

Native Plant Workshop: Vegetative Propagation by Softwood and Semi-hardwood Cuttings

Karen J. Little
Sul Ross State University

Introduction

This handout was prepared for the SRSU Native Plant cuttings class. I have based it on instructions from Jill Nokes' book, How to Grow Native Plants of Texas and the Southwest, and have added what I've learned from years of making cuttings. Simplified instructions are first. This page lists the steps in order. I would recommend using it as a kind of checklist of the steps for making cuttings. Use it every time you work on cuttings until you know the steps by heart. The pages that follow explain in detail why you are doing each step. These are the things I would have explained to you in class while we were making the cuttings. Also included are paragraphs that condense parts of the book and contain advice from my experience making cuttings. Since we were unable to have the class, I have included illustrations from the book so that you have an idea of what the cuttings should look like. Please contact Karen or consult Jill Nokes' book for further explanation if needed.

Like some of you, the only cutting I had done previously were starting clones by sticking cuttings from houseplants in a jar of water or air-layering a philodendron. I was intimidated by the staggering array of plant rooting products and mystified by the question of why some plants start by cuttings and others don't. I wasn't sure when to start plants from seeds and when start them from cuttings. This book cleared up a lot of that uncertainty and empowered me to expand and experiment beyond the book. I hope this handout will encourage you to do the same.

Karen

Checklist of instructions for making softwood and semi-hardwood cuttings

1. Prepare pots for cuttings at least a day ahead of time. Peat moss is hydrophobic when dry, so water the pots several times to get the peat moss mixture to absorb the water. After the peat moss is soaked up, make a hole in the rooting media with a pencil or similarly sized stick to put the cutting in.
2. Put out equipment to make your cuttings including face masks or mouth/nose covering of some kind (like a handkerchief), gloves, scissors (pruning or plant trimming scissors), small water container, and small container for rooting hormone. Don't risk contaminating the whole bottle of rooting hormone by dipping directly into it. A large number of plants can be treated with a very small amount of rooting hormone so put a spoonful of the hormone in a small dish and throw out any unused hormone rather than put it back into the bottle.
3. Collect plant material first thing in the morning. The plant material should be at least 5-6 inches long, longer if possible. Keep it cool and moist. Do not put cuttings in water.

Process the cuttings as soon as possible. If you can't process immediately, keep them cool in a refrigerator or a cooler. Do cuttings one at a time, start to finish.

4. Dip scissors in alcohol, 70% or higher is best. Allow scissors to dry.
5. Cut off the bottom half (or more) of the leaves. If leaves are big or long, cut them in half.
6. Make a fresh cut just below a node (see definitions). Cuttings should have 2 or more nodes after the basal cut is made. If the basal end is woody, "wound" it by gently hitting it with the handle of the scissors. Cuttings are best if the final length is at least 4 inches when it is finished.
7. Dip cut end into the water. Shake off excess.
8. Dip cut end into the rooting hormone. Tap gently to remove excess hormone.
9. Put cutting into the pot. Put it carefully in the hole made previously so that you don't scrap the rooting hormone off. Gently push the peat moss mix in around the cutting.
10. Put pots of cuttings into a mist tent or in a moist area. Do not put them in standing water.
11. After 2 weeks, start checking the bottom of the pots for roots and reduce misting frequency if possible. Some plants will root right away, but others require a reduction in misting in order to start forming roots.
12. Transplant the cuttings that have rooted. Carefully pot the cuttings into an appropriate potting soil. Keep transplants out of direct sunlight for at least 2 weeks.

There are more detailed instructions for each step on the following pages. There are also illustrations of cuttings on page 7 and 8 and a short list of definitions on page 9.

Detail for Instructions from page 2

1. I root cuttings in 2 inch square pots but pot size is not important. Rooting media must be well drained. Media can be a mixture of the following ingredients: peat moss, vermiculite, perlite, and sand (Hoban or course sand should be used, never use sugar sand. See “Types of Sand” in definitions). Peat moss should be the first ingredient in most rooting media mixes. The acidity in peat moss encourages the growth of callus cells from which roots grow. Even most of our alkaline-loving native desert plants need peat moss in the rooting media in order to make good roots. I usually use a mixture of 1 part peat and 2 parts perlite or vermiculite. I have also used the following mixes for my rooting media:

1 part peat, 1 part course sand and 1 part perlite and

1 part peat, 2 parts coarse sand (for plants that like mineral bases like *Choisya dumosa*).

Make a hole in the moist media that is the diameter of a pencil. This will allow you to put your cutting in the media without scrapping off the hormone.

2. It is best to prepare your space ahead of time so that you can make the cuttings as quickly as possible after the plant material is cut. Wearing a face mask is recommended since peat moss and rooting hormone should not be inhaled. If you don't have a face mask, cover your mouth and nose with a handkerchief or something similar. Impenetrable gloves, like nitrile or latex gloves, should be worn to keep rooting hormone off of the skin. If you know ahead of time which hormones you will be using, put small containers of them out as well. Specific rooting hormones will be discussed later in the handout.

3. Collect plant material first thing in the morning. I use a plastic grocery bag and wet paper towels to keep my cutting material fresh. If I collect off-campus, I put the plastic grocery bags full of plant material into a cooler with ice but be careful not let the ice touch the plant material. I cut a generous length of plant material when possible so I that the finished cuttings are at least 4-6 inches long. Cuttings shorter than 4 inches aren't as successful. We have probably all rooted plants in water but soaking most native plant material or cuttings in water encourages rot instead of rooting. There are exceptions, like willows and cottonwoods, so look up the recommended propagation technique for the plant you want to start because there are many plants that either don't need hormone to root or are very difficult to start by using softwood or semi-hardwood cuttings. Some plants use techniques like root cuttings, hardwood cuttings, or tissue culture which are not covered in this handout. The time of year to best make cuttings will be discussed later.

4. Alcohol disinfects the scissors, which kills most plant diseases and fungus. I disinfect between species of plants but not between each individual cuttings.

The longer cut plant material sits before processing, the less likely it will root.

Do steps 5-10 with each individual cutting (in other words, don't cut all of the leaves off all the material at once).

5. Cuttings need some leaf material, but too much leaf material will cause the cutting to dry out before it can root. Cutting leaves off the bottom half and cutting big or long leaves in half helps to keep transpiration low (along with misting).

6. Make the basal cut just before dipping the cutting into the water and hormone. Make a slightly angled cut (see illustrations) just below a node. Wound, if necessary (see definitions). If the cutting wasn't finished immediately after the basal cut was made, it will need to be cut again. Basal cuts must be fresh!

7. The water dip is just to help the hormone stick if you are using a talc based hormone. The quick-dip rooting hormone doesn't require this step.

8. Dip into the hormone then gently tap excess hormone off of the cutting.

9. The hole should be bigger around than the plant stem so that the hormone does not rub off when you put it into the rooting medium. Push the potting mix against the stem just enough to keep the cutting upright.

10. If you don't have a mist tent, you can use a plastic bag, propagation tray with a clear dome, or spray mist the cuttings with water as often as possible. Pots of cuttings must not stand in water.

11. Two weeks is a minimum rooting time. The cutting should not be disturbed during the first 2 weeks. Many plants take longer to root. Leave the cuttings alone until they have rooted. Jill Nokes' book has good guidelines and recommendations for rooting many native plants. The roots should come out of the drain holes in the pots so that you can see them but sometimes the roots keep circling without coming out the drain hole. If you need to check for circling roots, gently depot the cutting into your hand, check for roots, and carefully put the mass back into the pot if there are no visible roots. Clean out any rotted material and rotted cuttings when checking for roots. If large or long leaves have grown, cut them in half if the plant hasn't rooted yet.

If possible, cut back on misting when roots start to appear. This will harden the cuttings off and prepare them for transplanting. Some plants don't root very well until after the misting is cut back, but be sure that the cuttings aren't allowed to dry. The mist tent at Sul Ross is not adjustable; all the plants have to be on the same mist schedule so I try to do as many cuttings as possible on the same day. I usually set the mist timer for 1 mist every 8 minutes or 1 mist every 4 minutes if the plants are water lovers. If I can't harden off some cuttings because other, fresher cuttings are in the same tent, I really pamper the cuttings after transplanting.

12. Most roots on cuttings are very brittle adventitious roots (see definition). Fibrous roots and taproots often don't grow until after transplanting. The cuttings should be transplanted into a well-drained potting mix and pampered until they show signs of growing. When transplanting, I make a hole in the potting soil mix, carefully put the contents of the 2 inch pot into the hole, and cover with a thin layer of potting soil. Push the potting mix gently against the root ball but do not press or firm the soil when transplanting cuttings or you might break the brittle roots. Water thoroughly. I leave the transplants in the greenhouse as long as necessary for the plants to show signs of growth, which is usually two weeks or longer.

When to make cuttings

Jill Nokes' book, [How to grow Native Plants of Texas and the Southwest](#), is an excellent source for propagation advice from the best growers of desert plants. I recommend it to anyone who is serious about propagating our desert native plants. Keep in mind that the suggested times to make cuttings are just suggestions. The recommended times to do cuttings are good ballpark suggestions and many are spot-on for our area but timing can change dramatically from location to location and from year to year. Some plants in our area make good cutting material in March-May, but others don't until after the rains start. Some plant cutting should be made in the Fall and others make the best cuttings when they are a little woody. The best way to make cuttings is to take the growers suggestions and balance that advise with the growth you are seeing on the plants you want to propagate. Look at the actual plants you want to make cuttings from to see if they have made good cutting material. Sometimes the heat will cause new growth to get woody and, in some years some plants just don't make good cutting material at all. Experiment with different times of year, with different hormone strengths, and with different cuts. Keep track of your successes and share them with the rest of us.

Rooting Hormone

Jill Nokes' book has rooting hormone strengths in parts-per-million (ppm) IBA (Indolebutyric acid). Sometimes that can take a bit of research and some math to determine the ppm in your specific rooting hormone. I use a talc rooting hormone brand, Hormodin, simply because Patty Manning already had containers of it in the greenhouse. I had to get the Material Data Safety sheets (usually found online or from the manufacturer) to get the figures to do the math. There are many excellent rooting hormones on the market, but I haven't used them. The Hormodin works well for me and is easy to use. Hormodin brand rooting hormone comes in 3 strengths:

Hormodin 1 1000-2000 ppm

Hormodin 2 3000-5000 ppm

Hormodin 3 <5000 ppm

Most things I start use Hormodin 1 and 2. I've also used Clonex brand gel rooting hormone with mixed results. I've heard that home-made quick dips work well but I haven't had luck with them. I plan to try again.

All plants make hormones that help with rooting, but true willows (weeping willows, seep willows, and other trees in the genus Salix) have a natural substance called WRS, Willow rooting substance. (Keep in mind that desert willows are not in the genus Salix, so their stems won't work.) WRS contains, among other things, Salicylic acid and IBA. I have used it in combination with Hormodin1 when trying to root cottonwoods in late fall (cottonwoods normally don't need help in rooting during the growing season, but this was after the growing season). I have seen a couple of recipes for making WRS: Jill Nokes' book says to use this year's stems, remove leaves, cut stems into small pieces, pack them in a container, and cover with water. The stems should be allowed to steep in the water for 24 hours, then drain and keep the liquid and discard the pieces of stem. Soak the cuttings standing up in the liquid for 24 hours before placing them in the rooting media.

The recipe I have used is the same except that the stems were soaked in boiling hot water (boil and pour, don't boil the stems). I soaked my cuttings and then used the liquid WRS to water the cuttings until I ran out of liquid. I successfully rooted 60% of the cottonwoods that I tried the WRS/Hormadin1 on. The year before, using Hormodin 1 alone failed to root any late-season cottonwoods. WRS is cheap and easy to use but the concentration can vary quite a bit. Try it!

Remember that too much hormone is as bad as not having enough hormone. Some plants don't need supplemental hormone to help make good roots. If I am trying to root a plant that I can't find information on, I do some cuttings without hormone and other cuttings with every hormone I have on hand. Don't take the results personally; sometimes the rooting voodoo just doesn't work. Keep trying.

Best temperature and light for cuttings

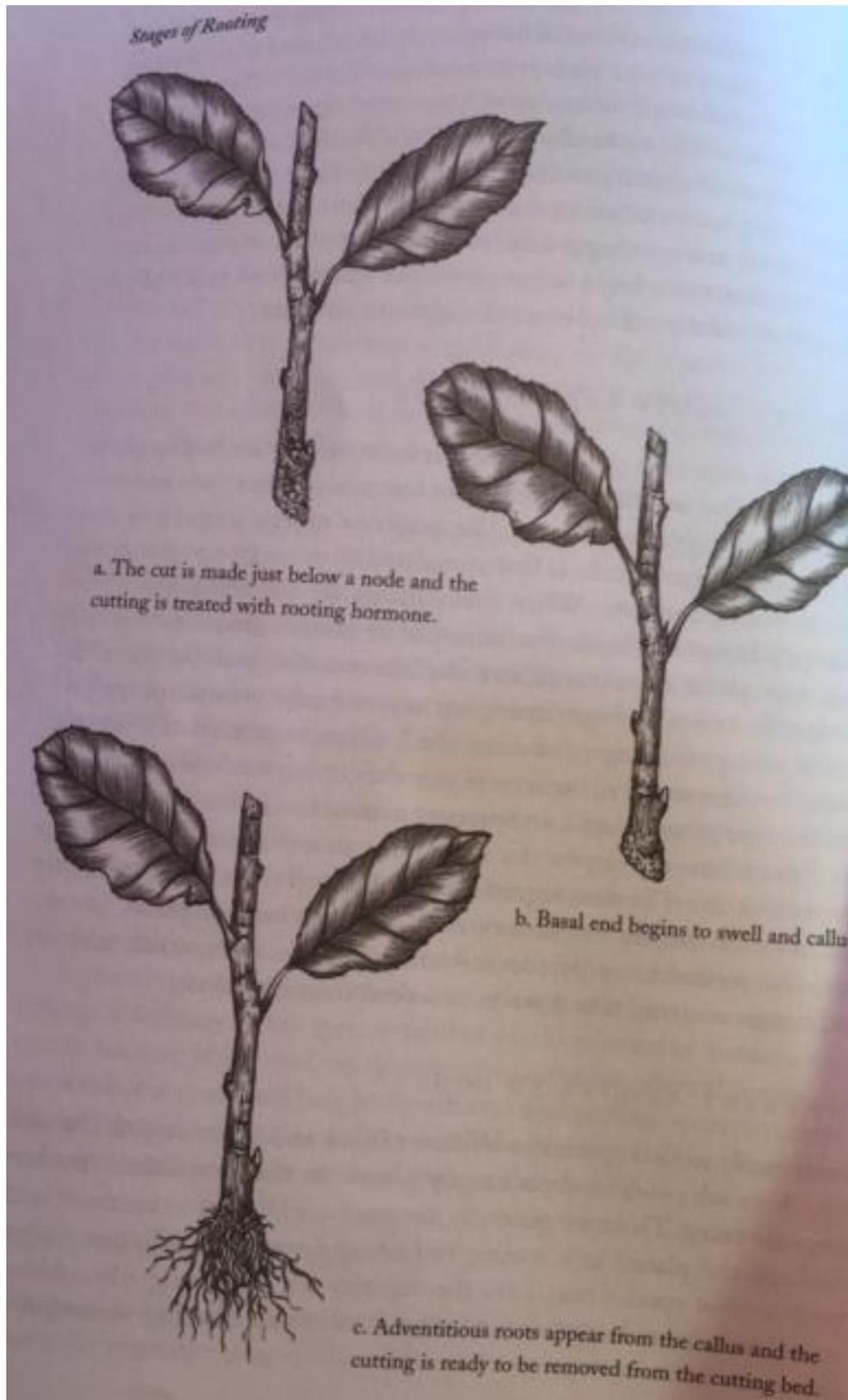
If you are happy with the temperature, generally the cuttings are happy. Temperatures between 70-80 degrees F are recommended but the lower end of that is best. Don't put cuttings in direct light. My mist tent has an opaque plastic cover over it and it is in a part of the greenhouse that gets a minimum of direct sunlight.

Fungicides

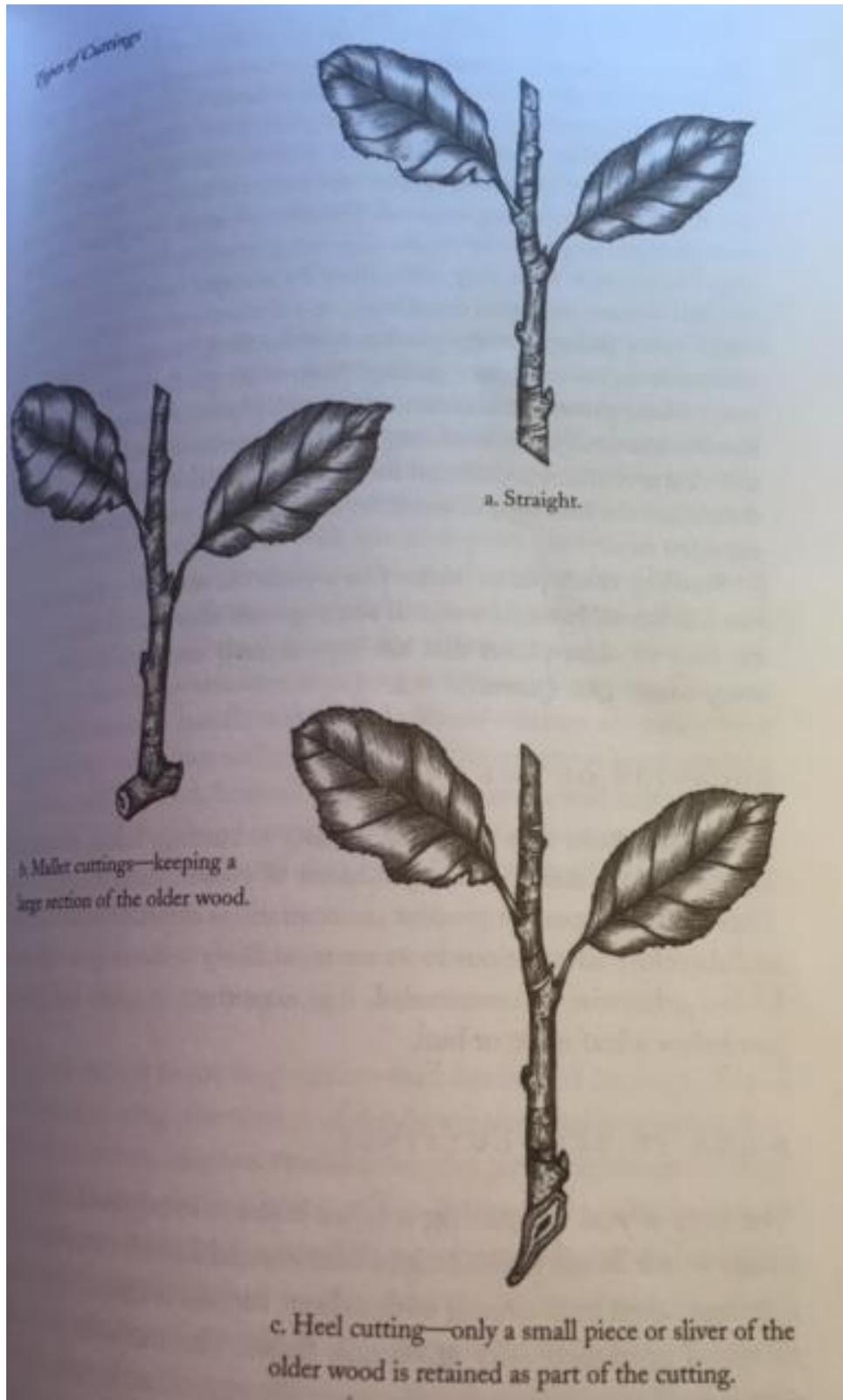
If you use a fungicide, follow all safety recommendations on the label **to the letter!** I don't use a fungicide except the occasional spritz of neem oil or insecticidal soap. Fungicides can be hard on plants and even harder on people who don't use protective clothing and breathing protection like respirators or face masks. I might get better results if I used it, but, between my years in the grocery business (don't eat unwashed grapes from the grocery store!) and in the greenhouse business, I don't consider the perspective gains worth the trouble. You can make up your own mind.

*I apologize for the quality of the illustrations on the following pages.

** I use the straight cut most often and, if I were doing the illustrated cuttings, I would cut those big leaves in half.



Stages of Rooting from [How to Grow Native Plants of Texas and the Southwest](#)



Types of Cuttings from How to Grow Native Plants of Texas and the Southwest

Definitions:

Adventitious roots – roots that arise on other parts of the plant besides the radicle or root.

Callus- a swollen mass of unspecialized cells that develop around a wound or a basal part of a stem cutting. Rooting hormone encourages these cells to form roots.

Node- A joint of a stem. The point of insertion of a leaf or leaves.

Rooting Hormone- A plant hormone is an organic substance other than a nutrient that controls plant processes. These are produced naturally in plants, but can also be introduced to encourage plant cuttings to root.

Semi-hardwood – new wood from the first flush of growth, reasonably hard, not flexible, with mature leaves. Not as sensitive as softwood.

Softwood – Emerging tender shoots or growing tips that are delicate and sensitive to drying out.

Types of sand-

Sugar sand is very fine sand. Sugar sand holds water and is the poorest draining type of sand.

Hoban sand is angular. It has lots of surface area for water but drains well and is never soggy.

Course sand is the larger sand that is sifted from concrete sand. It is the best draining type of sand.

Wounding the basal cut – Breaking or hitting the basal cut end of a woody cutting. Wounding seems to stimulate the production of greater amounts of callus cell as well as allowing more water and root-promoting substances to be absorbed.