1976. Genetics and selective breeding. In: Shrimp and prawn farming in the western hemisphere *Dowden, Hutchinson* & Ross. WC, Pennsylvania.

Milligan, D.J. 1976. A method for obtaining metaphase chromosome spreads from marine shrimp with notes on the karyotypes of *Penaeus aztecus, Penaeus setiferus,* and *Penaeus duorarum.* Proceedings VII World Mariculture Society, San Diego, California 1976. 327–332.

Niiyama, H. 1948. Cytogenetics, Oguma Conference. In: Biology Data Book (2nd ed.) Vol. I. Federation of American Societies for Experimental Biology. Bethesda, Maryland, p. 5.