

Attempts to Propagate *Stylisma pickeringii*, an Endangered Plant in Illinois, Using Stem Cuttings

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Stylisma pickeringii Stems with Flowers and Fruits

INTRODUCTION

Stylisma pickeringii (Patterson bindweed) is an endangered sand prairie plant found in areas along the Illinois River and Mississippi River (Herkert, 1991). Currently, only three populations are found in Illinois, with only one being on public land. It is a perennial plant with indeterminate growth in the Convolvulaceae Family. To expand its establishment in its natural habitat, more information about its reproductive and developmental biology are needed.

Stylisma pickeringii flowers in the field between late June and early September. In greenhouse conditions, *Stylisma pickeringii* has yet to flower. However, studies with *Jacquemontia curtisii*, another species of Convolvulaceae, demonstrated that plants in greenhouses flowered sooner when started from cuttings than from seed (Koptur, 2001). It is possible that *Stylisma pickeringii* also will flower sooner in the greenhouse if propagated by stem cuttings from flowering plants rather than by seed.

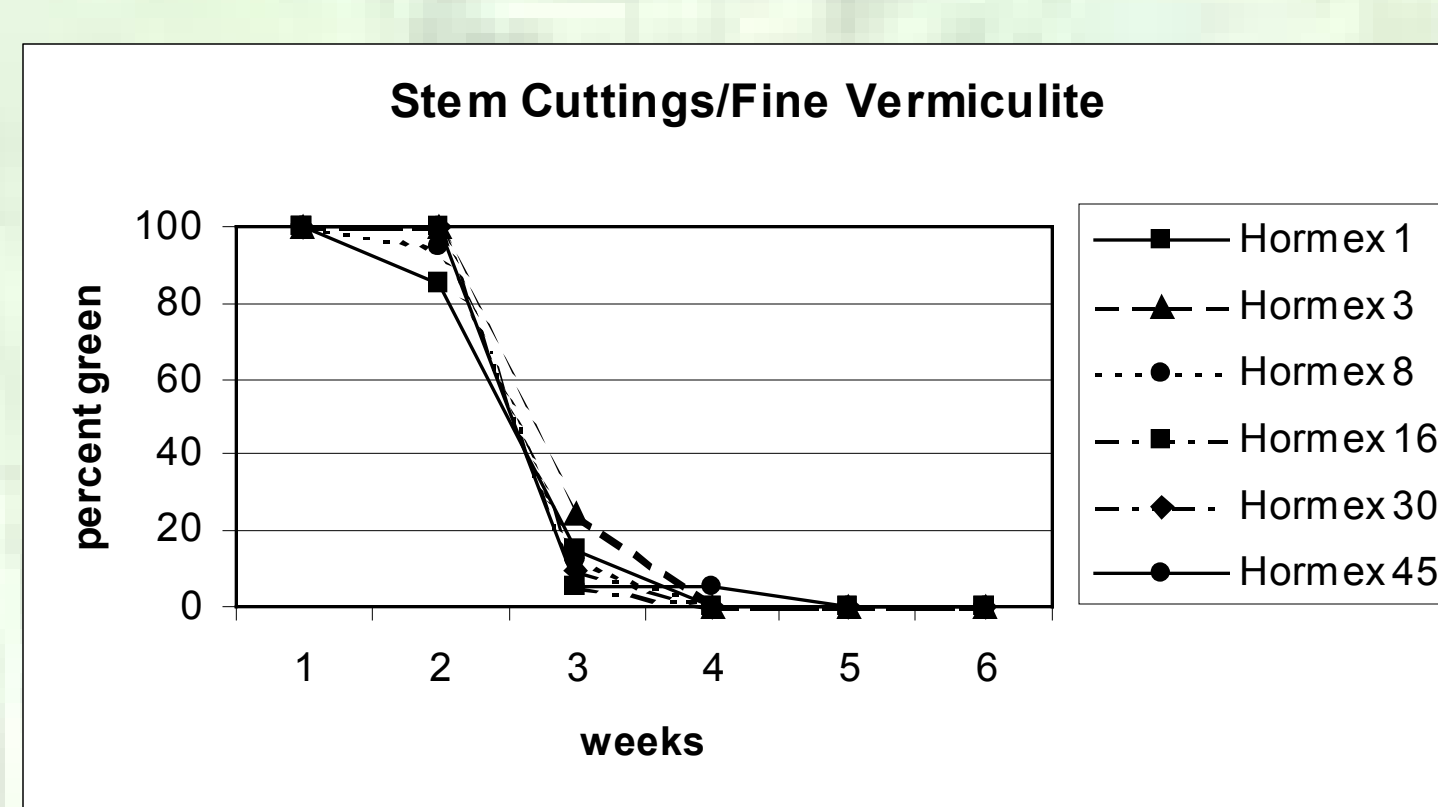
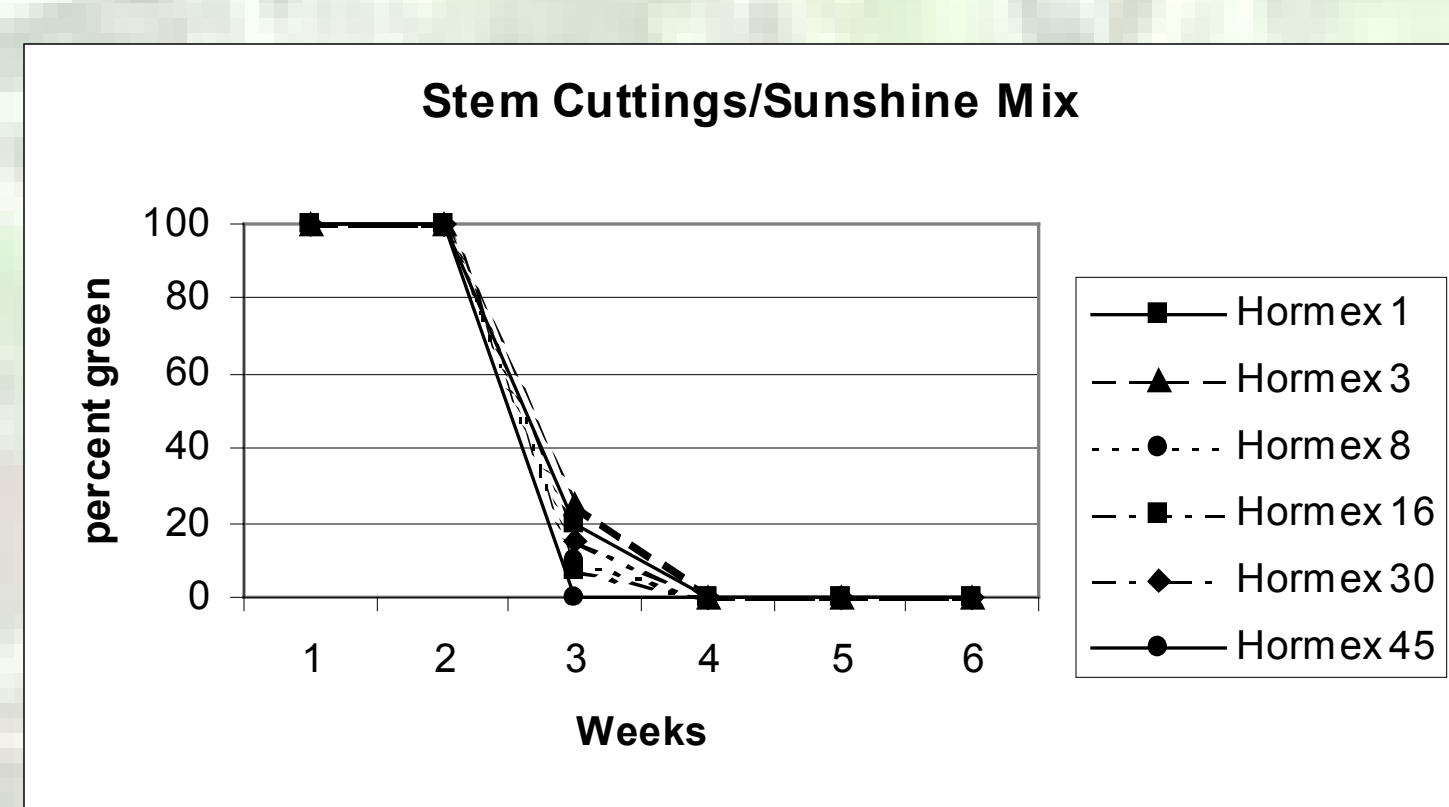
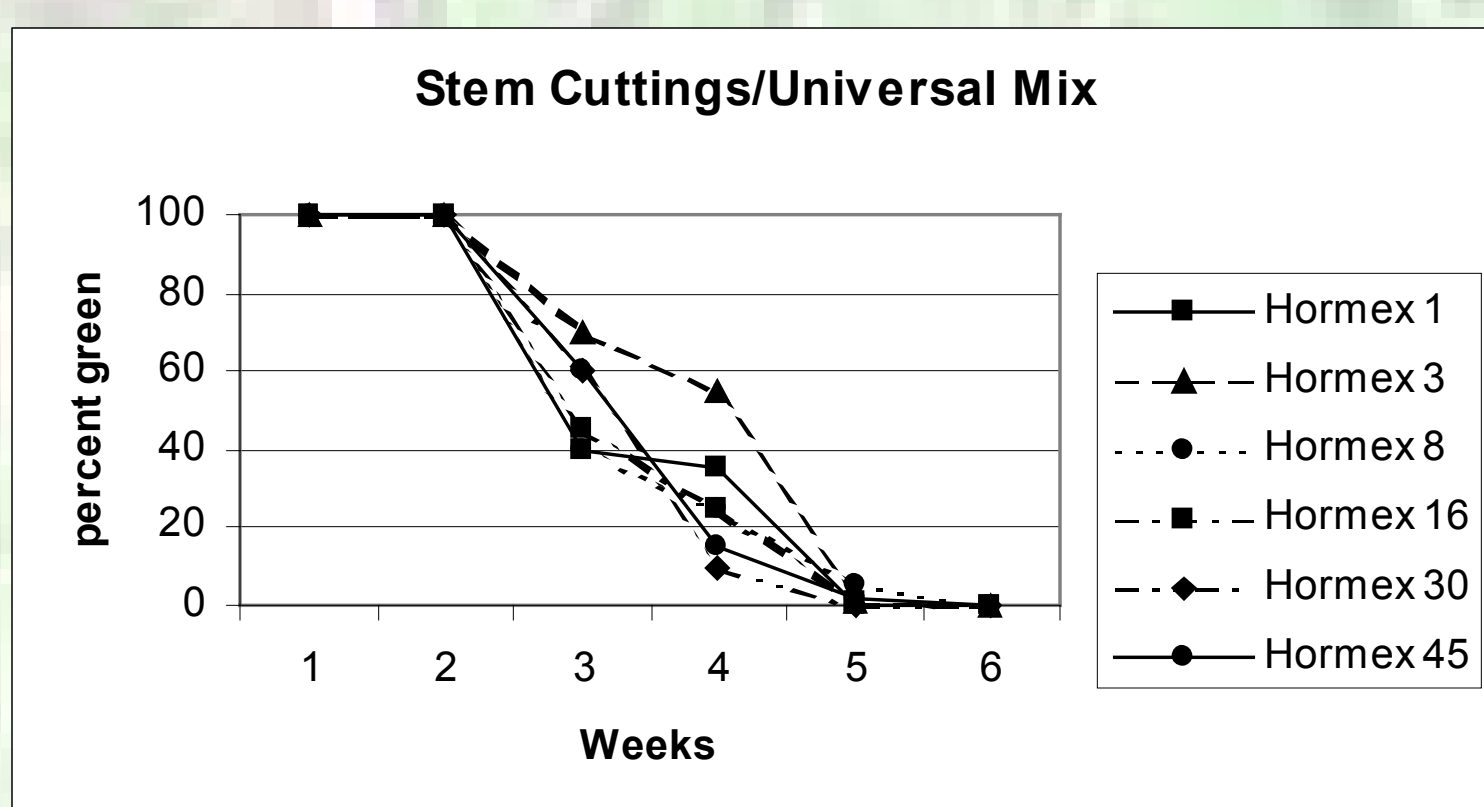
For propagation of plants via stem cuttings, pre-existing meristems such as terminal or lateral buds are contained in the cutting. Often for propagation, stems containing these buds are cut from the mother plant, dusted or dipped with an auxin compound, potted in a soilless media, and placed in a mist or high moisture environment until new roots develop. The auxins stimulate development of new adventitious roots, while the mist protects the plants from desiccation. Concentrations of auxin generally are lower for herbaceous or easy to root plant materials, and higher for woody or hard to root plant materials. Various concentrations of auxin are available in different commercial products such as Hormex. The soilless media needs to provide support, aeration and moisture. Hence, some variables that may affect the successful development of new plants from cuttings include plant tissue, auxin concentration, and media type (Hartmann et al., 1997).

The purpose of this study was to investigate how factors such as tissue, media, and auxin concentration affect the success of *Stylisma pickeringii* cuttings to develop plants. For this study, two plant tissues (stem with lateral nodes or stem tips), three types of media (Universal Mix, Sunshine Mix and fine vermiculite), and six Hormex concentrations (1, 3, 8, 16, 30 or 45) were used. Establishment of plants with these conditions was evaluated.

PROCEDURE

Stylisma pickeringii (Torr. ex M.A. Curtis) Gray var. *pattersoni* (Fern. and Schub.) Myint. stems were collected on August 21, 2001 near Snicarte, IL (Mason County). The plants were stored in moist bags until August 24, 2001, when cuttings were planted. Two different plant tissues (stems with 2 lateral nodes and stem tips about 5-7.5 cm long) were cut from stems. The base of cuttings were dipped into one of six different concentrations of auxin (Hormex powder 1, 3, 8, 16, 30 or 45; i.e. 0.1-4.5% indolebutyric acid). Cuttings then were placed into one of three different types of media (Universal Mix, Sunshine Mix or fine vermiculite) in a standard 9-cell pack container. Cuttings were grown in a mist bed with temperatures at 23°C during the day and at 22°C during the night. The mist frequency was every 6 minutes for a period of 16 seconds. Light in the mist bed fluctuated with ambient sunlight that was transmitted into the greenhouse. No supplemental light was added. For stem cuttings, all three types of media and six Hormex concentrations were used. For tip cuttings, only two media (Sunshine Mix or fine vermiculite) and three Hormex concentrations (1, 16 or 45) were used. For each combination of treatments, nine cuttings or replications were used. Individual cuttings were evaluated weekly during six weeks for any new stem growth, and each one was scored as 1) green (healthy) or 2) a mixture of green and brown or 3) brown (necrotic). Percentage of cuttings that remained green were calculated and plotted for each treatment at each sampling time.

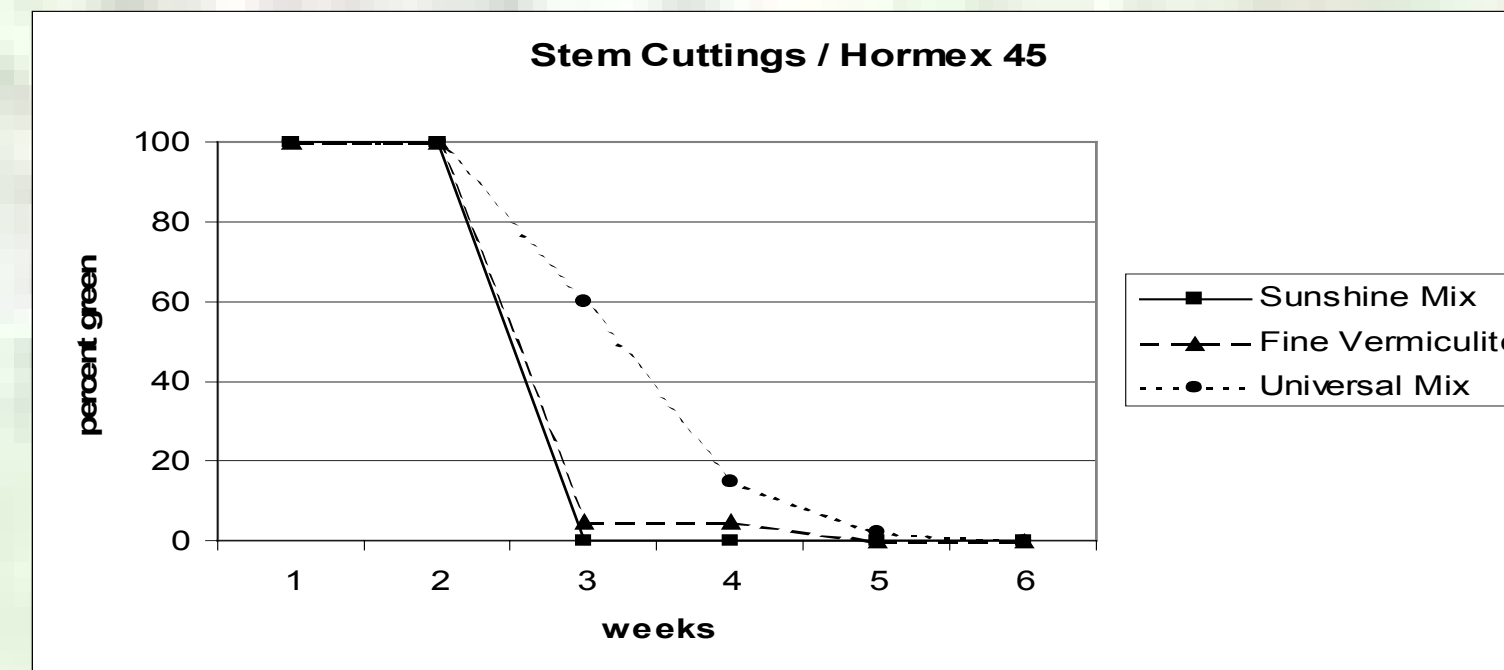
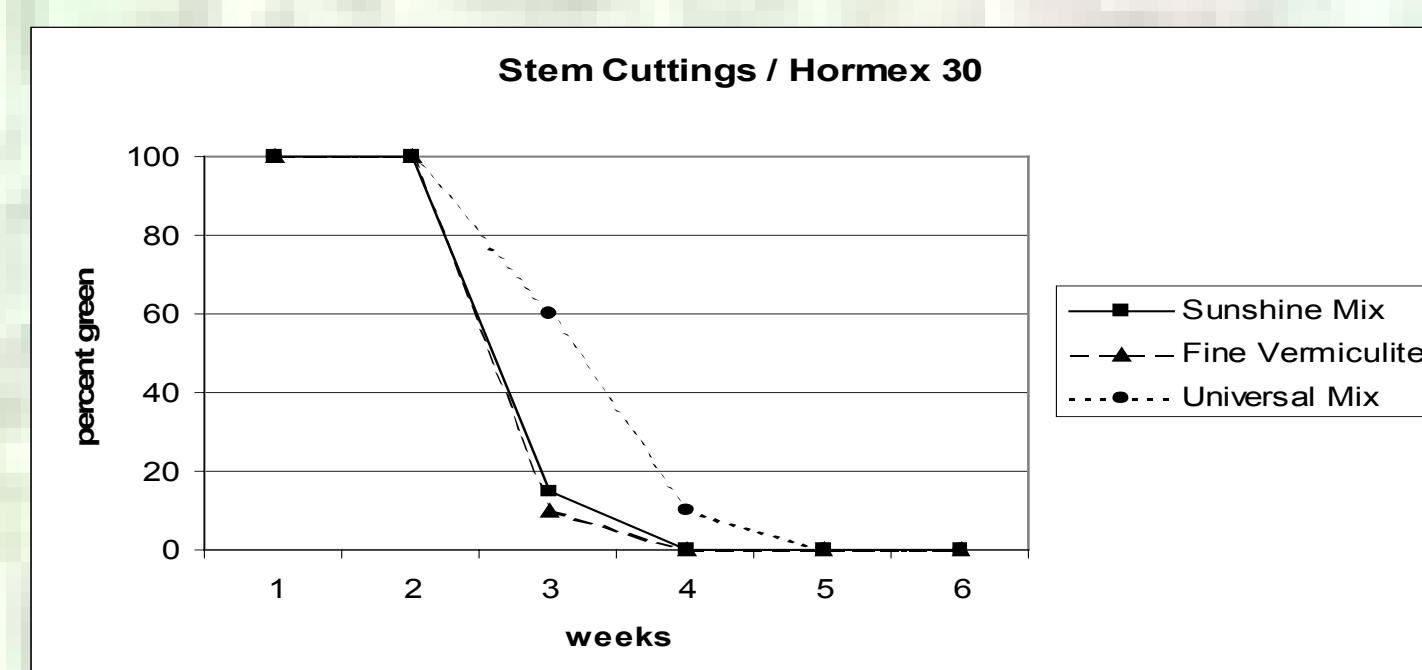
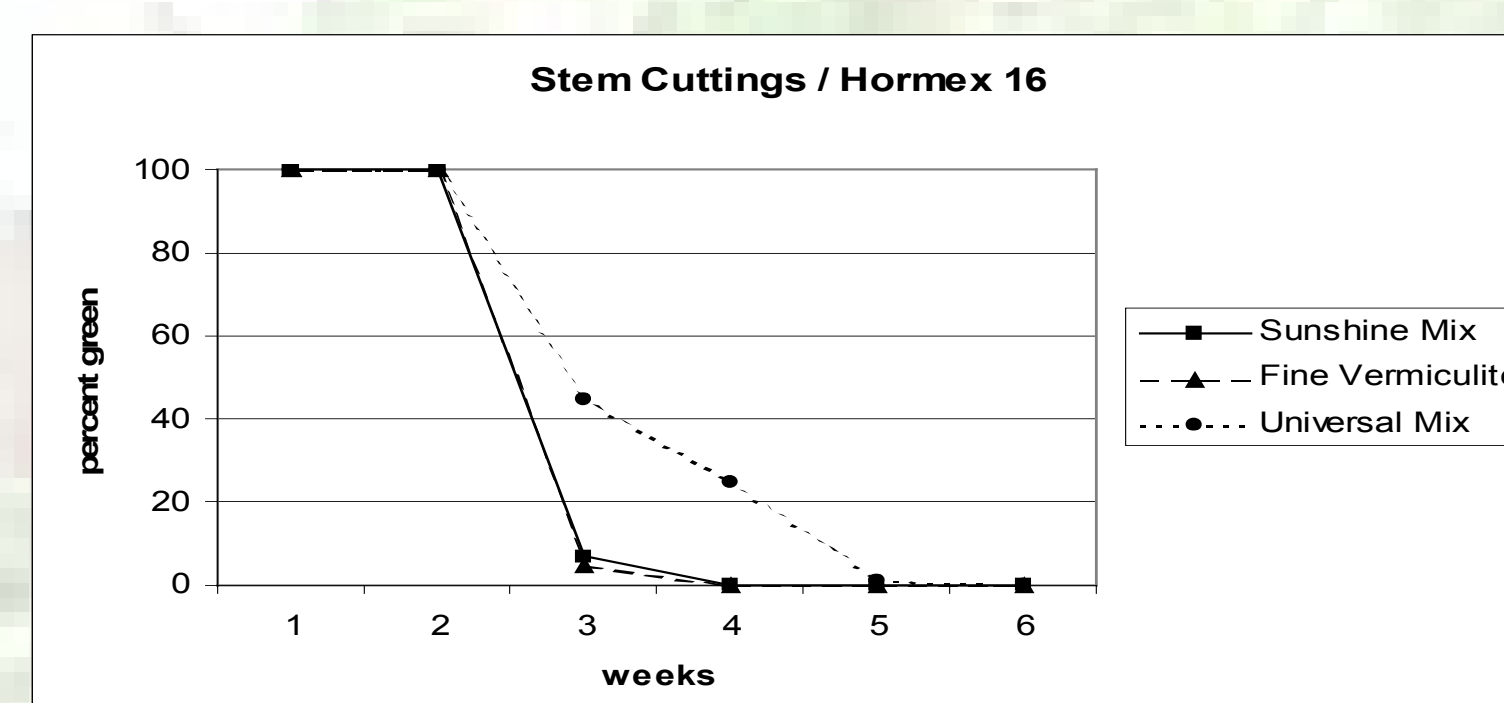
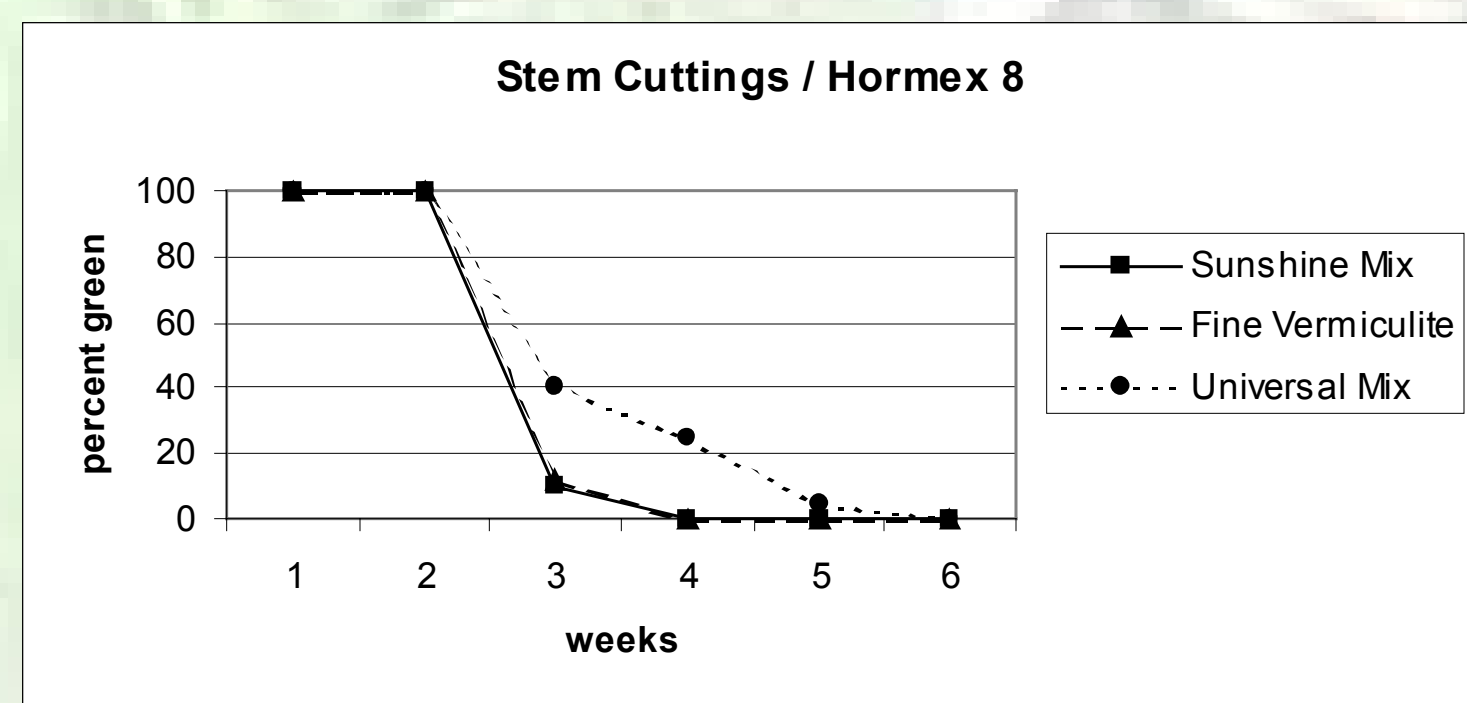
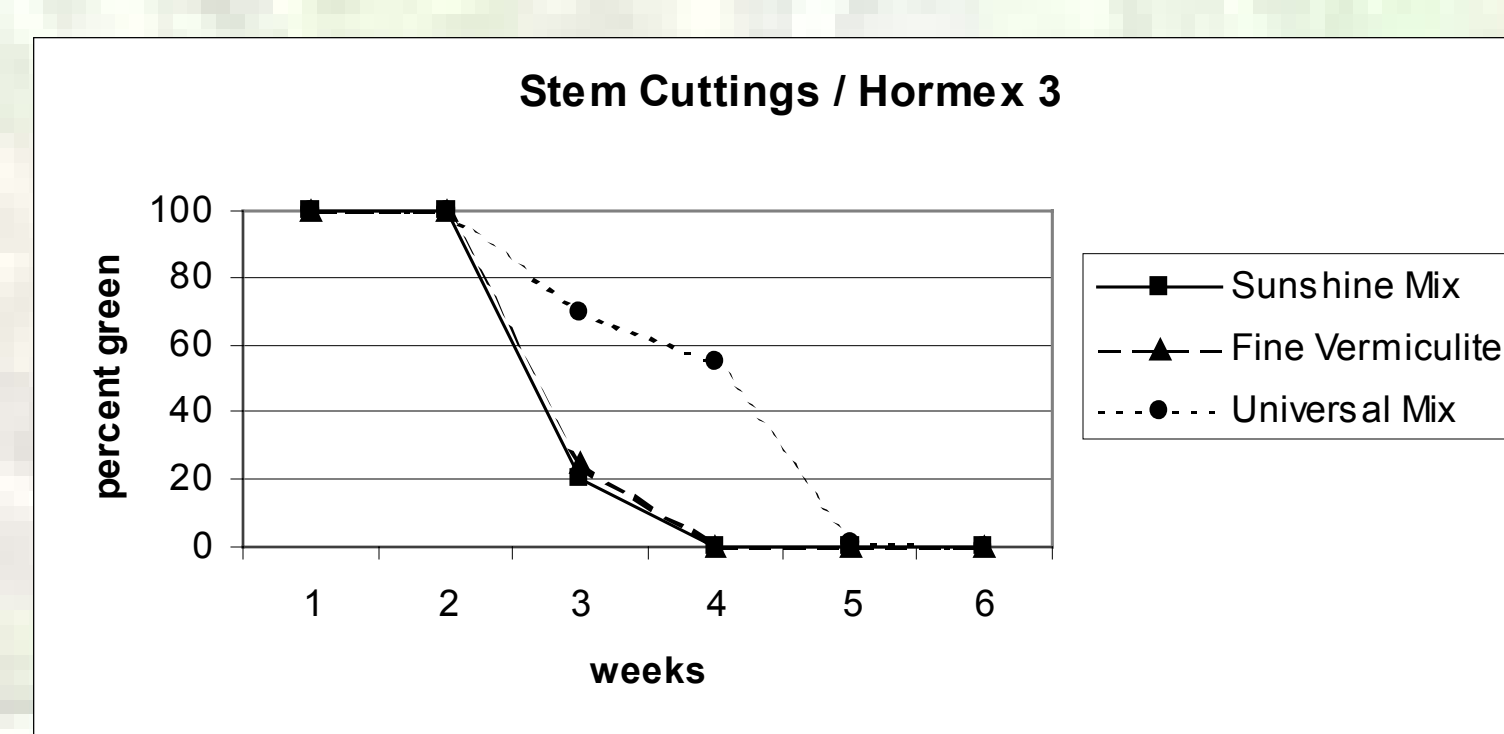
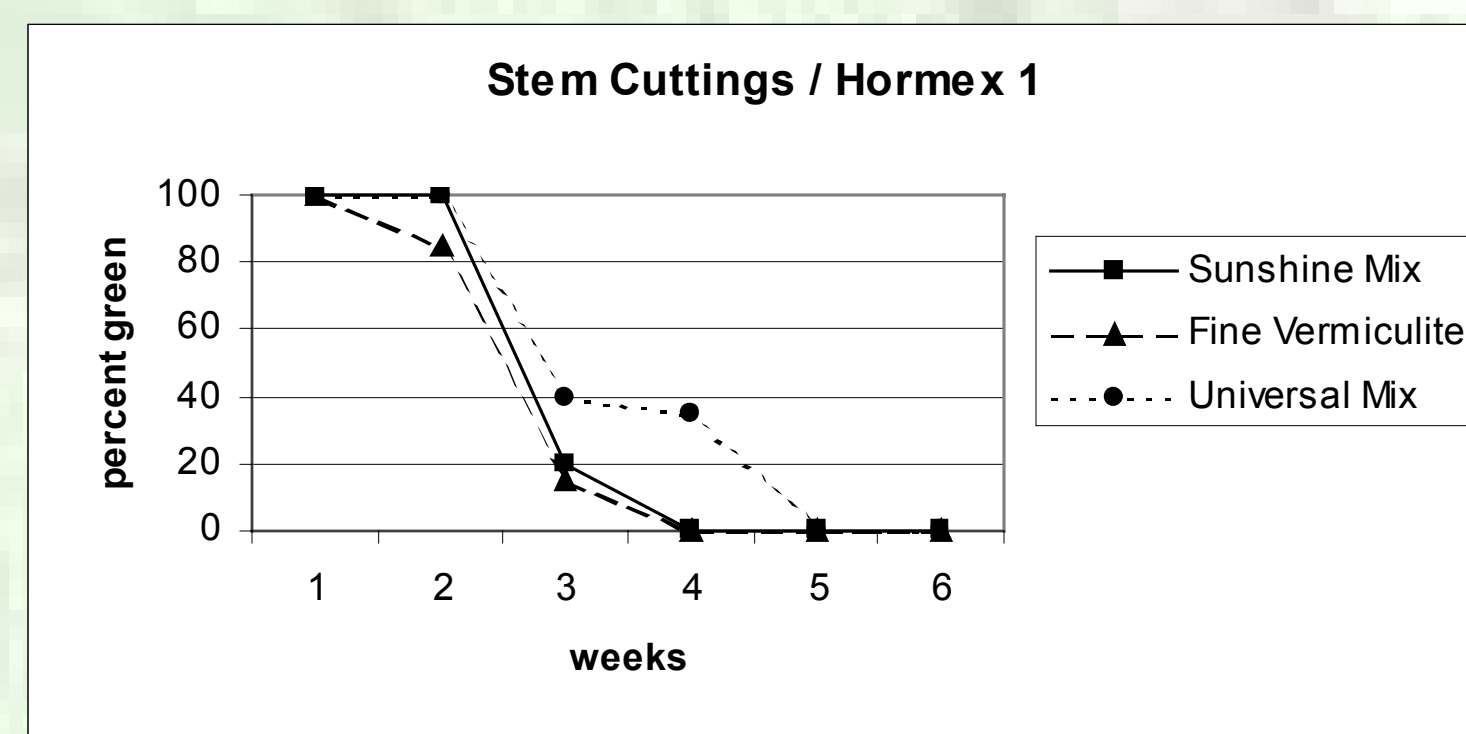
Stem Cuttings—Different Media



ABSTRACT

Stylisma pickeringii (Convolvulaceae) is an endangered sand prairie plant in Illinois. *Stylisma pickeringii* can be propagated by seed, but in greenhouse studies, no flowering has occurred. Similar Convolvulaceae species flowered within six months when propagated via stem cuttings. Hence, an attempt to propagate *Stylisma pickeringii* via stem cuttings was made to hasten the onset of flowering. Specific objectives were to investigate how rooting media, auxin concentrations, and tissue sources affect development of *Stylisma pickeringii* stem cuttings into plants. *Stylisma pickeringii* stems were collected on August 21, 2001 near Snicarte, IL. On August 24, 2001, cuttings were taken using three types of rooting media (Universal Mix, Sunshine Mix, and fine vermiculite), six Hormex concentrations (1, 3, 8, 16, 30 and 45; i.e. 0.1-4.5% indolebutyric acid), and two tissue sources (stems with 2 nodes or stem tips). Nine cuttings for each treatment were placed in a mist bed in a greenhouse. Plants were evaluated weekly for new stem growth, and for percentage of tissue that was healthy or chlorotic or necrotic. After six weeks, all cuttings were necrotic, and appeared dead, but information was gained about rooting media, auxin concentrations, and tissue sources. For stem cuttings, plants were healthier longer in Universal Mix with Hormex 3 relative to other rooting media and Hormex concentrations. Stem tip cuttings became necrotic first in Hormex 45, and no obvious difference was seen when comparing the rooting media. In addition, new stem growth from stem cuttings was observed for 3% of plants during the fifth week, which was after the original stem was necrotic. However, these new stems eventually died. Although no plants were propagated successfully using cuttings, differences were found between rooting media and Hormex concentrations. In future studies, stems will be collected earlier in the year when still actively growing.

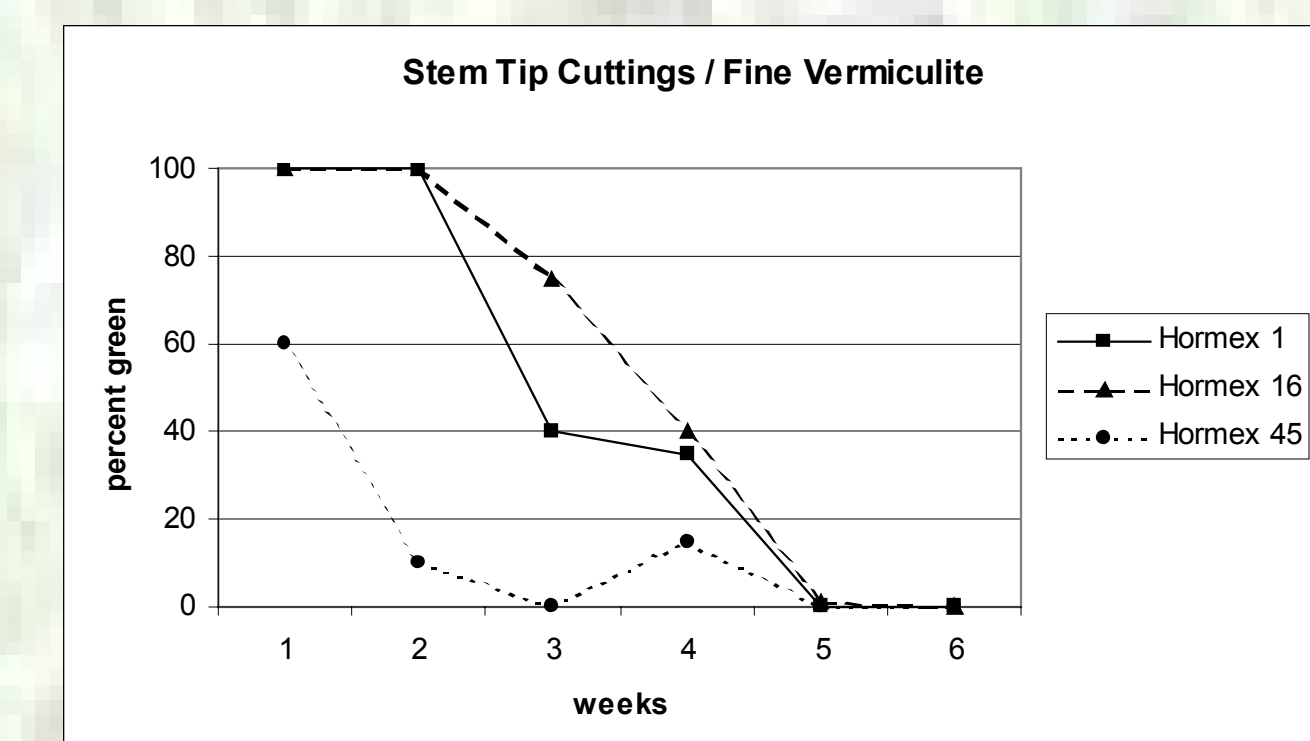
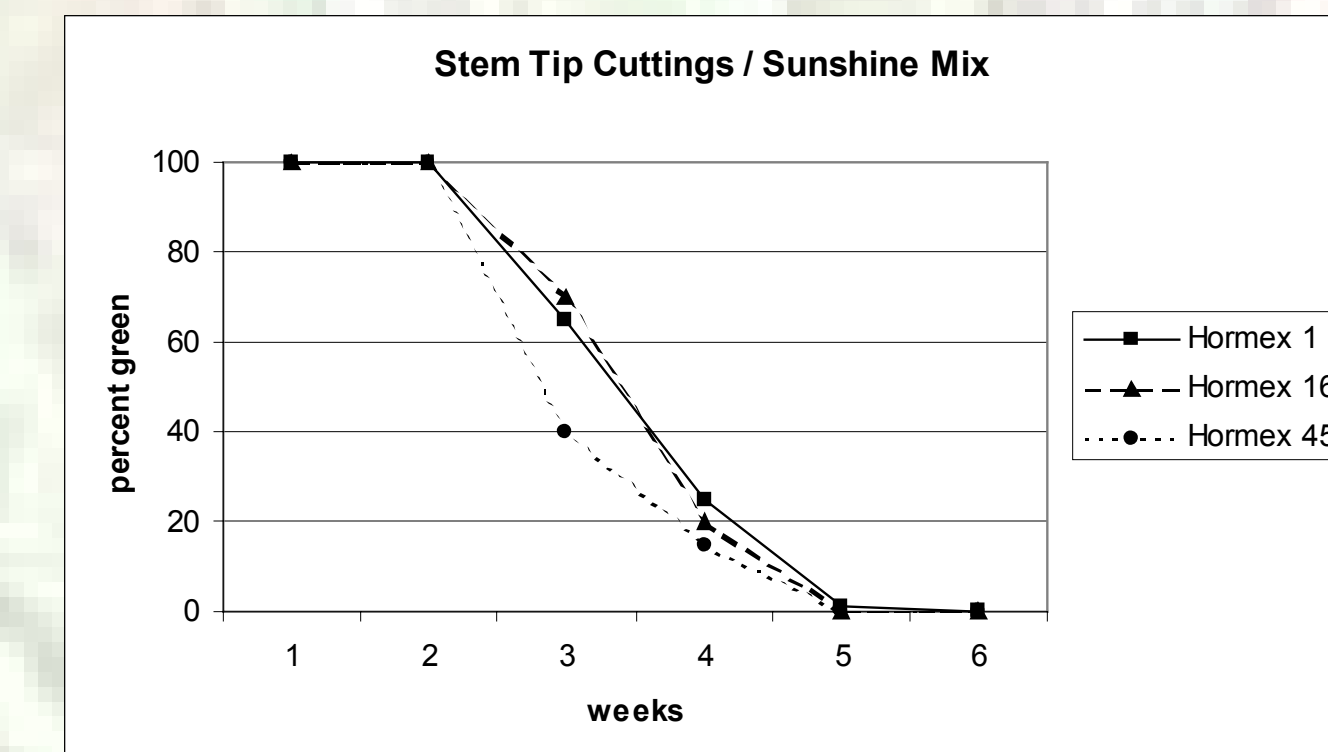
Stem Cuttings—Different Hormex Concentrations



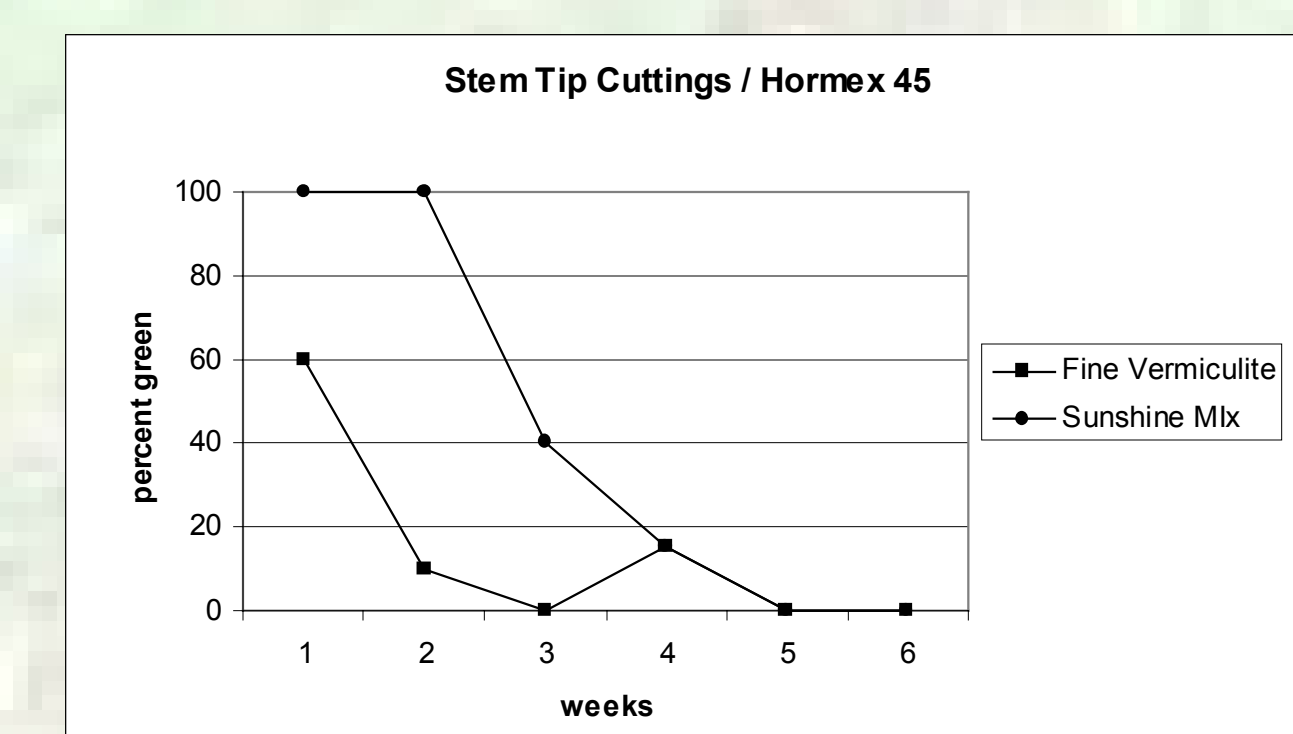
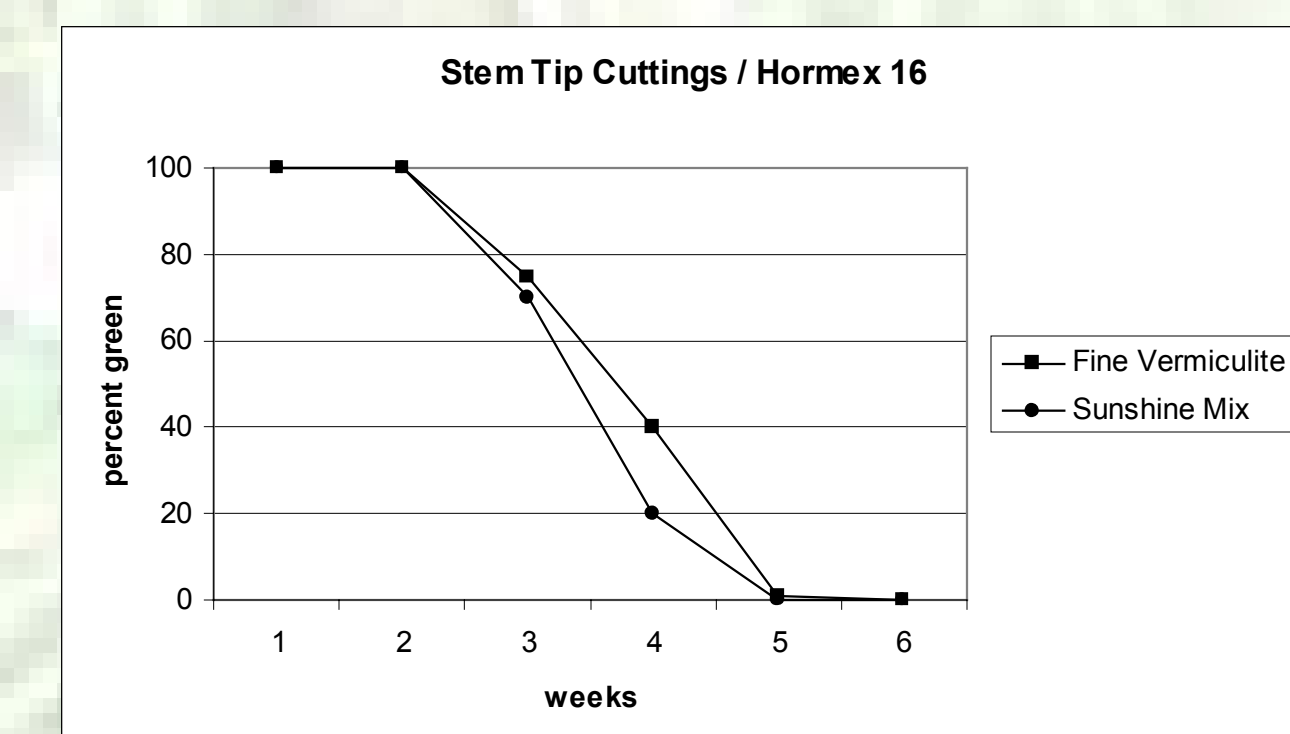
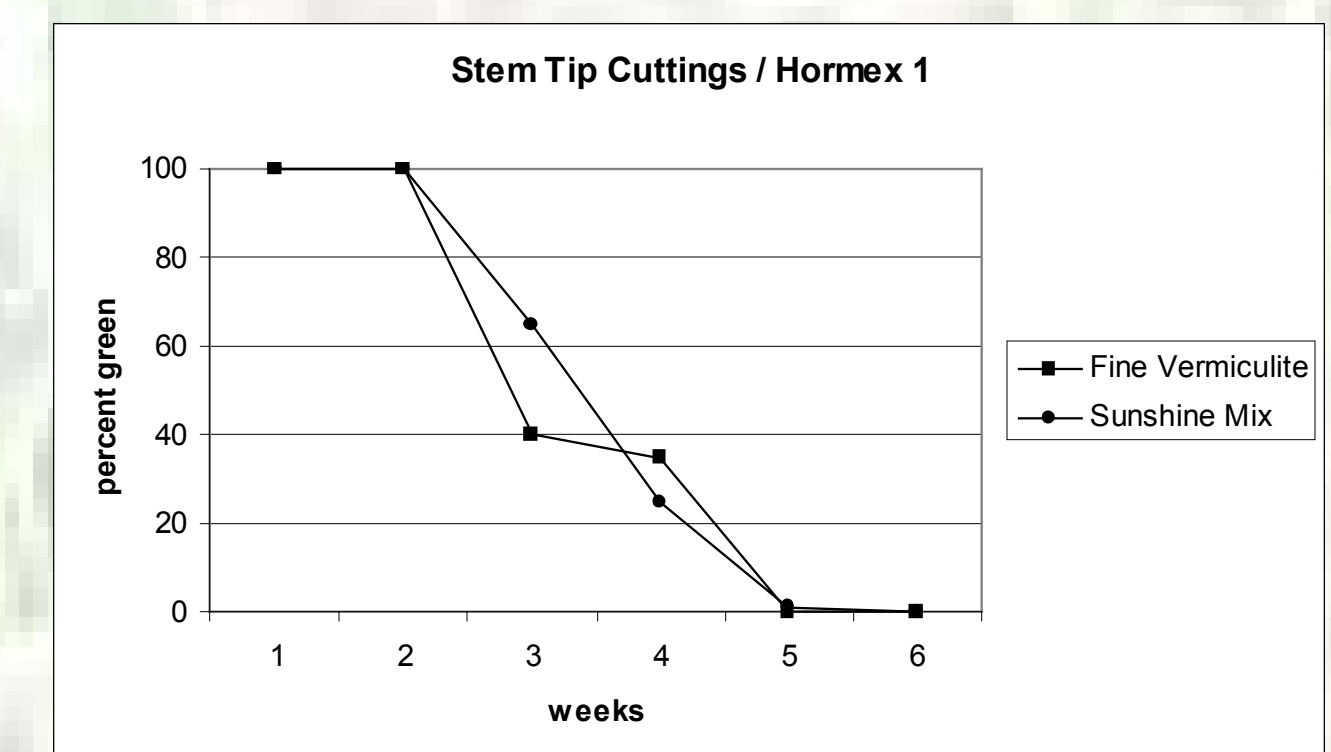
ACKNOWLEDGMENTS

Special Undergraduate Research on the Environment (SURE) Program of The Environmental Council at the University of Illinois, Urbana, IL
Department of Natural Resources and Environmental Sciences at the University of Illinois, Urbana, IL

Stem Tip Cuttings—Different Media



Stem Tip Cuttings—Different Hormex Concentrations



SUMMARY

Based on this study, it is recommended that Universal Mix and Hormex 3 be used for further studies. Since little difference in success rate was found between stem cuttings and stem tip cuttings, it is recommended to use stem cuttings since more plant material for cuttings can be obtained per single stem. Also, for future studies, stems should be collected earlier in the season, because it is probable that stems used in this study were collected too late in the season when active growth was slow.

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