Observations on the life-history of *Fritschiella tuberosa* IYENGAR (A preliminary report)

A. K. VARMA* and A. K. MITRA**

The interesting Chaetophoralean *Fritschiella tuberosa*, first described from India by IYENGAR (1932) and subsequently reported by RANDHAWA (1939, 1946), SINGH (1941, 1947) and RANDHAWA and VENKATARAMAN (1962) has so far been reported only from SUDAN (BROOK, 1952, 1956). The only available report on the sexual reproduction and life-history of this alga was that of SINGH (1941). The present investigations were aimed to clarify some of the aspects in the life-history of this alga. Parallel studies were made both under natural and cultural conditions. Some of the present findings are at variance with the published work.

The alga has an ubiquitous occurrence in the district of Allahabad in the Uttar Pradesh in North India. It grows either in moist shaded places or in open fallow lands and occurs throughout the year. The alga prefers a pH of 6.8 to 7.3 and the moisture content of the substratum on which it grows ranges from 1.19 to 5.13%. It grows luxuriantly, particularly on manure heaps and on substratum rich in organic matter. The alga is characterised by an erect fan shaped projecting system (primary and secondary systems), a parenchymatous prostrate system and an elongated and branched rhizoidal system.

Sexual reproduction by isogamous biflagellate gametes and differentiation of the quadriflagellate zoospores into macro- and microzoospores as reported earlier (SINGH, 1941) could not be confirmed. All efforts to induce the formation of biflagellate gametes in this form failed and consequently the isomorphic alternation of generation reported earlier (SINGH, 1941, 1947) could not be confirmed.

* Algae Section, Division of Microbiology, Indian Agricultural Research Institute, New Delhi-12.

** Department of Botany, Allahabad University, Allahabad, India

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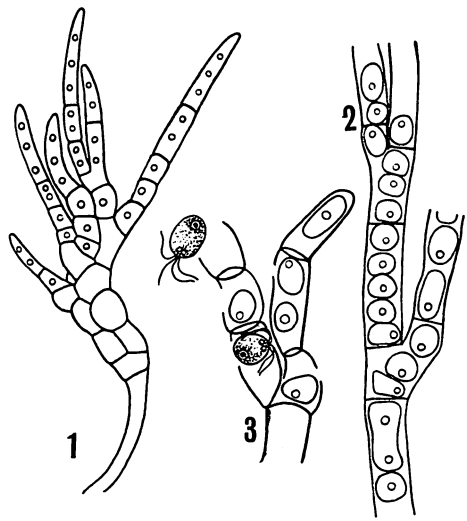
The quadriflagellate zoospores are formed from the young cells of the projecting system (Figs. 2, 3). The zoospores have no eye spots and are non-phototactic. In the present investigations, the zoospores were found to possess two contractile vacuoles at their anterior ends.



Figs. 1–3. *Fritschiella tuberosa* IYENGAR
1. an young plant; 2. initial stages in the formation of zoospores; 3. liberation of quadriflagellate zoospores.

The development of the adult thallus from a single zoospore was followed under cultural and natural conditions. The zoospore on germination undergoes a transverse division into two cells. The lower cell gives rise to the rhizoidal system and upper one gives rise to the projecting system. The prostrate system has been found to be secondary in origin, resulting from the septation of the cells in the erect growing filaments in various planes (IYENGAR 1932; FRITSCH, 1954).

The cells of the prostrate system undergoes further repeated divisions to form large packets of cells. The cell wall gets thickened and functions as cysts. No motile swarmers were observed to be produced either from these cysts or from the cells of the prostrate system as reported earlier (SINGH, 1947). Instead, these cysts in the prostrate system

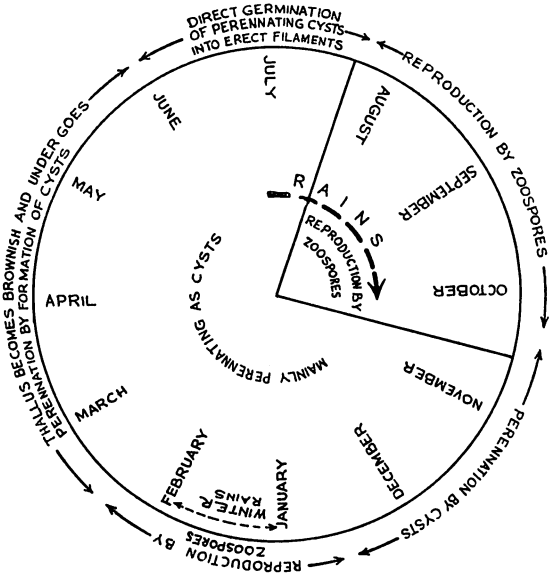


Fig. 4. Annual growth phases of *Fritschiella tuberosa* IYENGAR at Allahabad.

directly germinate into new erect filaments. However, a certain degree of dormancy in the cysts was observed. While germination could be initiated in few cysts, majority of the cysts remained in perennating condition. Similar differential germination of cysts was observed in nature also. Thus, the alga persists throughout the year reproducing either by asexual zoospores or by thick walled cysts. A detailed paper on the ecology and life-history of this alga will be published elsewhere.

Summary

Fritschiella tuberosa IYENGAR, a member of the Chaetophorales exhibits most of the potentialities for the early land plant. In the present investigation careful attention was given to the life-history of this alga both under artificial and natural conditions. It was observed that the reproduction of the alga was either by asexual zoospores or by thick walled cysts. The presence of an eye spot in the zoospores and the formation of biflagellate gametes could not be confirmed. Zoospores, on the other hand, were found to possess a pair of contractile vacuoles in their anterior end.

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フークス卵における RNA の分布*

中 沢 信 午**

S. NAKAZAWA: Distribution of RNA in *Fucus* eggs*

Fucus の卵は最初直径およそ 60 μ の球形で，のちその一側に原形質の張り出しがおこり，ここに仮根ができる。このときに仮根形成に役割を演ずる物質は，もちろんこの部域に集まって活動するにちがいないことが論理的にも考えられるし，また他の植物の実験例からも容易に想像される。たとえば *Coccophora* では仮根突起がはじまってから遠心力をかけて仮根形成物質とおぼしきものを仮根極から遠ざけてしまうと仮根が分化しない事実 (NAKAZAWA, 1960), *Acetabularia* では HÄMMERLING (1934) の古典的研究によって，キャップ形成の遺伝情報が下端の核から出発して先端まで移動して集まり，そこでキャップ形成にはたらくことが仮定され，のちに WERZ (1959, 1960) によってこの遺伝情報の正体が RNA とタンパクとの結合体であると立証された事実などである。また *Fucus* の生卵を RNase 0.1% を含む海水

* 斎藤報恩会学術研究費による

** 山形大学文理学部生物学教室

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