

used agar, *D. filix-mas* produced all spatulate male gametophytes while *D. dilatata* again produced cordate female gametophytes. It is suggested that because of these gametangial patterns, both species are outbreeding but in *D. filix-mas* there exists also an antheridiogen system.

Potential of the ostrich fern (*Matteuccia struthiopteris* (L.) Todaro) as a crop plant

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Croziars of the ostrich fern (locally known as the fiddlehead fern) have been traditionally harvested in the spring as a green vegetable from wild stands. In co-operation with other workers in the Canadian maritime provinces, we are conducting experiments to test the feasibility of cultivating this fern as an agricultural crop plant.

Our studies involve the following approaches:

1. Propagation of sporophyte plants *in vivo* and *in vitro*, both sexually, from spores, and, asexually, from rhizome segments. Asexual propagation to produce large numbers of clonal plants for the field is important if high-yielding clones are required for cropping: buds grown from 'detached meristems' on rhizomes can be cultured *in vitro* and *in vivo* to produce clonal plants.

2. Growth of propagules in controlled environments for studies of growth and development. Maximum linear growth of rhizomes occurs in July. Rhizomes initiate significantly more apical crown formation and secondary rhizomes in response to short (8 h) as compared with long (16 h) daily photoperiods; there are also differences in sporophyll formation according to daily photoperiod, and in growth of tropophylls from croziars according to temperature—suggesting the importance of seasonal changes in daylength and temperature for the partition of various developmental processes according to season.

3. Rhizome segments lacking bud formation, 3-year-old sporophyte plants grown from spores or rhizomes, and mature crowns have been planted and assessed in plots and row plantings. The most satisfactory establishment and subsequent colonisation by rhizome formation in the years following planting has been obtained from the 3-year-old sporophyte plants that were hilled (ridged) after their initial establishment. Light-tolerant clones have been isolated and may outproduce other less tolerant clones during their establishment period.

Yield comparisons have been based primarily on: the number and weight of croziars elongating from the total number present within the crown, the plant density attained, and the yield of croziars that can be sustained with different harvesting pressures. We conclude that there is considerable potential for selection of high-yielding clones that can provide a sustainable yield of croziars from year to year.