

研究报告

## 光和基质对菹草石芽萌发、幼苗生长及叶片光合效率的影响

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**摘要** 通过室内模拟试验,研究了基质和光照对菹草石芽萌发、幼苗生长以及不同光照对菹草生长后期叶片光合效率的影响.结果表明,在光照和缺乏基质的条件下,菹草石芽的萌发率和出苗率提高.基质的存在促进了根的生长,而光对根的生长并未起到促进作用.在无光条件下,菹草幼苗节间长度明显大于有光处理.在暗处理中,菹草叶片的质膜透性显著增加.在有光照条件下,有无基质对菹草幼苗叶片叶绿素a(Chla)、叶绿素b(Chlb)以及Chla/Chlb比值的影响为Chla、Chlb的含量增高,Chla/Chlb比值在3.5上下波动;Chla/Chlb最大值和最小值在有基质时分别为4.4和2.8,无基质时为4.2和2.7.但对幼苗处理40 d时,暗处理的叶片质膜透性与有光有基质、有光无基质之间差异极显著( $P < 0.01$ ).不同光照处理(自然光、50%自然光、20%自然光和10%自然光)的光合特性差异比较结果表明,在菹草生长后期,在自然光下菹草叶片的 $F_v/F_m$ 和 $F_v/F_o$ 的比值与其它3个遮光处理相比存在显著差异( $P < 0.05$ ),而在3个遮光处理之间差异不显著.进一步比较 $F_v/F_m$ 、 $F_v/F_o$ 、ETR、 $qP$ 、 $qN$ 和 $\Phi PS II$ 等荧光参数值的结果显示,在生长的后期,一定程度的弱光会起到促进菹草的光合效率、延缓菹草衰老的作用.

**关键词** 菹草 石芽萌发 幼苗生长 光合效率 叶绿素荧光参数

分类号

## Effects of light and matrix on turion germination, seedling growth and leaf photosynthesis efficiency of *Potamogeton crispus*

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### Abstract

The study with in-door experiment showed that the germination and seedling rates of *Potamogeton crispus* were increased under light but without matrix. Matrix promoted root growth, but light could not. The internode's length was obviously longer under dark than under light. After treated with dark, the permeability of leaf plasma membrane raised apparently. Under light condition, the Chla and Chlb contents and Chla/Chlb ratio of seedling's leaf fluctuated, depending on with or without matrix. The maximum and minimum value of Chla/Chlb ratio was 4.4 and 2.8, respectively when the matrix existed, and was 4.2 and 2.7 when the matrix was absent. After 40 days of seedling growth, there was a significant difference in the permeability of leaf plasma membrane between the treatments with light and matrix, and with light but without matrix ( $P < 0.01$ ). A significant difference was also observed in  $F_v/F_m$  and  $F_v/F_o$  at the late growth period between the treatments of full (100%) and partial (50%, 20% and 10%) natural light, while no significant difference was found between the treatments of different partial natural light. It was suggested from the measurements of  $F_v/F_m$ ,  $F_v/F_o$ , ETR,  $qP$  and  $qN$  that weak light promoted the photosynthesis, and slowed down the senile of *P. crispus*.

**Key words** *Potamogeton crispus* Turion germination Seedling growth Photosynthesis efficiency Chlorophyll fluorescence parameter

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