

the seedlings develop a tumorous malformation instead of leaves, *i.e.*, the same agents that induce polyploidy induce also tumorous growth, when applied in relatively large doses. It should be mentioned that tetraploid shoots are rarely formed from the regions affected by plant galls, the cytology and histology of which is very similar to those of the tissues treated by large doses of colchicine and acenaphthene. The investigators should have in mind these circumstances when experimenting with these agents. My experiments show that washing off (exosmosis) of the agents after a certain period of treatment leads to a better recovery from the treatment.

In connection with this study, it seems to us worth-while to suggest a method that might lead to a successful attack of the problem of fighting some infectious diseases. A number of infectious diseases are prevented by previous immunization of the organisms with attenuated (less virulent) strains. If colchicine and acenaphthene induce changes in the cells of the micro-organisms (our preliminary observations on yeast cells

indicate that this seems to be so) including bacteria, from which larger, less viable and less virulent strains for immunization can be obtained, parallel to that observed in the higher plants, the fighting of a series of infectious diseases can be considerably facilitated.

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Recent Researches on *Trochus*.

By N. Kesava Panikkar.

(Department of Zoology, Madras Christian College, Tambaram.)

Trochus niloticus has been commercially exploited for over a decade and a regular *Trochus* fishery was established in the Andamans in October 1929. In the initial season, the fishery yielded not less than 500 tons of shells within the first three months, but the yield, however, began to steadily decline and although the period of fishing has since then been doubled, the quantity of shells obtained at present has almost reached the low figure of 40 tons in one fishing season. The scarcity of full-sized specimens has also resulted in an indiscriminate fishing of shells of all sizes by both the licensed and unlicensed Japanese fishermen, so much so that, at the present day, the *Trochus* beds of the Andaman waters are getting rapidly depleted. Unless effective steps are taken by the Government to prevent overfishing, and to develop the fisheries on scientific lines, this important shell fisheries is threatened with almost complete extinction. The habits and habitats of this commercially

important shell fish have also remained practically unknown for a long time. The Government of India appointed a special officer in 1930 to carry out a scientific study of the fisheries, but before the person appointed could gather any appreciable data, the contract was terminated as a result of the retrenchment policy of the Government. The work, however, was continued under the auspices of the Zoological Survey of India, and the recent investigations of H. Sreenivasa Rao have brought in much valuable information on the bionomics of *Trochus*. In a paper on the habits and habitats of *Trochus niloticus*,¹ he reports that the two common types of shells observed both in the Andaman and Nicobar Islands do not represent two distinct species as was supposed by some authors, but only plastic phases of one and the same species *T. niloticus* Linn., possibly brought about by differences in the rate of growth at various ages. The animals live chiefly on bottom deposits and fresh

algal vegetation. A finding of considerable interest is that it is a continuous breeder in the Andaman waters, with an intensive spell of spawning during or immediately after the warm seasons. This is against the observations of Moorhouse² on the same species in the Great Barrier Reef, where a definite spawning season five months duration, commencing from March, has been noticed. Thus the species is an excellent example of a marine animal that exhibits different types of breeding in different localities. In a general discussion on the problem of breeding in tropical marine animals, Rao evaluates the environmental factors that influence breeding and says that the evidence in support of the view that the tropical marine animals breed continuously tends to gather weight. He adds: "It does not seem to be clear, however, what, under the uniform biological conditions of tropical seas, constitute the stimulus for inducing marine animals to spawn." A complete answer to this question is by no means possible in the present state of our knowledge, but it should be admitted that in addition to the factors like temperature, food, and latitude usually considered in connexion with the phenomena of breeding, the effect of monsoon is an important factor that has to be considered in the tropics, as evidenced by the finding of Malpas³ that spawning in the Pearl Oyster *Margaritifera vulgaris* is stimulated by salinity changes in the sea-water brought about by the monsoons.

Observations on the length of life of the species and a statistical study of the rate of growth of shells have also been conducted; and the results published⁴ indicate that while there is no slack season for growth

or a period of æstivation in *Trochus niloticus*, the rate of growth during the first two years of its life is particularly rapid, but is more slow and uniform thereafter. The age of *Trochus* in the Andamans is shown to exceed ten years, and the incidence of mortality due to disease or old age is indicated to be low.

The animals associated with *Trochus* shells in the Andamans have also formed the subject of a series of valuable papers; Prashad and Rao have described a new species of *Spiroglyphus* (Family Vermitidæ) and two new limpet-like Gastropods, *Saptadanta nasika* and *Patella tara*.⁵ Monod⁶ gives a full account of *Panaietes camerata* Stebb., a parasitic (or Commensal?) Copepod almost invariably found in the living state in the buccal cavity or œsophagus of *T. niloticus*; and finally, Winckworth⁷ records *Acanthochitona penetrans* found living in the holes made on the shells by species of the bivalve *Lithophaga*.

It is hoped that arrangements will be made by the Government of India to continue this interesting and valuable series of researches so well begun by Rao, and that with the present improved financial situation, the question of establishing an up-to-date research station at Andamans will be taken up without delay.

¹ *Rec. Ind. Mus.*, 1937, **39**, 47-82.

² *Sci. Rep. Great Barrier Reef Exped.*, 1932, **3**, 5, 145-55.

³ *Ceylon Journ. Sci., C. Fisheries*, 1933, **5**, 21-48.

⁴ Rao, *Rec. Ind. Mus.*, 1936, **38**, 473-99; Rao and Raja, *ibid.*, 500-3.

⁵ *Rec. Ind. Mus.*, 1933, **35**, 409-12; *ibid.*, 1934, **36**, 1-4.

⁶ *Ibid.*, 1934, **36**, 213-18.

⁷ *Proc. Mal. Soc., London*, 1933, **20**, 318-19.

National Collection of Type Cultures.

THERE are several centres of mycological and bacteriological research in India, each maintaining a substantial collection of type cultures. The time may not be propitious for the establishment of a Central Institute for housing national collection of type cultures on the lines of the Lister Institute, England, and the Central Bureau for Cultures in Holland.

With a view to take stock of the cultures already available in the country and make

it known to interested workers, the publication of a list of the cultures maintained by various institutes in the country, together with conditions of their sale or exchange is earnestly suggested. This work may be taken up either by the Agricultural Research Council or by another academic body—one of the Academies in India or by *Current Science*—with a grant from the Agricultural Research Council.

M. S.