Transformation of Lemna minor for Nitrate Reduction, Year Three

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As the world population continues to rise, the search for quickly and cheaply grown food becomes more and more desperate. For many years, farmers have used fertilizers to feed the world. Though their efforts have yielded more crops, the fertilizers they used created hypoxic and anoxic zones (created by high levels of nitrates) in nearby ponds and rivers, which have led to environmental imbalances. The quest has now turned to reducing these zones with nitrate-reducing plants, but scientists have been unable to find a native candidate. Duckweed is a non-nitrate reducing, asexually-reproducing plant native to North America. In this experiment, duckweed plants were electroporated and cultured to change them into nitrate-reducing plants. Independent variables include amounts of plasmid, while dependent variables include transformation and growth efficiencies. Controlled factors are the amount of light and duckweed, time, growth medium, and sterilization chemicals. The research hypothesis states that if the transfected duckweed plants grow into full and viable explants, and they are successfully transfected with the plasmid coding for nitrate reduction, then the duckweed plants will reduce nitrates. Transfection success was observed with proof of concept trials, and whole duckweed plants have been transformed with the pGlo plasmid via electroporator. Whole duckweed plants were transfected with the plasmid coding for nitrate reductase, and have shown promising results with population regrowth. In the future, the researcher will statistically determine if the transfected plants efficiently reduce nitrates.

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