

INTRODUCTION

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Ferns are assemblage of vascular cryptogams that have established themselves most successfully to life on land. Their successful invasion of the varied habitats, their supremacy in vegetative propagation and their remarkable success in competition with the modern seed plants proves their excellency in experimentation. Under normal conditions there is a regular alternation of generations between a gametophytic and a sporophytic phase. These two stages are quite distinct and controllable with change in the cultural conditions or slight variation in temperature, two phases can be interchanged at will. Pteridophytes are known for their simple nutritional requirements. In spite of their simplicity in morphology and nutritional status, these plants equally respond to physiomorphogenetic substances. They respond quickly to sudden change in environment, light, growth regulators (i.e. cytokinins & auxins), amino acids, nucleic acids and their analogues.

In the present course of investigations two ferns viz; Ceratopteris thalictroides and Marsilea minuta were selected for experimentations. Fern Ceratopteris thalictroides belongs to the family Parkeriaceae which is an aquatic homosporous fern with vegetative mode of reproduction by means of formation of adventitious plantlets from the buds

present on fronds. Fern Marsilea minuta belonging to the family Marsileaceae, grows well with its rhizome floating in water.

Literature reveals that ferns have also proved to be suitable experimental material for morphogenetic studies in vitro (Bristow, 1962; Mehra & Suklyan, 1969; Mehra & Palta, 1971; White, 1971; Loyal & Chopra, 1977; Cheema, 1979 & 1983 and Whittier, 1995). Although a lot of work has been done on apospory, apogamy and regeneration; induction and differentiation of callus however was not thoroughly investigated. In fern morphogenesis the chemical factors played an important role to bring the shift from sporophytic phase to gametophytic phase and vice versa. In the earlier studies it has been reported that sucrose played an important role in callus induction and its further differentiation. Absence of sucrose or low nutritional level enhanced apospory. Besides the role of chemicals for morphogenetic shifts in fern system, the role of endogeneous factors was also thoroughly investigated in our laboratory (Cheema, 1979a,b, 1980, 1983 & 1984; Cheema & Kaur, 1985 and 1986) in order to study whether the endogeneous factors like life cycle and developmental pattern of gametophyte or sporophyte play any role in morphogenesis or not. The results of earlier investigations in our laboratory proved that the endogeneous factors of fern gametophytes and

sporophytes are equally responsible for morphogenesis in fern system. With this back ground in mind it was planned to confirm this concept and to prove that the nature of the tissue is equally important as the chemical factors are. The present investigations were carried out using two fern systems viz; Marsilea minuta (an aquatic heterosporous fern) and Ceratopteris thalictroides (an aquatic homosporous fern).