

15-day treatment individual chromosomal aberrations were highly significant.

Translocations were observed only in few of the drug-treated groups at frequencies which were insignificant and no translocations were observed in control animals. In control animals, total anomalies increased from 10.35% to 13.11% from 7 to 30 days. The anomalies exhibited in control animals were not due to the inoculation of drug but were thought to be spontaneous in origin<sup>4-6</sup>. The increase in the anomalies from 7 to 30 days could be attributed to the ageing of the animals<sup>6</sup>.

The mechanism of production of the above anomalies is thought to be due to irregular cell divisions, nuclear fusion, disturbance in mitotic spindle formation, selective or complete endo reduplication, lysis of certain chromosomes, asynapsis, desynapsis, structural rearrangements and deletions<sup>7, 8</sup>. It is not understood as to how brufen induces chromosome anomalies.

Analyses of the data showed that an increase in the concentration of the drug and duration of the treatment enhanced the incidence of chromosome aberrations. Thus it may be concluded that administration of brufen induced chromosome anomalies in spermatocytes of mice at higher doses.

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1. Evans, E. P., Brecken, G. and Ford, C. E., *Cytogenetics*, 1964, 3, 289.
2. Shobha Devi, P. and Polasa, H. *Mut. Res.*, 1986 (in press).
3. Shobha Devi, P. and Polasa, H., *Curr. Sci.*, 1986 (in press).
4. Sharma, G. and Polasa, H., *Hum. Genet.*, 1978, 45, 179.
5. Thadani, M. and Polasa, H., *Hum. Genet.*, 1979, 49, 97.
6. Stevenson, K. J. and Curtis, M. J., *Radiation Res.*, 1961, 15, 174.
7. Lin, C. C., Tsuchida, W. S. and Morris, S. A., *Can. J. Genet. Cytol.*, 1971, 13, 95.
8. Bortsch, M. D., *Chemical mutagenesis in man and mammals* (eds.) F. Vogel and Rohrborn, Springer Verlag, New York, 1970, p. 420.

## PSEUDO-NEOPLASTIC CONDITION "HAMARTOMA" IN *SYNODUS INDICUS*

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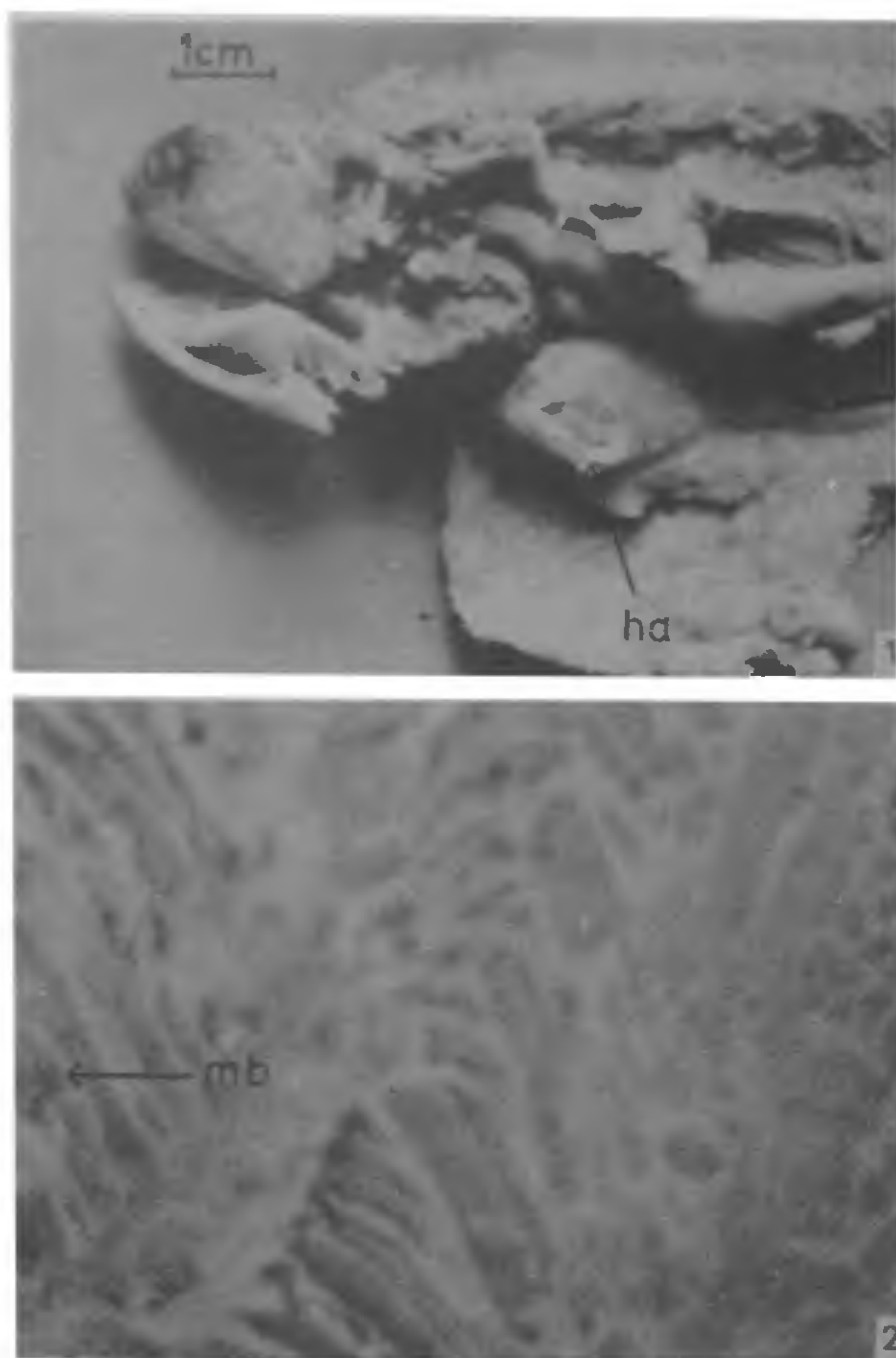
A PSEUDONEOPLASTIC condition known as "hamartoma" was reported for the first time in the lizard fish *Synodus indicus* (Class: Osteichthys; Order: Myctophiformes; Family: Synodontidae) from Indian waters.

During our investigation on the diseases of fishes of Porto Novo coast, 1653 fish belonging to 35 different species were autopsied for disease diagnosis. Incidentally, a peculiar disease manifestation was observed only in one out of 132 fish examined which belonged to the species *Synodus indicus*. The fish was caught from the nearshore waters of the Bay of Bengal at Porto Novo (Lat. 11°29'N; Long. 79°46'E) during March 1983. Apparently, the fish appeared healthy without any external sign of the disease, but when autopsied, a prominent pathological condition was observed. Gross pathological examination showed an abnormal growth of flattened tongue-shaped (approximately 1 cm × 2 cm) growth attached to the inside of the ventral body wall just posterior to the gill arch (figure 1).

The lesion was dissected and fixed in 10% neutral formalin embedded in paraffin wax, sectioned at 7 μ thickness and stained with haematoxylin and eosin. Histopathological examination was made by Dr John C. Harshbarger, Director, Registry of Tumour in Lower animals (RTL), U.S.A., who diagnosed it as "hamartoma" and the material was evaluated and accessioned as RTLA 3299 of National Museum of Natural History, U.S.A.

According to the 26th edition of Dorland's as well as Stedman's (24th edition) medical dictionaries, the diagnostic term "hamartoma" means a benign tumour-like nodule composed of an outgrowth of mature cells and tissues that normally occur in the affected part, but often with one element predominating and are not likely to result in compression of adjacent tissue (in contrast to neoplastic tissue). Pathological examination of the lesion in *Synodus indicus* revealed that the lesion consisted of skeletal muscles oriented as rows of muscle bundles separated by connective tissue fasciae. The muscle fibres were striated and appeared normal. In most places, the muscle bundles had an orderly appearance (figure 2).





**Figures 1–2.** 1. *Synodus indicus* with pseudoneoplastic disease hamartoma. 2. Section through hamartoma; H + E  $\times 280$ . ha = hamartoma. mb = muscle bundles

The lesion was not a neoplasm but appeared to be a normal tissue in an abnormal place as in a developmental anomaly. The tissues represent only one germ layer, the mesoderm (figure 2). Very little information is known about the non-neoplastic condition in marine fish<sup>1</sup>. This is mainly due to difficulties in the correct identification of the origin and type of cells, distinguishing the reactive lesions from neoplasms; differentiation of border line condition such as hyperplasia or developmental anomalies from neoplasia and also lack of known morphological or biochemical characteristics that is pathognomonic for neoplasia<sup>1</sup>.

Though pseudoneoplastic condition was reported from 21 species of fish of the orders: Pleuronectiformes and Perciformes, two species of the order Gadiformes<sup>1</sup> and in *Lebistes*<sup>2</sup> the lesion, similar to the one reported in *Synodus indicus* were not reported earlier. Perusal of

the literature on the diseases of fishes give credence to the fact that the 'hamartoma' in *Synodus indicus* is a new record from Indian waters. The cause of the development of "hamartoma" is yet to be established.

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1. Hisaoka, K. K., *J. Morphol.*, 1961, **109**, 93.
2. Harshbarger, J. C., *Natl. Cancer. Inst. Monogr.*, 1984, **65**, 251.

## RECORDS ON *ACAULOSPORA* SPP FROM INDIA

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Little is known about the taxonomy of Indian Endogonaceae. Various species belonging to the genera *Sclerocystis*, *Gigaspora* and *Glomus* have been described<sup>1–9</sup>. Taxonomical studies on *Acaulospora* are lacking from India<sup>10</sup>. During investigations on mycorrhizal associations of the tree species in a sub-tropical evergreen montane forest of North-East India, two species of *Acaulospora* namely, *A. laevis* and *A. scrobiculata* described earlier<sup>11, 12</sup> were collected from the rhizospheric soil of the tree species namely, *Machilus kingii* and *Alnus nepalensis* during the later part of the rainy season in 1984. The roots of the tree species were heavily mycorrhizal. The spores of these species are maintained in microbial ecology laboratory of North-Eastern Hill University, Shillong.

Endogonaceous spores were isolated from the soil by wet sieving and decanting technique of Gerdemann and Nicolson<sup>13</sup>. The species of *Acaulospora* were identified using the keys of Walker and Trappe<sup>14</sup>.

*Acaulospora laevis* Gerdemann and Trappe.

Sporocarp unknown, spores forming singly, sessile, borne laterally on a wide thin-walled hyphae 20  $\mu$ m in diam that terminate nearby in a globose vesicle of the size of spore, shrunken at spore maturity, spores smooth, 300–400  $\mu$ m, globose or sub-globose, dull