

What are they teaching kids in school these days? A look at plant propagation courses at North Carolina State[©]

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INTRODUCTION

North Carolina State University currently offers several plant propagation courses to a number of different student audiences: HS 121 (Plant Propagation for Associates degree students), HS 301 (Plant Propagation for Bachelor's degree students), and HS 203 (Home Plant Propagation for certificate students and Bachelor's degree students pursuing majors unrelated to Horticultural Science). Some of these students are majoring in horticulture, and others are just taking a plant propagation class an elective out of interest. Some of the students want to propagate plants at home as a hobby while others plan to make a career in commercial horticulture.

Even the delivery of the course materials vary as some of these courses are taught in person on campus, while one of them—(HS 203)—is also taught online for distance education students. The students who want to learn about our craft have a wide range of goals. Despite their differences, my teaching goals in these classes are the same.

GOAL ONE: EQUIP STUDENTS WITH A FULL SUITE OF TECHNICAL SKILLS IN PROPAGATION

Plant propagation is first and foremost an applied science. A plant propagation class cannot be complete without giving students the opportunity to put the techniques and scientific principles that they learn about in lectures into practice. Students pursuing a minor, Associates degree, or Bachelor's degree in Horticultural Science at North Carolina State are required to take a plant propagation course in person and on campus—which includes a 3-h laboratory period once a week.

During this laboratory period, students practice and experiment with techniques including: cuttings (stem, leaf, root, and culm) from herbaceous and woody species, grafting, budding, tissue culture (Figure 1), layering, bulb scaling and twin-scaling, controlled pollination and hybridization (Figure 2), fern spore germination, seed germination, seed scarification, and seed stratification.



Figure 1. A student at North Carolina State learns how to tissue culture Mexican feather grass (*Nasella tenuissima*).

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Figure 2. A student performs a controlled hybridization on petunias.

For my Home Plant Propagation course, we cover the same skills required for the courses for Horticultural Science majors, but from the perspective of hobbyist propagation for the homeowner. Emphasis is placed on learning techniques that are better suited for home plant propagation such as division (Figure 3) and layering. This course is taught both online and in person, but even online students must engage in hands-on practices of these skills. Online students view a series of videos instructing them on techniques before attempting them on their own at home. They then submit photos of their efforts to the course website where they can also view photos posted by their classmates (Figure 4). Discussion between students regarding strategies for effective propagation at home based on these shared photos is an essential part of the course.



Figure 3. Students in Home Plant Propagation (HS 203) practice division.



Figure 4. A photo submitted by a distance education student taking plant propagation online, showing how they are propagating stem cuttings at home.

GOAL TWO: ENCOURAGE STUDENTS TO USE PROBLEM-SOLVING SKILLS IN REFERENCE TO PLANT PROPAGATION

Any educator will tell you that problem-solving skills are important for students in any area of study, and plant propagation is no exception. In all of my classes, I try to present students with problems in the realm of plant propagation that have yet to be solved. Sometimes this may involve describing a plant that no one has yet figured out how to effectively propagate for commercial production. Sometimes I challenge them to think of ways to use the technical skills that they have learned in their lab period to overcome a particular problem (Figure 5).

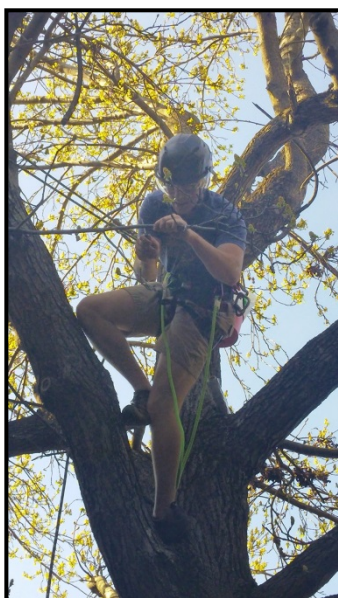


Figure 5. A student air layers a tree in an effort to get an own-rooted plant of a species that is normally grafted and difficult to root by stem cuttings.

During lecture periods, I give examples of how others in the industry have leveraged propagation techniques to overcome horticultural challenges and ask the students to present ideas on how they would meet these challenges. Some days we discuss the scientific principles underlying propagation and why certain techniques are effective. In these discussions, questions posed by both myself and by the students may not have an answer. I use these opportunities to encourage the students to dig deeper into the topic through research on their own time.

Assignments in my classes are also designed to encourage students to research topics independently. Although millennial college students are “digital natives,” they often lack experience and knowledge of how to use the technology of today to find answers to questions. I believe that learning how to utilize the internet and other resources in this way is key to the success of students. Smart phones and other personal devices make memorization of facts less important than it once was. Students entering the workforce today must learn how to use these tools to find the information they need and to assess the quality of the information that they find.

GOAL THREE: EXHIBIT PATIENCE AND PERSISTENCE THROUGH PROPAGATION

The same technological devices that make finding information and solving problems so quick and relatively effortless can also create an expectation for instant answers and results. Plants rarely offer either. Many students taking plant propagation classes are surprised by how long it takes a cutting to form roots for a particular species or become discouraged when the first tree they have ever grafted is not successful. Frequently students assume that a plant is dead simply because it has not shown much visible change after a

month or more.

As part of my teaching strategy, I try to select propagation activities and species that represent a range of levels of difficulty. Some plants that we take cuttings will root in a matter of weeks, and this quick response builds confidence and excitement in students. However, other techniques that we practice will have a low rate of success and prove difficult for students to master the first time. My goal is that they would see failure as a normal part of the process of learning. When they reach the workforce, I hope that they see such experiences as a motivation to persist in honing their skills and as an opportunity to learn from what did not work. If a student has a plant that dies, I require that they hypothesize as to why it died and propose a solution if they were to attempt to propagate that plant again.

Allowing students to experience failure in class does result in expressions of disappointment and frustration. However, at the end of the semester, when students look back at all the plants they have acquired as a result of their efforts, many of them also express sentiments similar to that of a student who said: "Failing is kind of challenging but also rewarding! I like doing well but failing also makes you consider what could have gone wrong—and shows you differences between different plants and practices." I hope that encouraging this type of perspective through plant propagation courses will benefit students not only in future plant propagation endeavors, but in their careers and lives once they leave North Carolina State.