

## **Propagation of Woody Stem Cuttings**

### **Wounding and auxin**

Cuttings are classified based on the part of the plant the cutting is taken from and/or the maturity of the plant part. Cuttings are generally classified as either stem cuttings, leaf cuttings, leaf-bud cuttings, and root cuttings. In this introduction to classification of cuttings, the differences among the various types of woody stem cuttings, and proper procedures for taking each type of cutting will be illustrated.

- Dormant cuttings may be deciduous or evergreen and are collected from stems in a resting stage of growth.
- Greenwood cuttings are collected from the newest actively growing stems and may be very pliable and flexible.
- Softwood cuttings are collected from current season wood that has formed a terminal resting bud and are generally not flexible.

This laboratory will introduce you to propagating woody plant species from stem cuttings subjected to wounding treatments. Basal wounding is beneficial in rooting cuttings of many species, especially cuttings with older wood at the base.

The objectives of this lab are to: Familiarize students with reasons for wounding and degrees of wounding, demonstrate proper procedures for wounding stem cuttings, and evaluate the effects of heavy wounding and rooting hormone on the propagation of woody cuttings.

Wounding can influence rooting success of woody cuttings through either physiological or mechanical mechanisms or both. Physiological factors include changes such as natural accumulation of auxins, ethylene, and carbohydrates in the wounded area that will stimulate cell division resulting in the formation of callus and root primordia along the margins of the wood. Mechanical factors include an increase in the surface area through which water or auxins may be absorbed and a mechanical separation of the layer of sclerenchyma tissues, or fiber cells, present in some species, which acts as a physical barrier through which developing root primordia cannot penetrate.

Depending on species and stage of development, the degree or severity of wounding can influence rooting success of cuttings. Light wounds can be produced in cuttings of narrow-leaved evergreen species in the process of stripping the lower side branches of the cuttings. Light wounding is also achieved by making a vertical cut down the side of a cutting on the basal end approximately 1-2 inches in length as illustrated in the photo. This cut penetrated through the bark into the wood of the cutting. Heavy wounds can be produced in cuttings by removing a small strip of bark on either one or two sides of a cutting approximately 1-2 inches in length on the basal end. Heavy wounding can also be achieved by splitting the basal end approximately 1-2 inches in length.

For this lab, you will need flats with cell packs of enough cells to root at least 24 woody cuttings for each species chosen by your lab instructor, enough substrate to fill the cell packs, a liquid auxin formulation such as IBA at 5,000 ppm, a jar or container for dipping cuttings into auxin formulation, tags to label treatments, pruners or another appropriate cutting utensil for taking

cuttings and wounding, and a sources of woody plant material.

The general methods for this lab are as follows: Prepare substrate in cell pack flats.

Take 24 cuttings of each woody shrub or tree chosen by your lab instructor. Subject six cuttings of each species to each of the four wounding/hormone treatment combinations. Stick cuttings in cell pack flats by treatment. Label flats accordingly and place on benches under mist.

Now we will look at specific preparation and treatment procedures.

First, prepare cell pack flats with substrate provided by a lab instructor and water substrate in well to ensure a saturated media for propagation. Then, take cuttings of the selected species of woody shrubs or trees. Cuttings should always be uniform in length and include at least 3-5 nodes.

Heavy wounding treatments should be applied by removing the bark and a small portion of the wood on 1-2 inches of the basal end of the cutting with a pruner, knife or similar cutting device. Always make cuts in a safe manner. If you are not comfortable working with the knife make all cuts away from your body and away from your fingers.

For auxin treatments, pour enough rooting hormone in a jar or other container to allow at least 3/4 inch of the basal end of the cutting to be treated. Dip the basal end of each cutting into the auxin solution for 1 second and then place them in the substrate.

For the heavy wounding and rooting hormone treatment wound the basal end of the cutting first and then dip in the rooting hormone.

Control treatment cuttings should have the basal leaves removed as with other treatments and then be placed directly into the substrate with no wounding or auxin treatment. Make sure the treatments are labeled separately within the flats and place under mist.

Woody cuttings often take longer to produce roots than herbaceous cuttings, so be patient. Depending on the species selected by your instructor data may be collected on rooting success 3 to 6 weeks after sticking. Remove substrate from roots by washing substrate gently from roots in water as in previous labs. Record rooting success, number of roots and root length for all cuttings. For each species you tested calculate the rooting percentage, mean number of roots, and mean root length for each of the four auxin and wounding combination treatments. Discuss observed differences among treatments and species.