

Project Instructions - Hemlock Field Insectary

This document is for the project leader of a charitable project approved by the SGH Board to plant a large number of hemlock saplings in a hemlock field insectary at the request of a Georgia beetle lab and/or the Georgia Forestry Commission and with permission from the property owner / manager. Separate instructions exist for projects for hemlock restoration on trout streams or other large-scale sapling planting on public land or nonprofit property.

Site selection

1. Whether for new planting or augmentation, the site and number of trees will be chosen or approved by the associated beetle lab and/or Georgia Forestry Commission. Considerations will include but not be limited to space, sun/shade orientation, soil quality, grade and drainage, and accessibility for watering and later beetle collecting.
2. Future beetle raising/collecting will be most successful where the site:
 - will remain undisturbed for at least 5 years (preferably 15 years), i.e., not be logged, sprayed, or have road / building construction.
 - has winter sun exposure, i.e., south-facing (or east facing with southern exposure); covers or openings with infested hemlocks nearby are ideal.
 - has (or will accumulate) needle duff; good soil moisture and adequate needle duff / mulch (rather than turf or bare soil) are needed for beetle larvae that drop to the soil and pupate.
 - Is surrounded by other hemlocks over a wide area; can include a mix of pines, firs, and spruces.
3. Once a site is approved for planting a new insectary or augmenting an existing one, SGH and the property owner / manager will execute a *Memorandum of Understanding (MOU)* covering permission to access the site over multiple years, any site preparation needed, specifications for planting, roles and responsibilities for maintenance and production.
4. SGH and the insectary owner / manager will coordinate any minor site preparation needed, such as removal of small bushes or debris.

Project planning

1. A new insectary usually starts with 24 – 30 trees, which SGH will provide at no cost to the insectary owner / manager. Saplings should be 2 – 4 feet tall, well branched, and healthy. Container stock that has been in pots for at least a year is preferable.
2. Based on the number of trees to be planted, SGH will estimate and acquire the necessary supplies for planting – such as soil amendments, HWA treatment product, and mulch – at no cost to the insectary owner / manager. See *Checklist*.
3. Also based on the number of trees to be planted, SGH will take the lead in engaging an adequate number of volunteers from our own membership, Master Gardeners, students seeking service credit hours, and other organizations. Typically a group of 15 volunteers can plant 24 saplings in 2 – 3 hours. When volunteers sign up, we will confirm their participation and send a copy of the *Project Details*.

Project preparation

1. Prepare copies of the *Release / Waiver of Liability* sign-in form and volunteer instructions for planting.
2. Choose and mark the planting location for each tree with a small flag. Trees should be spaced 12 to 15 feet apart to ensure adequate light, water, nutrition, and air circulation so they can remain vigorous with branches all the way to the ground.
3. Arrange to get fresh water from a hose or faucet if possible. If water will be taken from a stream, bring one or more clean containers to use for dipping. Chemical jugs must never be dipped into a waterway.
4. Assemble project materials, tools, and supplies 1 or 2 days before project date and stage them at the planting site. Water the trees so their root balls will be fairly soft. Be sure tools are in good working condition and marked with owner's name.



5. Prepare large tubs of soil mix, baggies of soil additives (1 per tree), baggies or small cups of Soil Moist (1 per tree), and gallons of initial watering mix (1 per tree). See *Checklist*. Have more materials on hand as needed.

Orientation for volunteers

1. **Welcome volunteers** as they arrive. Ask each participant to sign the *Release / Waiver of Liability* form and fill out and wear a name tag so folks can get to know each other.
2. **Make sure each participant is properly attired** -- Dressed for the weather and terrain with long pants and long sleeved shirt, sturdy shoes/boots with socks, work gloves. Provide work gloves for anyone who doesn't have them.
3. **Explain project significance** to natural and human communities (*adjust depending on audience*):
 - **Aesthetically**, hemlocks contribute greatly to the enjoyment of those who live, work, and play among them, as well as the many people who come to north Georgia for tourism and recreation.
 - **Ecologically**, hemlocks help maintain the health and biodiversity of our forests and provide food and habitat for a diverse population of birds and other animals, shade for native plants, and cool temperatures for trout streams.
 - **Environmentally**, hemlocks are vital for protecting the quality of our waterways and watersheds, preventing soil erosion on mountain slopes and around waterways, and maintaining our air quality.
 - **Economically**, healthy mature trees such as hemlocks support jobs and local tax revenues associated with tourism and recreation and supporting the value of private properties and the community as a whole.
 - **And on a personal note**, hemlocks are the favorite tree of so many people who grew up visiting the woods, taking their children and grandchildren to the woods for memorable family outings, and teaching lessons of respect and personal responsibility, wise use of resources, and environmental stewardship.
 - **But they are under attack** by an invasive insect, Hemlock Woolly Adelgid (HWA), and most will die unless action is taken to prevent it. While chemical treatment is highly reliable, it is only a temporary solution. It is hoped that biological controls – having one living thing control another in a predator-prey balance – will ultimately provide a long-term natural method for ensuring that the hemlocks survive.
 - **And that's where we come in.** Today we will be planting (or augmenting) a hemlock field insectary on which to raise one or more species of predator beetles that are the natural enemy of adelgids and that are known to feed only on adelgids.
4. **Explain layout of insectary** and location of all materials.
5. **Explain composition** of soil mix and initial watering mix.
6. **Divide volunteers into teams** of 2 – 3 and distribute tools and supplies.
7. **Give personal safety briefing:**
 - Look out for holes, snakes, bees, poison ivy, briars / tangling vines, eye-level branches, steep / slippery terrain.
 - Be mindful of heat and adequate hydration, cold and hypothermia, changing weather conditions.
 - Stay within sight/speaking distance of other team members.
 - Seek project leaders immediately in case of a problem.

Planting Tasks

Give out volunteer instructions for planting. Explain the process and demonstrate with the first sapling. Ask if there are any questions. Then get started.

1. If insectary site is on a hill, instruct volunteers to start at the top to avoid rocks or debris falling onto workers below.
2. **For each planting site**, the team should go to central location and get a tree, bucket of prepared soil mix, baggie of soil additives, baggie or small cup of Soil Moist, half a bag of shredded hardwood mulch, and gallon of initial watering mix.
3. After removing the marker flag, **dig a hole** 3 – 4 times the width of the container (i.e., you could place the pot in the hole 3 – 4 times in a triangle or square) but only 2" deeper than the dirt in the container. Pile the removed dirt next to the hole.
Note: If planting site is on a hill, depth of the hole on the down-side edge should be 2' deeper than the dirt in the container; depth of hole on the up-side edge may be considerably more.
4. **Combine the bucket of soil amendment with the native soil** removed from the hole plus the contents of the baggie of soil additives. Put 2 – 3 inches of this soil mix back into the hole.

5. **Remove the tree from the container** carefully and set container aside. Tickle the root hairs so they're facing outwards. If the roots are pot-bound, use a sharp tool to make several half-inch-deep scrapes all around the root mass to free them.
6. **Place a bamboo stake** of appropriate height in the center of the hole.
7. **Place the tree in the center of the hole** as close to the bamboo stake as possible, and be sure it's sitting a couple inches above grade.
Note: If planting site is on a hill, place the tree closer to the down-side edge, being sure it's only slightly above grade.
8. **Fill the hole halfway** with soil mix. Then **sprinkle a small amount of Soil Moist** water retention crystals all around the roots of the tree (about 1 tsp per gallon of root ball size).
9. **Fill the hole the rest of the way** with soil mix so that it just covers the root ball. Firm the dirt with foot to eliminate air pockets. The tree should now be sitting exactly at grade, level with the surrounding ground.
Note: Don't create a "watering saucer" around the tree unless it's on a steep hill; if this is the case, a very shallow watering saucer can be created but should be removed by the end of the first year when the soil will have stabilized.
10. **Use velcro tape** to secure the main stem to the bamboo stake LOOSELY at the half-way point and about 6 inches from the top. This tape should be removed by the end of the first year.
11. **Apply 2-3 inches of shredded hardwood mulch** from the trunk out to the drip line, pulling the mulch back couple of inches so it's not actually touching the trunk. This is to maintain stable soil moisture and temperature.
12. Immediately after planting, **water thoroughly** but slowly right at the base of the tree, using 1 gallon of initial watering mix per gallon of root ball. Two or three hours later, firm the dirt again with foot to eliminate any remaining air pockets and **water again with plain water**, using 1 gallon of plain water per gallon of root ball.

At end of planting project

1. **Collect SGH tools**, other supplies, and empty containers from volunteers and make sure all are accounted for. Clean tools. Make note of anything that needs repair or replacement.
2. **Forward original signed Release / Waiver of Liability forms** to Donna, copy retained by project leader.
3. **Thank volunteers for their good work** and indicate that students seeking credit for service hours will receive a letter by email that they can present to their instructor. Also let them know that help will be needed with ongoing maintenance during the establishment period, and ask anyone who is interested in helping to let us know.

Ongoing maintenance of insectary saplings

Roles and responsibilities

1. The insectary owner / manager will be responsible for watering trees during establishment period and times of severe drought. The insectary owner / manager will also monitor trees for health and contact SGH if any problems are observed.
2. During the first 5 years after planting, SGH will inspect the trees at least twice a year for tree health and prune them as needed to encourage fullest new growth.
3. After the first 5 years, the insectary owner / manager may let the HWA protection lapse or work with SGH to retreat them for another specific period in anticipation of activating them as insectary trees. This decision will be based primarily on their size and condition at the time.

Maintenance tasks during first 6-9 months after planting (See volunteer instructions for maintenance tasks.)

1. **Water once a week:** Give each tree 1 gallon of water per foot of tree height. Water slowly right at base of trunk. Do not spray the foliage except during the summer, and then be sure there's time for the foliage to dry before evening.
2. **If watering with a hose:** Turn nozzle to "full." When moving the hose, be careful not to pull it against the little trees or disturb the mulch and needle duff under the trees. When finished watering, retract the hose into the reel box with water pressure still on. Then turn off faucet and drain the hose. During cold weather, also disconnect the hose from the faucet.

Maintenance tasks during first 5 years after planting (See volunteer instructions for maintenance tasks.)

1. **Watering:** Generally no regular watering is needed after the first 6-9 months except during periods of drought. During drought, water once a week as described above.
2. **Monitoring:** During the first 5 years following planting, the trees are protected against HWA; however, they should be monitored for signs of early HWA reinfestation, other insect pests, fungal diseases, discolored foliage, and physical damage. Any concerns or signs of problems should be reported to SGH project leader