Botanica Marina
Vol. XXI, pp. 67–69, 1978

SHORT COMMUNICATION

Seasonal Changes in Growth, Fruiting Cycle and Oospore Output in *Turbinaria conoides* (J. Agardh) Kützing

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(Received August 8, 1977)

Introduction

Detailed studies on the seasonal aspects of growth and reproduction were made on *Turbinaria conoides* (Umamaheswara Rao 1969), *T. ornata* (Umamaheswara Rao and Kalimuthu 1972) and *T. decurrens* (Kaliaperumal and Kalimuthu 1976). The present account deals with the seasonal changes in growth, fruiting cycle and oospore output in *T. conoides.*

Materials and Methods

This alga grows in the sublittoral zone in the Gulf of Mannar near Mandapam commonly on big rocks. Samples for the above study were collected every month from a rock in the Gulf of Mannar. Mean height of the plants and percentage of fruiting plants in the population were estimated as described in the case of *Turbinaria ornata* (Umamaheswara Rao and Kalimuthu 1972). For oospore output study, five to ten fruiting plants were selected from the samples every month and the total number of receptacles present on each plant were counted. From each plant, four mature receptacles with well developed oogonia were taken. They were placed in small petri dishes kept in finger bowls and the finger bowls were filled with sterile sea water. Oospores liberated and settled in petri dishes were counted every day for a period of 10 days using a binocular microscope. The sea water in the finger bowls was changed daily. All the experimental sets were kept near a light source of 14 watts daylight fluorescent lamp for 8 hours in the laboratory from 9 a.m. to 5 p.m. to provide illumination.

Results

Data collected on the mean height of the plants, percentage frequency of small plants (below 5 cm in height), branched plants and reproductive plants are plotted in Figure 1. The oospore output is given in Figure 2. The data collected on the standard deviation of the means and the maximum and minimum height of the plants in the monthly samples are also plotted in Figure 1 A.

Growth cycle

In *Turbinaria conoides* the growth cycle commenced in April. In this month all the plants were found to be young and their mean height was 1.2 cm. In July also 98% of the plants in the population were less than 5 cm in length. The abundance of these young plants in the monthly samples below 5 cm are plotted in Figure 1 B. Marked increase in growth was found from August onwards and most of the plants reached their maximum height of 12 to 19 cm during the period from October to December. The degenerating shoots of the old generation started disappearing in the month of February and completly disappeared in the month of March. Young shoots of the new generation also appeared on the rock in the month of March. The data collected on the percentage occurrence of branched plants in the monthly samples are shown in Fig. 1 C. The plants were found to be unbranched between March and August. Later the branches were observed from September and maximum number of branched plants occurred in November.

Fruiting cycle

Figure 1 C shows the changes in the abundance of fruiting plants in the population of *Turbinaria conoides* for the period from October 1974 to September 1975. Plants with reproductive structures "Receptacles" occurred for five months between October to February and maximum number of reproductive plants were noticed in the month of January 1975. From the above observation it is evident that the fruiting cycle of this alginophyte starts in the month of October and ends in

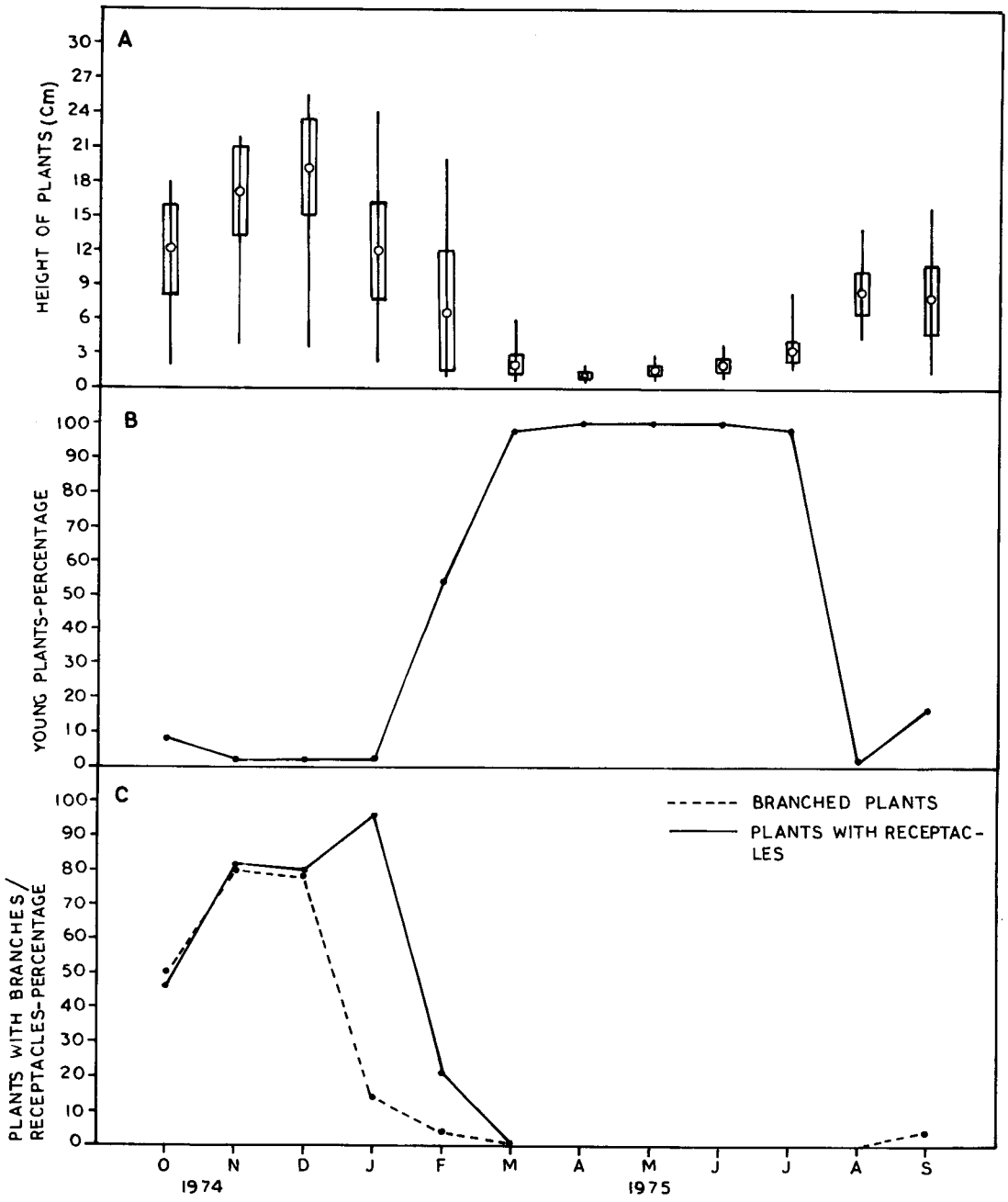

Fig. 1. Monthly changes in the mean height of the plants (A); Frequency of young plants (B); Frequency of plants with branches/ receptacles (C). The broad vertical lines in the growth curve (A) indicate the standard deviation of the mean values and the narrow lines the maximum and minimum range in the samples analysed.

the month of February. The growth and fruiting cycle in *T. conoides* observed during this one year period is found to be almost similar to that observed by Umamaheswara Rao (1969) for this species.

Oospore output

The data collected on oospore output in *T. conoides* from October 1974 to February 1975 are furnished in Table I. The total oospore output per plant was estimated for 7 days as healthy spores were observed for one week only (last column of Table I). Experiments on oospore output were started from October 1974 when good numbers of well developed fruiting plants were seen in the samples (Fig. 1C). The data on oospore output were collected only for five months. The mean value of 25 experiments conducted from October 1974 to February 1975 are plotted in Figure 2 to show the pattern of liberation of oospores continuously for a period of seven days.

The liberation of oospores was not periodic and the same was found in different stages of development on the receptacles. Maximum spore output was observed

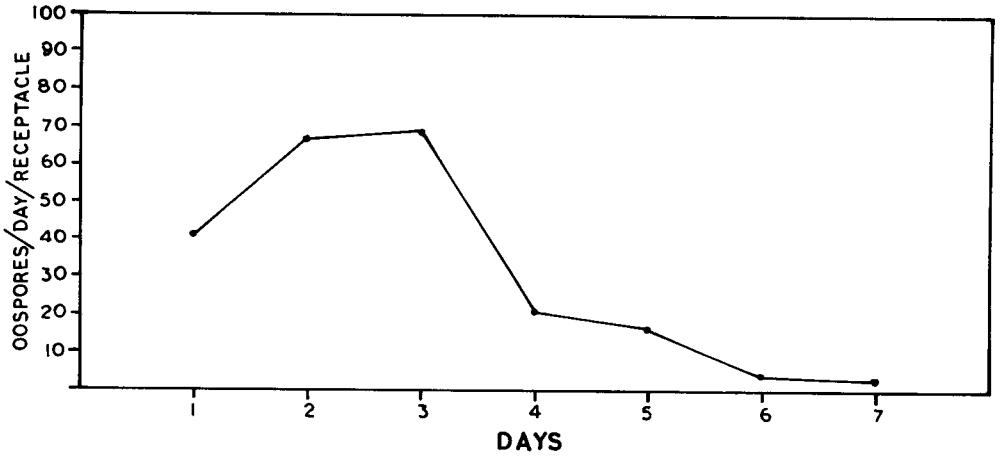

Fig. 2. Variations in the liberation of oospores from the receptacles

Tab. I. Oospore output in *Turbinaria conoides* during the period from October 1974 to February 1975

Month	Number of receptacles per plant	Mean oospore output per receptacle and day	Oospores per plant and day	Oospores/ plant
October 1974	16	18	288	2016
November 1974	34	10	340	2380
December 1974	48	18	864	6048
January 1975	16	101	1616	11312
February 1975	4	2	8	56

at the 3rd day (Fig. 2) and thereafter the number of spores liberated per receptacle decreased. The receptacles remained healthy for one week after which they started degenerating. The spores liberated after seven days were also found to be unhealthy.

During the fruiting season of *Turbinaria conoides*, spore output per receptacle per day was high in January (Tab. I) and lowest in February. The number of receptacles per plant varied during the period of observation, which may be due to shedding of leaves with receptacles and the size of the plants selected for the experiments. The growth of epiphytes and other animals associated with the plants may also influence the spore production from the plants. From the above it can be concluded that the spore liberation increases gradually from October onwards reaching the maximum in January with a sudden decline in February.

Harvesting season

From the above studies on the growth and fruiting cycles of *Turbinaria conoides*, it may be mentioned that *T. conoides* may be harvested for extraction of alginic acid during the peak growth season between October and January as good yield was obtained in *Turbinaria* sp. during peak growth season (Umamaheswara Rao 1969, Umamaheswara Rao and Kalimuthu 1972, Kaliaperumal and Kalimuthu 1976).

Acknowledgements

Our thanks are due to Dr. E. G. Silas, Director, Central Marine Fisheries Research Institute, Cochin for his keen interest in these investigations and Shri. G. Venkataraman, Officer-in-charge, Central Marine Fisheries Research Institute-Mandapam Regional Centre, Mandapam Camp for his encouragement.

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