

Tobacco Hornworm Rearing Assignment

Rearing

Tobacco hornworms (the larva of a moth) are somewhat common insects in gardens and can do substantial damage. In nature, the larvae feeds on a variety of plants, but we will be feeding our larvae a premixed, artificial diet which can be ordered from a biological supply house – it makes it much easier! These larvae of a sphinx moth are distinctive in that they develop a very characteristic “horn” on their posterior end. They also get large – up to four inches – before they pupate.

We will order hornworm eggs from a biological supply house and will maintain them until they hatch. Upon hatching, each of you will be given a first instar larva and food in a small rearing cup. Look carefully to find your larva, it will be feeding along the edge of the food. You are being asked to rear your larva from its early beginning through to an adult moth. This is not an easy assignment and will require you to care for your larva. Still, many of you may not be able to complete this assignment through no fault of your own – all we ask is that you try.

When you receive your cup with its larva, take it home and try to find a place where the temperature is between 70 and 85 degrees. Temperatures below this threshold will not allow the larva to grow and develop at its normal rate while temperatures above 90 degrees will be fatal to your larva. The larva should also be kept under constant light or as close as possible. A good way to provide the larva with needed living conditions is to place your cup approximately 10 to 15 inches from a 100-watt light bulb. Temperature can be regulated by moving the larva (in its cup) closer or further from the source of light and heat. You should check the temperature several times during the initial rearing to make sure that conditions are correct. Remember, if it is too cold or too hot, your larva will not develop and may die. When you first obtain your rearing cup, lay it on its side. Do not try to handle your larva at this early stage, as it is much too delicate. If you notice black mold developing in your rearing cup, remove the food and the larva and wipe the cup out. You may also want to punch some holes in the lid of the rearing cup to allow for a little flow of air.

At first, your larva will grow slowly. During its first three instars, growth is minimal but do not become frustrated. If your larva eats all of its food or if the food becomes hard, obtain new food from the instructor. When your larva becomes too large for the small rearing cup in which it was provided to you, you will be given a larger cup with more food. The food will be on a stick and the cup should be placed upright so that the food is at the top of the cup. As the larva feeds, it will defecate. This fecal material (small black or brown pellets) should be removed from the rearing cup as it begins to accumulate. You can remove the larva and wipe out the cup. Again, if you begin to develop mold, get new food and a cup from the instructor. Your larva should obtain a length of three to four inches! Get more food, as you need it.

Upon maturation, you will be able to see the heart (which is a long tube in insects) become visible and begin to pulsate along the back of the caterpillar (the dorsal midline). At this time, the larva is mature and it will stop feeding. It then enters what is called a wandering period. In

nature, this is the time that larva would leave its host plant (its food) and move down into the soil to pupate (form its cocoon). When your larva stops feeding and appears to become restless, you will need to remove it from the feeding cup and ready it for pupation.

Remove the larva from its rearing cup and place it into a container in which it can pupate and emerge as a moth. The larva should be placed into a box (e.g., a shoe box) a terrarium, aquarium, or other container in which shredded paper, sawdust, potting soil, peat moss, etc. has been placed. Try to place three to four inches of medium in the container. A dish of water will also help to maintain the moisture in the container. Put the container in the dark and wait. The larva may still wander for a few days but should eventually go down into the medium and form a puparium (cocoon). No matter what type of container you use, there should be enough room for the moth to emerge and spread its wings (5-6 inch wingspan). It is best to have something on which the moth can crawl-up, such as a stick, to allow it to spread its wings and dry. If all goes well, a moth should emerge in one to three weeks. Check often. Good Luck!

Hornworm Rearing Assignment

You have been given a first instar hornworm larva with enough food (medium) to get it started. This larva will grow to several inches in length, if you take care of it, and eventually pupate and metamorphose into a sphinx moth (Lepidoptera: Sphingidae). However, its care is a delicate matter.

Try to keep the larva as warm as possible (that is, in a warm area - don't make a baby (larval) blanket for it) and under constant light conditions. If you have a study light that is on 24 hours or close to that, that would be a great spot. However the larva should not become too hot (read your rearing handout). This larva will go through a lot of food and I will continue to provide it for you. Watch for fungus on the food medium; try to keep your larva's home as clean as possible. In a week or so, I will give you more food and a larger larval cup. Although the larva will molt several times, you may not see the caste exoskeletons, as the larva will probably eat them.

Eventually, your larva will stop feeding and will begin to "wander." When this takes place, the larva should be transferred to a large jar or container with a couple of inches of wood chips on the bottom. This moth usually forms its pupa (cocoon) in the ground and these wood chips (which I will provide) will be a good substrate for pupation. If all goes well, you will obtain a large, adult moth.

I want you to maintain a log of the progress of your larva. Take 10 minutes or so every day and watch your youngster. How much has it grown, is it changing color, is it feeding, wandering, just sitting, etc. You will eventually turn your log in to me (I will return it) for "grading."

Good Luck – it is not easy to rear these larvae.

Sample Log

Date	Observations
29 Aug 2005	Larva under a 100 watt study light that is left on 24 hours a day. Temperature near larva approx. 80°F. Larva approx. 1/8 inch in length and constantly feeding. Larva is bright green in color.
30 Aug 2005	Observations
31 Aug 2005	Observations
1 Sept 2005	Environmental conditions as above. Larva appears to have molted as parts of the exoskeleton are in the rearing container. Larva has taken on a pinkish tinge. Larva continues to feed and is almost 1/2 inch in length. Cleaned fecal material from larval container.