REFERENCES

CHUA, T. E. 1973. *IDRC Aquaculture Seminar for Southeast Asia, Malacca, West Malaysia, Contribution paper No. 16*, 7 pp.

——— AND S. K. TENG 1977. *Fish. Bull.*, **20**: 1-20.

——— AND ——— 1978. *Aquaculture*, **14** (1): 31-47.

GULLAND, J. A. AND S. J. HOLT 1959. *J. Cons. CIEM*, **25** (1): 47-49.

HAMSA, K. M. S. A. 1983. *Proc. National Seminar Cage and Pen Culture, Fisheries College, Tuticorin, India, March* 18-19, 1983, pp. 69-79.

KRISHNAN KUTTY, M. AND S. Z. QASIM 1968. *J. Cons. perm. int. Explor. Mer.*, **32** (2): 249-255.

LANJUMIN, L. 1982. *Report of the Training Course on small-scale Pen and Cage Culture for finfish, South China Sea Fisheries Development and Co-ordinating Programme, Manila, Philippines*, pp. 165-166.

LEE, E. S. 1982. *Ibid*, pp. 197-199.

MILNE, P. H. 1972. *Fish and Shellfish Farming in coastal waters.* Fishing News (Books) Ltd., London. 208 pp.

——— 1979. In: *T. V. R. Pillay and W. A. Dill* (Ed.) *Advances in Aquaculture* (FAO), pp. 416-423.

YAMAN, A. R. B. G. 1982. *Report of the Training Course on Small-Scale Pen and Cage culture for finfish, South China Sea Fisheries Development and Co-ordinating Programme, Manila, Philippines*, pp. 173-176.

EFFECTS OF DIFFERENT PHOTOPERIODS ON DIATOMS *THALASSIOSIRA FLUVIATILIS* AND *SKELETONEMA COSTATUM*

ABSTRACT

Effects of different photoperiods on growth of *Thalassiosira fluviatilis* and *Skeletonema costatum* revealed that both the species preferred longer duration of light for their maximum growth. The growth of *T. fluviatilis* was higher than that of *S. costatum* in different photoperiods. In *T. fluviatilis* maximum growth was observed at continuous light (24 hrs) and in *S. costatum* at 20.4 LD cycles. Short term exposure to light like 8 and 6 hrs did not enhance good growth in both the species.

LIGHT is one of the significant physical parameter that controls the productivity of the aquatic ecosystem and responsible for the temporal variability in local production. The neritic species might be adapted to utilize the light that occurs for only short periods of time (Harris and Piceinin, 1977). Studies on the effects of photoperiod on unicellular algae have been made by Paasche (1967, 1968), Hobson (1974), Admirral (1977), Nelson and Brand (1979), Chisolm and Brand (1981) and Brand and Guillard (1981). The present work deals with the effects of various photoperiods on growth of two centric diatoms *Thalassiosira fluviatilis* and *Skeletonema costatum*.

Material and methods

Thalassiosira fluviatilis and *Skeletonema costatum* were isolated by single cell isolation method from phytoplankton samples collected from the mouth region of the Vellar Estuary (11°29′N; 79°49′E). Unialgal culture of *T. fluviatilis* and *S. costatum* was grown in F/2 medium (Guillard and Ryther, 1962) under 3000 lx continuous light at 30‰ (Temp) 28±2°C, pH 7±0.5). During preliminary study, 3000 lx light intensity was found to promote maximum growth of *T. fluviatilis* and *S. costatum*. The different durations were determined by running the experiments at various exposure periods to light.

Exponentially growing cultures were inoculated in 100 ml of F/2 medium and subjected to 24, 20, 16, 12, 8 and 6 hrs light of 3000 lx intensity for a period of 3 weeks with a subculturing schedule once in five days to fresh medium. After three weeks, aliquotes of the cultures were inoculated in duplicates to experimental flasks having 100 ml medium and incubated at various photoperiod as given above for one week. Growth rate was determined using Guillard's (1973) formula of

$$K = \frac{\log_2 (N_1/N_0)}{t_1 - t_0}$$

Where K = divisions/day, N_1 and N_0 are cell concentration at the end and beginning of a period of time $t_1 - t_0$ days.

Results

The effects of different photoperiods on growth of *T. fluviatilis* and *S. costatum* is shown in Fig. 1. Both the species showed

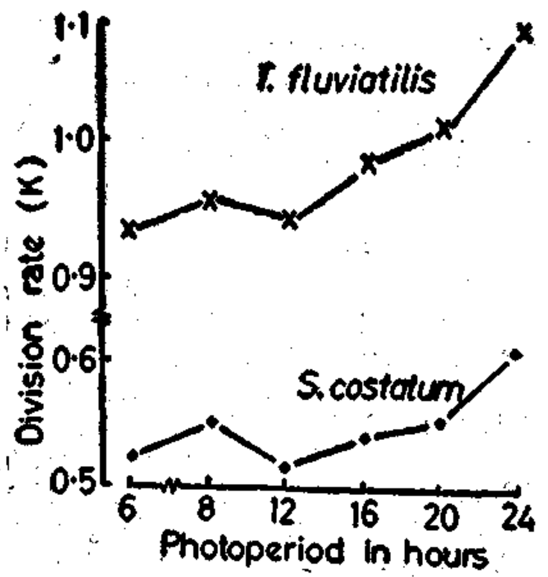

FIG. 1. Effects of various photoperiods on division rate of *T. fluviatilis* and *S. costatum*.

highest division rates at continuous light (24 hrs). *T. fluviatilis* exhibited higher division rate than *S. costatum*. *T. fluviatilis* showed low division rate at 6 : 18 Light : Dark (LD) cycle and it represented 49% of the final yield obtained at continuous light. At 16 : 8 and 12:12 LD cycles, there was not much significant variation observed in growth rate. *S. costatum* showed maximum division rate at 24 hr exposure and it decreased in lower incubation period. The final yield increased at 20 : 4 LD cycle by 3.2% over the cell number obtained at continuous light and it decreased to 85.7, 77.9, 82.6 and 79.4% to that of 24 hrs. exposure at 16, 12, 8 and 6 hr incubation period respectively.

Discussion

In the present investigation, since the inocula were taken from culture grown previously in continuous light, erratic results were obtained at first when the culture was incubated at various photoperiods. But after nearly 10-18 generations had passed in 3 weeks duration. the cell counts taken in the two series of experiments were found to be closely similar. In *T. fluviatilis* the division rate differed significantly in different photoperiods. In *S. costatum* except in continuous light, light and dark cycle did not cause much variation in the division rate. In general, both the species were found to grow at their maximum when incubated in longer duration of light. The present result could be compared with that of Brand and Guillard's (1981), where *Asterionella glacialis*, *Ceratium candelabrum*, *Gonyaulax polydera*, *Hymenomonas carterae* and *T. pseudonana* reproduced more rapidly in continuous light than in the light and dark cycles. *Bacteriastrum delicatulum*, *Biddulphia* sp., *Corethron criptulum*, *Cyclocoolithina leptopora*, *Ditylum brightwellii*, *Helmauldas hauckii*, *Streptotheca tamnis* and *Thalassiosira* sp. grow exponentially in 14 : 10 LD regime (Brand and Guillard, 1981). In *S. costatum* though the cell division was highest at continuous light, maximum cell density occurred at 20 : 4 LD cycle. This suggest that

S. costatum needs a few hours of darkness for maximum growth.

In coastal and adjacent water bodies, the photosynthetic light duration is an unpredictable one. The phytoplankton of these habitats should be adapted to utilise with its maximum efficiency, the light available at short duration. The present investigation suggests that *S. costatum* and *T. fluviatilis* are adapted to variations in photoperiod.

66 Gandhi Street, Anupurpalayam Pudur, Tirupur-638 652.

SOUNDARI GURUSAMY

REFERENCES

ADMIRRAL, W. 1977. *Mar. Biol.*, 39 : 1-9.

BRAND, L. E. AND R. R. L. GUILLARD 1981. *J. Exp. Mar. Biol. Ecol.*, 50 : 119-132.

CHISOLM, S. W. AND L. E. BRAND 1981. *Ibid.*, 51 : 107-118.

GUILLARD, R. R. L. AND J. H. RYTHER 1962. *Gran. Can. J. Microbiol.*, 8 : 229-239.

——— 1973. Culture methods and growth measurements. *In*: Janet T. Stein (Ed.) *Handbook of Phycological Methods*, pp. 298-311.

HARRIS G. P. AND B. B. PICENIN 1977. *Arch Hydrobiol.*, 80 : 405-457.

HOBSON, L. A. 1974. *J. Fish. Res. Bd. Can.*, 32 : 391-395.

NELSON, M. D. AND L. E. BRAND 1979. *J. Phycol.*, 15 : 67-75.

PAASCHE, E. 1967. *Physiologia*, 20 : 946-956 and 21 : 66-77.

DISEASES OF CHAETOGNATHS FROM THE ARABIAN SEA

ABSTRACT

Three different diseases, provisionally assigned as spot disease, swell disease and tail rot disease, were observed in chaetognaths *Sagitta enflata* Grassi and *S. bedotti* Bernaneck. The first two diseases showed high percentage of occurrence. The spot disease is caused by fungi and the tail disease is by bacteria. The cause of swell disease is not yet known. The present report on the disease of chaetognaths is recorded for the first time from the Arbian Sea.

KNOWLEDGE on the diseases of chaetognaths is very limited (Nagasawa and Marumo, 1984 ; Nagasawa and Nemoto, 1984). Nevertheless, studies on the diseases of fishes, decapod crustaceans and bivalves were made owing to the economic importance and hence information are available. However, general reviews on the parasites of chaetognaths (Hyman, 1959 ; Alvarino, 1964 ; Ghirardelli, 1969) contained no information about the diseases. Santhakumari (1986) recorded a ciliate parasite from Indian Coast. According to Kinne (1980) no marine organism seems to be completely free from potential disease agents and animals belonging to all systematic groups contain members which can act as agent or host.