TABLE I

Effect of crushed wheat induced ruminal acidosis on blood glucose and plasma insulin concentration at different time intervals in buffalo calves

Parameters	(Normal) 0 hour	Time of sampling				
		24 hours	48 hours	72 hours	96 hours	120 hours
Blood glucose (mg/100 ml)						
Mean	59·9	83·9*	88·6*	100·1*	114·1*	125·1*
SD	± 2·0	± 6·4	± 6·7	± 4·4	± 9·6	± 10·3
Plasma insulin μU/ml						
Mean	24·0	41·8*	50·0*	42·2*	29·7*	18·9*
SD	± 1·1	± 2·2	± 5·9	±11·3	±11·3	± 5·6

* Values significantly changed in comparison to 0 hour at 5% level of significance.

adrenal medulla on histopathological examination revealed that catecholamine secreting cells were degranulated indicating their overactivity. The depletion of liver glycogen may be due to hyperactivity of adrenal medulla to caus. increased glycogenclysis thus contributing towards hyperglycaemia[6]. A rise in glucose level has also been reported by Bide *et al.*[1] in cattle due to sudden change of feed from hay to grains.

In the present study, circulating levels of IRI continued to increase significantly during the first 48 hours of the induction of rumen acidosis and then declined to a significant extent even below the base level of 24·0 ± 1·1 μU/ml at 120 hours. Jenny and Polan[8] also observed an increase in plasma insulin levels in cattle fed with high grain diets. Increase in insulin level might be due to the higher proportions of propionate and butyrate produced in the rumen of animals fed high grain diets which on absorption stimulated insulin secretion. A gradual decrease in the level of IRI after 48 hours, as observed in the present study, can be safely attributed to the process of degranulation due to hyperactivity in the initial stages leading to exhaustion and subsequent atrophy of endocrine beta cells which was confirmed by histopathological examination of endocrine pancreas with Methylene blue-Phloxine-Azure staining[9].

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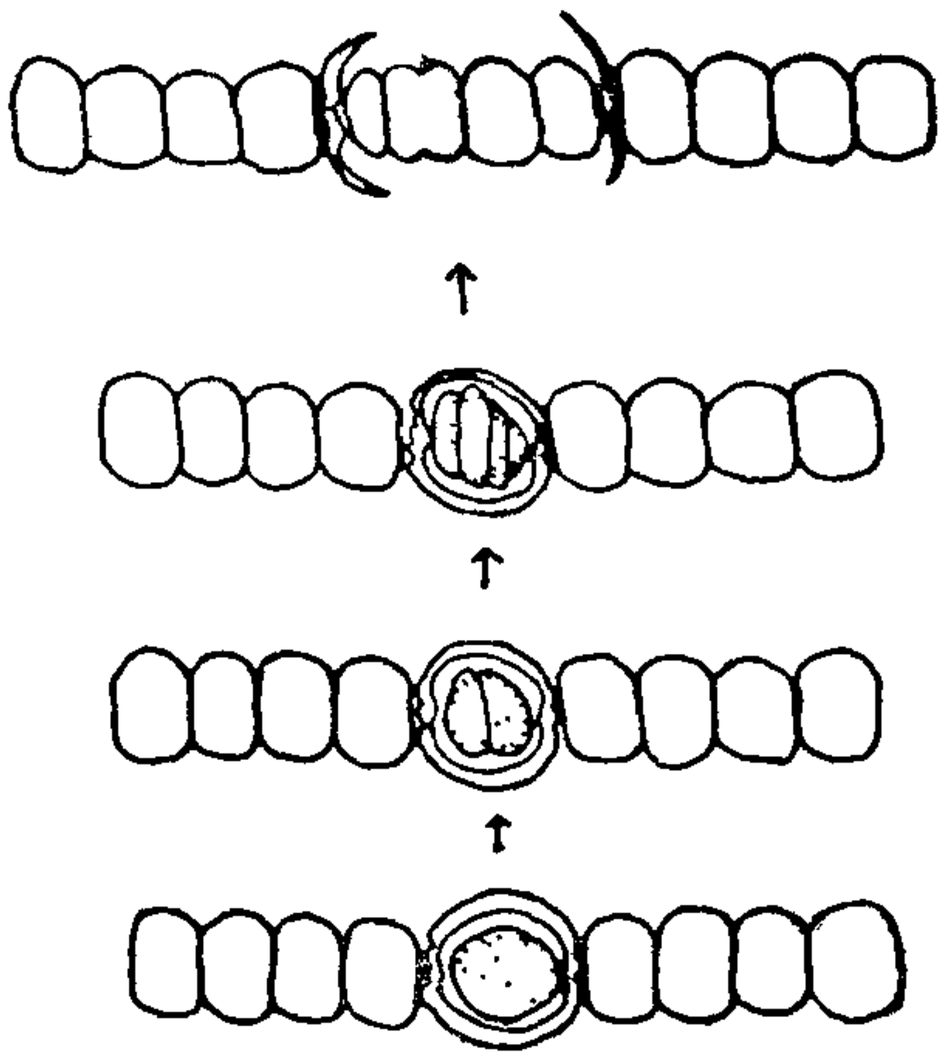
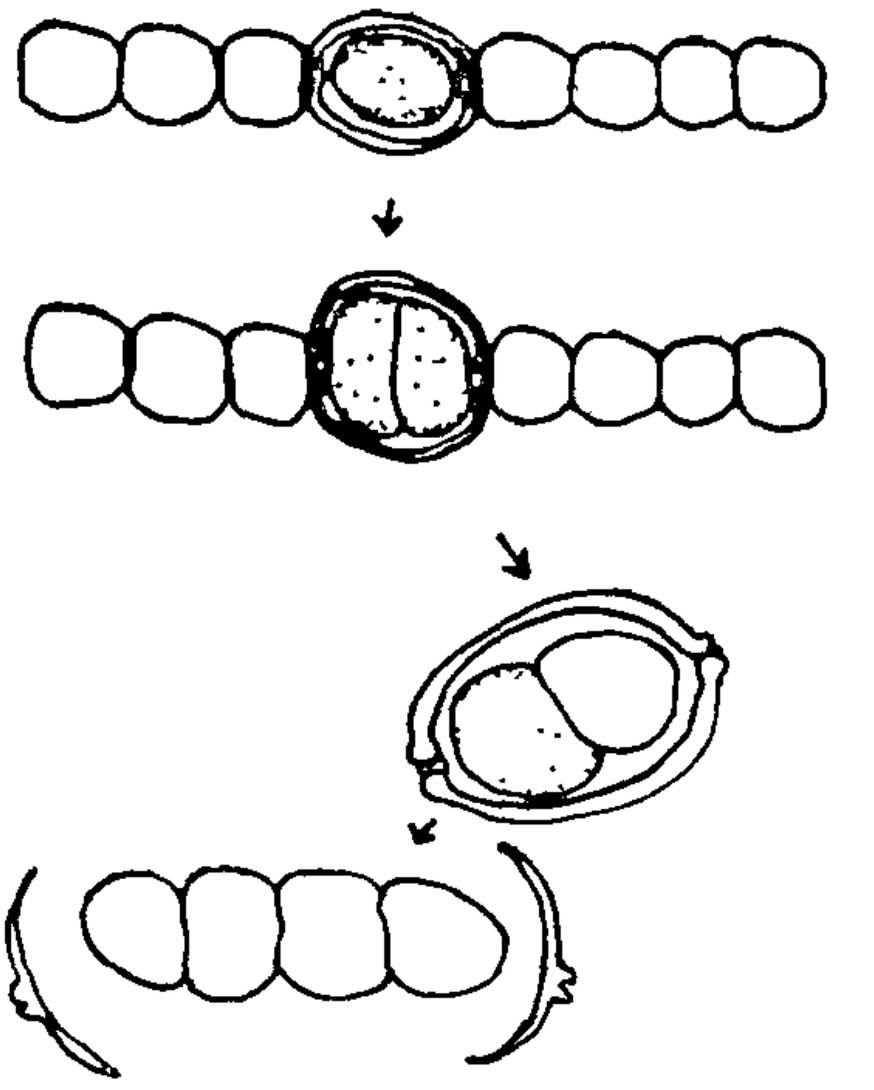
HETEROCYSTS AS REPRODUCTIVE STRUCTURES IN BLUE-GREEN ALGAE

HETEROCYSTS of blue-green algae are known to have a role in fragmentation and vegetative reproduction, sporulation, as reproductive units, organ of attachment and biological nitrogen fixation[1]. Their role as reproductive organs or units is one of the less investigated aspects. Geitler proposed that heterocysts are archaeic reproductive structures[2], but Fritsch[3] opposed this hypothesis. Heterocyst germination has been

reported in many species in the presence of nitrogen source[1–5]. It is suggested that in the presence of excess nitrogen, heterocysts get eliminated by germination. The present investigation reveals that heterocyst germination can also be a process of reproduction in some *Anabaena* species.



TYPE I



TYPE II

FIG. 1. Heterocyst germination in *Anabaena* spp.

Anabaena catenula (A 101 = 1403/1 Cambridge), *A. variabilis* (A 484 = 1403/46 Cambridge), *A. viguierii* (A 528 = M2/4 France) and *A. oscillarioides* (A 804 = 1403/11 Cambridge) from the Madras University Botany Laboratory Culture collection were grown in Chu 10 medium (in which they are maintained), diphasic soil water medium and Allen and Arnon's medium. The cultures were also studied *in A* and *A medium* in which the concentration of potassium nitrate ranged from 0·100 mg/l–10·0 g/l. Cultures were grown at 26 ± 1° C with illumination of 1200 lux units; only liquid cultures were used.

The two major types of germination of heterocysts are represented in Fig. 1. In the first type, the contents of the heterocyst divides to form 2–4 cells. Further divisions and elongation of the germling breaks the wall transversely and the remnants of the heterocyst wall remain attached at either end. There is never an enlargement in the size of the heterocysts. In type II, there is a first division showing a two celled large germling. Probably at this stage they get detached, and these are always found scattered. Further divisions take place only after the break of the heterocyst wall and release of the germlings.

Type I is common in cultures grown under higher concentrations of KNO_3. This may probably be a process where the heterocysts are eliminated by germination. However it is interesting to note that the heterocyst with 4 celled germlings are commonly found in isolates No. 1 and 4 in the basal medium. These isolates never sporulated in culture. Here one may attribute a reproductive function to the heterocysts. Type II is rarely found in the cultures when grown in higher concentrations but occurs commonly in isolates 2 and 3. The very fact that this type of germination is always found in heterocysts which are detached, contrary to the type I, indicates that they behave as reproductive units.

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