COMPARISON IN REPRODUCTIVE CAPACITY OF WILD AND CULTIVATED POPULATION OF MARSILEA SPECIES

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The present paper describes comparison in reproductive capacity of wild and cultivated population of three Marsilea (M. minuta, M. rajasthanensis and M. shashibalii) species. It becomes clear that wild populations of both M. minuta and M. rajasthanensis show enhanced reproductive capacity in comparison to their respective cultivated populations. However, reproductive capacity appears to be almost equal in both wild and cultivated populations of M. shashibalii.

Keywords: Marsilea; Reproductive capacity.

The sporocarps of Marsilea is highly specialised and unique structure specially in its being the thickest amongst Fern. An example of its toughness was provided by Allop9 who was successful in germinating sporocarps picked from poisoned herbarium specimens of various ages. Bloom3 studied the sporocarp wall of M. hirsuta in details. Bloom3, 5 studied the heat resistance of sporocarp wall in M. quadrifolia. According to Gupta4 the wall structure is nearly same in all the species. Bhardwaja and Sen5 also observed that sporocarps of M. rajasthanensis could withstand sustained heating at least upto 54 hours at 65°C. Malone and Proctor4 reported the dispersal of M. mucronata by water and flying birds. Bhardwaja7 has described wind dispersal in some arid zone Marsilea species.

Megagametogenesis in Marsilea has been investigated by various workers. Campbell6, 9 made a report on megaspor germination of M. aegyptiaca and M. vestita. Strasburger10 studied the apogamous behaviour of megagametophyte in M. drummondii. Schultz11 studied in detail the macrogametophyte of Pilularia globulifera and M. quadrifolia. A detailed investigation of megagametophyte development in M. diffusa, M. hirsuta and M. augustifolia was undertaken by Demalsy-Feller12. Bloom13 and Bloom and Nicholas14 studied factors influencing rhizoid formation in female gametophyte of M. drummondii. Tourte et al15 investigated some aspects of oogenesis in M. vestit.

Ripe sporocarps of M. minuta, M. rajasthanensis and M. shashibalii collected (both wild and cultivated populations). Five sporocarps of each species were scarified and for germination kept in a petridish containing tap water. Observation made of sorophore extrusion and sporeling formation. Reproductive capacity was calculated by the following formula.

Reproductive capacity = \[\frac{\text{Total Number of Spores Germinated}}{\text{Total Number of Spores}} \times 100\]

A perusal of table 1 reveals that the wild populations of both M. minuta and M. rajasthanensis show enhanced reproductive capacity in comparison to their respective cultivated population. However, reproductive capacity appears to be almost equal in both wild and cultivated populations of M. shashibalii. It is evident that in wild population of Marsilea species show high reproductive capacity in unfavourable conditions of environment. It means adaptations develop for survival of species in harsh conditions and reproductive capacity increased in wild population. The observation represented graphically in Fig. 1.
Table 1. Reproductive capacity of wild and cultivated population of Marsilea species

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Parameters</th>
<th>M. minuta</th>
<th>M. raiasthanensis</th>
<th>M. Shashiballi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WP</td>
<td>CP</td>
<td>WP</td>
<td>CP</td>
</tr>
<tr>
<td>1.</td>
<td>No. of megaspore/sporocarp</td>
<td>68</td>
<td>18</td>
<td>06</td>
</tr>
<tr>
<td>2.</td>
<td>No. of germinating megaspore</td>
<td>50</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>3.</td>
<td>Reproductive capacity (%)</td>
<td>73.5</td>
<td>55.5</td>
<td>83.3</td>
</tr>
</tbody>
</table>

WP = Wild Populations; CP = Cultivated Populations

The Phenomenon of reproductive capacity has been studied from long time in many Marsilea species and other plants. Wadhwani and D'Souza observed that increasing dryness of the habitat play a significant role in evolutionary divergence at species level. These investigations reveal that the wild populations of both M. minuta and M. raiasthanensis show high reproductive capacity in comparison to their respective cultivated populations. But these variation in M. shashiballi is less, such type of calculations of reproductive capacity has been taken up first time so far as these Rajasthan State species are concerned.

References
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