

Methods of propagating *Cypripedium* species of Northern New England

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Cypripedium reginae, *Cypripedium parviflorum*, *Cypripedium arietinum*, and *Cypripedium acaule* are lady's slipper orchids found in the temperate climate of New England. After developing to the mature flowering stage in 8-10 years, they can live for as much as 100 years if left undisturbed. Through habitat loss and degradation, the first three of these four species of terrestrial orchids are critically endangered in northern New England. Crossroads Academy and Kimball Union Academy are attempting to restore *Cyp. reginae* to the wild and establish a model of conservation for *Cyp. parviflorum*, *Cyp. arietinum*. To do this, we have used in vitro axenic seed culture of *Cyp. reginae* to produce thousands of seedling to carry out experiments on, vernalization, soil propagation, habitat requirements and histological analysis. Our team at Crossroads Academy has about 2,200 seedlings in axenic culture. This brings our total seedling production to 7,000 since 2011. We have grown about 80 healthy seedlings in soil for about 2 years. This represents about a 50% survival of vernalized seedlings moved to soil. The plants in soil have produced fully developed leaves up to about 8 cm in length and are expected to begin flowering in the next 2 years. We also have about 400 seedling being vernalized at 5 °C in a variety of media including, compost, peat moss, and bare roots. Initial results suggest compost is more successful than peat moss. By the end of 2014, we expect to have germinated another 2,000 seedlings of *Cyp. reginae* and advanced the efficiency of in vitro growth of *Cyp. parviflorum* and *Cyp. arietinum*. With our *Cyp. reginae* seed cultures, we have a greater than 50% germination rate. Seedlings have well-developed shoots, rhizomes and roots by 2 months and are often transferred to new medium in larger culture vessels after 4-6 months to provide more room for larger root development. In an effort to accelerate our germination and development rates we have recently been testing the germination and subsequent seedling development of *Cyp. reginae* when exposed to the constant magnetic field (EMF) of rare earth magnets. We hypothesized that EMF would increase germination percentages and rates we did not hypothesize any acceleration in subsequent development. Initial results indicate that the magnetic field does not accelerate germination rates or percentages, but does accelerate seedling development subsequent to germination by about two weeks. We are now repeating these experiments to determine levels of significance between experimental and control groups.