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Systematics, Ecology and Life-History of Indian Gelidials with Special Reference to the Agarophyte, Gelidiella acerosa (Forsskal) Feldmann Et Hamel**

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AFTER critical examination of the available Indian Gelidials, nine species have been described in the two genera viz. *Gelidium* and *Gelidiella*. A new species, *Gelidiella indica* and a new form, *Gelidiella acerosa f.* minima have been described. The alga used in the manufacture of agar-agar is so far going under the name of *Gelidium micropterum* kutz. On a thorough study of this alga from south and west coast of India and a comparison of the authentic material, the Indian plant has been identified as *Gelidiella acerosa* (Forsskal) Feldmann et Hamel.

Quantitative information on the diurnal variation of important factors like exposure, temperature, salinity and hydrogen-ion concentration for upper mid-littoral tidepools of Jaleswar reef has been obtained. It was concluded that dissolved oxygen and hydrogen-ion concentration are biological in origin and temperature and salinity are dependent on the climatic condition. Also the temperature variation depends on the size and depth of the pool.

Studies on the annual events of life-cycle, reproductive behaviour and life-history studies of *Gelidiella acerosa* (Forsskal) Feldmann et Hamel have been carried out.

It has been concluded that a temperature 28°-29°C is important in the reproduction of the alga. Two spore shedding seasons have been observed in the annual life of the plant. The recurrence of the same temperature conditions during April-May and October-November have been considered to be responsible for the two tetraspore producing seasons.

It has been observed that the injured axes always produced only one proliferation per axis, as long as it is attached to the creeping axis. Also it has been observed that the regeneration has been completed within 90 days after injury to the axis in nature.

Seasonal change in the external form of this alga has been observed in the exposed pools at mid-littoral level. But such seasonal change in the external form of the alga is not evident in the plants growing at and below spring tide levels.

The spore studies of the alga revealed that (a) the shedding of spores during the two sheddings in a day are unequal (b) spores are shed when plants are covered by fresh sea water after exposure (c) drying of the fertile ramuli in shade does not induce shedding of more spores (d) the peak for spore shedding is observed to be at the beginning of the shedding period (e) spores may fix on to the substratum 15 minutes after they come in contact with it (f) the spore output of an average sized plant per season has been calculated to be 2×10^4.

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Basing on the ecological studies, it has been suggested that the harvesting of the agarophyte can be done for three months in an year beginning with May, in order to allow the plant to complete its normal events of annual life in nature.

Chromosome counts 2 N– 8 is being established from the vegetative cells of the inner-cortex and chromosome number n=4 in the prophase of the homotypic divisions in the tetrasporangium. Thus, there is direct as well as indirect evidence to indicate that reduction division possibly takes place in the tetrasporangium during the formation of tetraspores.

It has been concluded that the alga possibly has a diphasic *polysiphonia*–type of life-history, although sexual plants have not been met with in Indian waters or in other parts of the world.

It has been shown that the spore becomes multinucleate before the formation of the germ–tube and only one functional nucleus passes into the germ–tube, while the rest are left in the body of the original spore.

It is suggested on the basis of the studies on spore germination, that the "*Gelidium*–type" of germination can also be characterised by the multinucleate conditions before the formation of the characteristic germ–tube.

It has been concluded that the formation of a separate family, Gelidiellaceae, based on the supposed absence of sexual reproduction and the absence of hyphae is not tenable.