

crocodile etc. Among the invertebrates, coconut crab and endemic insects including butterflies are also found in Great Nicobar Island.

Eight biosphere reserves are so far notified around the different parts of the country. The Great Nicobar Biosphere Reserve, the only representative of Andaman and Nicobar Islands is one among them. The significance of the biosphere reserve is to conserve the genetic diversity and for the continuance of unchecked evolution of plants and animals by natural selection. About 85% of the biosphere reserve area is still intact with luxuriant vegetation, which satisfies all the necessary conditions for the sustaining life and serves as a model for conservation of genetic resources as legacy to posterity. The biosphere reserve area is also expected to be utilized for scientific, educational, economically, cultural and recreational purposes. The biodiversity of the Great Nicobar Biosphere Reserve is our natural and national asset. Once lost, it cannot be restored.

Despite the declaration of Great Nicobar Biosphere Reserve many years back, so far no management action plan has been prepared for its conservation. The faunal inventory is being prepared by the Zoological Survey of India and the account on about 700 species belonging to mammals, birds, reptiles, amphibians, fishes, butterflies, moths, beetles, etc have been published.

Recommendations

1. The conservation of natural ecosystem of Great Nicobar Biosphere Reserve should form part of planning and economic development in these Islands.
2. Sufficient attention be paid and funds allotted to arrest destructive activities in preservation of biodiversity.
3. Developmental activities be planned in such a way that make minimum damage to natural environment.
4. Environmental Impact Assessment studies should be mandatory before the commencement of any major project, to see the overall impact on environment after the completion of the project.
5. The influx of human population in the Great Nicobar Island shall be discouraged as the population increase enhances more pressure on natural resources and lead to environmental degradation.
6. The hunting and poaching of wildlife should be strictly prohibited as per the Wildlife (Protection) Act.
7. The marine animals like corals, sponges, sea turtles, dugongs etc. occurring in the region need special protection.
8. Removal of sand and coral boulders from nesting sites of sea-turtles is to be restricted to the minimum.
9. The Govt. departments and NGOs involved in

scientific researches and conservation activities should coordinate to work together for proper management and conservation of biodiversity.

GIBBERELLIN-LIKE SUBSTANCES IN A BLUE-GREEN ALGA, *PLECTONEMA BORYANUM* GEIT.

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The growth hormones are of widespread occurrence in various taxonomic groups of algae (Augier, 1976). The presence of gibberellins in algae was, however, reported much later than the auxins. Mowat (1963) reported two components in the acidified fractions of marine phytoplanktons which gave gibberellin-like activity. Gibberellins have been reported in a number of marine algae in subsequent studies (Sciuto *et al.*, 1981). A gibberellin-like substance resembling GA₃ in a freshwater blue-green alga, *Phormidium foveolarum* was reported by Gupta & Agarwal (1973).

The gibberellins play an important role in growth and morphogenesis of algae (Jacobs & Davis, 1983; Foltinova, 1987). In view of the role played by gibberellins in algal growth, it is desirable to study more blue-green algae for the presence of these substances. The present study was carried out in a blue-green alga, *Plectonema boryanum* Geit. (Cyanophyceae, Nostocales, Nostocaceae).

P. boryanum was obtained from culture collections of University of Texas at Austin, Texas 78712. The alga was grown for three weeks in modified Benecke's medium (De, 1939). The extraction of gibberellins was made by following the method of Russell (1975). Both ethyl acetate and butanol fractions were dried under vacuum and purified by chromatography with distilled water (Mowat, 1963). The paper strips were dried and eluted with acetone. The eluate was dried and used for the chromatographic separation of gibberellins, by TLC (Stahl, 1965).

For bioassay cucumber (*Cucumis sativus* cult Kalyanpur Green) hypocotyl growth test (Brian *et al.*, 1964) and dwarf maize (*Zea mays* cult. MER-K 78) leaf sheath growth test (Phinney & West, 1961) were carried out. Ten seedlings were used for each treatment. Rf 0.6-0.7 and 0.7-0.8 of ethyl acetate fraction and Rf 0.8-0.9 of n-butanol fraction were biologically tested.

A purple fluorescing spot was detected at Rf 0.7 of ethyl acetate fraction and a bluish purple fluorescing spot at Rf 0.84 of n-butanol fraction. The eluate from Rf 0.6-0.7

Table 1. Biological activity of eluates from thin-layer plates of *P. boryanum*

N.B. Average increase in length (cm) of ten seedlings provided.

EA = Ethyl acetate fraction, B = n-butanol fraction,

* = Significant.

Nature of fraction	Rf tested	Cucumber hypocotyl growth test	Maize leaf sheath growth test
EA	0.6-0.7	7.0*	3.1
	0.7-0.8	5.5	3.0
B	0.8-0.9	5.0	2.7
Control	-	5.0	3.7
		LSD at 5% = 1.539	Non significant

of ethyl acetate fraction showed a significant activity in cucumber hypocotyl growth test (Table 1) indicating thereby the presence of a gibberellin. The n-butanol fraction did not give any activity in the test. The response shown by maize leaf sheath growth test was, however, statistically non-significant for both the fractions tested.

Russell (1975) reported that ethyl acetate fraction of the extract contains free gibberellins while n-butanol fraction contains gibberellins bound to some other substances e.g. glucose. It may be due to this reason that the n-butanol fraction did not give any response in both the bioassays.

The gibberellin-like substance of cucumber hypocotyl may be of the nature of GA_3 . According to McMillan & Suter (1963) Rf value of GA_3 is 0.7. The n-butanol fraction has not given positive response in both the bioassays which may be due to the presence of bound gibberellins which are less active in bioassay systems (Yokota *et al.*, 1971). Thus, in *P. boryanum* a gibberellin-like substance is present in free state which is active in cucumber hypocotyl growth test.

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References

- Augier, H. 1976. Les phytohormones des algues. Etat actuel des connaissances : II-Recherche et tentatives d'identification des gibberellines, des cytokinines et de diverses autres substances de nature hormonale. *Bot. Mar.*, 19: 245-254.
- Brian, P.W., Hemming, H.G. & Lowe, D. 1964. Comparative potency of nine gibberellins. *Ann. Bot. (London)*, 28: 369-389.

De, P.K. 1939. The role of blue-green algae in nitrogen fixation in rice fields. *Proc. R. Soc. London*, 127: 121-139.

Foltinova, P. 1987. The effect of gibberellic acid on growth and chlorophyll biosynthesis in *Euglena gracilis*. *Biologia*, 42 (11): 1091-1096.

Gupta, A.B. & Agrawal, P.R. 1973. Extraction, isolation and bioassay of a gibberellin-like substance in *Phormidium foveolarum*. *Ann. Bot.*, 37: 737-742.

Jacobs, W.P. & Davis, Wendy, 1983. Effect of gibberellic acid on the rhizome and rhizoids of algal coenocyte, *Caulerpa prolifera* in culture. *Ann. Bot. London*, 52 (1): 39-42.

McMillan, J. & Suter, P.J. 1963. Thin layer chromatography of gibberellins. *Nature*, 97: 790.

Mowat, J.A. 1963. Gibberellin like substances in algae. *Nature*, 200: 453-455.

Phinney, B.O. & West, C.A. 1961. Gibberellins and plant growth. *Handbuch d. pflanzenphysiol.*, 14: 1195-1227.

Russell, S. 1975. Extraction, purification and chemistry of gibberellins. In: *Gibberellins and Plant Growth*. Wiley Eastern Ltd., New Delhi.

Sciuto, S., Chillemi, R., Piattelli, M. & Puglisi, G. 1981. Gibberellin-like and cytokinin-like activities in marine algae from central mediterranean. *Boll. Soc. Ital. Biol. Sper.*, 57 (15): 1590-1595.

Stahl, E. 1965. *Thin layer Chromatography*. Academic Press, New York.

Yokota, T., Murofushi, N., Takahashi, N. & Katusmi, M. 1971. Biological activities of gibberellins and their glucosides in *Pharbitis nil*. *Phytochem.*, 10: 2943-2949.

Know Co-workers

[Members are invited to send their name, full address, field(s) of interest, no. of publications made and any major finding worked out by them. Brief particulars will be published, so that like-minded workers of one field can come in touch with each other and exchange ideas and reprints of publications - Ed. BIONOTES].

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Field of Interest-Family Geometridae, Order Lepidoptera, Insecta. Works on species found in different parts of India. Have published account of West Bengal. Taxonomic papers requested on Lepidoptera in general and Geometridae in particular.