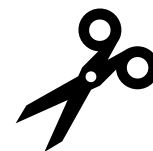




Restoration from Cuttings



<i>Objective</i>	Teach participants how tree cuttings work and why they can be an important part of restoration work.
<i>Audience</i>	2 or more participants; ages 8+
<i>Duration</i>	10-20 minutes
<i>Materials</i>	<ul style="list-style-type: none">• Sharp pruners• Locally evolved plants• <i>Optional</i> – Refrigerator, if storing cuttings
<i>Background</i>	Often when people think about plant reproduction they think of seeds, but that is not the only way plants can reproduce! Another way plants reproduce is through asexual reproduction which is any form of reproduction where there is no exchange of genetics with another individual. While this does happen in nature, we can also help plants reproduce asexually. An example of this is how some plants, including ecotypic dogwoods, will grow from cuttings. See glossary at end to help with more complex terms. Cuttings can be an economical and educational way to include restoration (replanting) in invasive plant workdays.
<i>Procedure</i>	<ol style="list-style-type: none">1. Introduce clonal reproduction:<ol style="list-style-type: none">a. Ask participants what they know about plant reproduction and clones. Is there any overlap?b. Many plants produce asexually (a.k.a. clonally). Spider plants and strawberries are naturally occurring examples. Emphasize these plants are genetically identical to the parent. Plant breeders or restoration workers can take advantage of this by taking ‘cuttings’ (taking a piece of a plant to make more plants).c. Depending on activity length and depth, consider going into advantages and disadvantages of asexual reproduction.<ol style="list-style-type: none">i. Advantages: quick, requires less energy, don’t need another individual.ii. Disadvantages: susceptible to disease, susceptible to genetic diseases.2. How can we, as forest stewards and restoration workers, use asexual reproduction to our advantage? Cuttings are easy, free, and can be done without harming the parent plant.3. Explain how to take a cutting. <i>Note: This information is for taking a hardwood dogwood cutting during the dormant season.</i><ol style="list-style-type: none">a. Timing: Take cuttings while trees are still dormant, before buds have broken.b. Choosing a branch: Choose strong, young growth from the previous growing season. The branch should be at least as big around as a pencil. Do not take more than 1/20 or 5% of the total new growth.c. Cutting the branch: Make sure to cut just above a node so there are no stubs that will die back. Cut the branches into 6-12” pieces with at least two leaf nodes, and preferably three or four. The end of the cutting closest to the roots (the “bottom”) should be cut at a 45° angle, just below a node. Be careful not to mix up the top and bottom of your cutting. The top can be marked with flagging or with a straight cut across the branch (while the root end will be angled).d. Storage options:<ol style="list-style-type: none">i. Put the cuttings in a plastic bag as you collect them. Keep them cool,

moist, and out of direct sunlight; can be stored like this for one week.

- ii. Cuttings planted in pots can stay outside over the winter, but they should be protected from freezing, wind, and full sunlight.
- iii. For long term storage, wrap bottom of cuttings in a moist paper towel, put in a plastic bag, and store in a refrigerator. Cuttings can be stored like this for upwards of two weeks or longer if buds haven't broken.

Other notes:

- iv. Use extremely sharp pruners, dull pruners can harm the parent plant.
 - v. For a higher success rate, use rooting hormone – it can be bought online or in gardening stores.
4. Planting the cuttings:
 - a. Find a spot where the new tree will have sunlight, water, and space to grow.
 - b. Make sure the right side is facing up and then either push 1/2 to 2/3 of the cutting into the ground or dig if the ground is too hard.
 - c. Water your cuttings! A good rule of thumb is once a day for a week, once a week for a month, and once a month for a year.
 5. Wrap up by talking about how important locally evolved trees are for the rest of the ecosystem. Birds need them for nesting and may eat the berries, they keep stream banks from eroding, etc. This activity is a great lead into talking about ecosystems, food webs, and the benefits of having diverse locally evolved plants.

Glossary

- **Asexual Reproduction:** A type of reproduction by which offspring arise from a single organism and inherit the genes of that parent only.
- **Clone:** An organism or cell, or group of organisms or cells, produced asexually from one ancestor or stock, to which they are genetically identical.
- **Ecosystem:** A biological community of interacting organisms and their physical environment.
- **Node:** The part of a plant stem from which one or more leaves emerge, often forming a slight swelling or knob.
- **Invasive Species:** An introduced species that evolved in another area (usually another continent with a similar climate) that causes harm to the environment, human health, and/or the economy.
 - *Examples: knotweed, emerald ash borer, Asian carp*
- **Locally Evolved Species:** Species that co-evolved with many other organisms as part of a healthy ecosystem in a given area (generally only considered locally evolved if its presence in that region is the result of only natural process, with no human intervention).
- **Plant Propagation:** When the reproduction of a plant is actively controlled/manipulated.
- **Plant Cuttings:** When a new plant can be produced using a segment of root or branch.
- **Sexual Reproduction:** The production of new living organisms by combining genetic information from two individuals of different types.
- **Vegetative Propagation:** The process of plant reproduction whereby a fragment (a cutting) of a parent plant is taken in order to produce more plants (clones).