

Cabbage Maggot Rearing
Shelton Lab, Cornell/NYSAES

This method has been used by the Shelton Lab for over ten years. Cabbage maggots are raised in an atmosphere-controlled rearing room at a constant temperature of 21°C. Humidity is maintained at 65% with a 16-hour photoperiod.

Oviposition cages- Oviposition cages are frame and screen structures measuring 1' x 1' x 1' (0.3 m x 0.3m x 0.3m). Pupae are placed into the cage in a petri dish or weighing dish and adults are allowed to emerge and mate. Each cage can support approximately 400 adults. Flies are given a 10% sugar water solution with yellow food coloring added for attraction. Sugar water is put into a 250 ml flask with strands of cotton dental wicking protruding from the top. This absorbs the solution and allows flies to drink without drowning. Flies are fed a diet consisting of approximately 70% Brewer's yeast and 30% debittered Brewer's yeast (available from Bio-Serv, www.insectrearing.com, 1-800-996-9908) mixed together and placed in the cage on small weighing dishes. Adult females will begin laying eggs about 3 days after mating.

Oviposition- Cover the bottom of a 9 cm Petri dish with water, then sprinkle dry sand/muck mix on the water to about .5 cm deep, and place a 1 cm slice of purple-top turnip on top. The sand/muck mix is made up of sifted washed sand (75%) mixed with high organic matter pesticide-free muck soil (25%). The organic matter seems to stimulate oviposition and the sand facilitates egg collection. Place the dish in the oviposition cage. The mix should be kept moist during oviposition. Eggs are usually laid at the soil line around the turnip slice. Eggs may be collected during at 24-72 hour periods as needed.

Egg collection- Eggs are collected by removing the sand/muck mix and mixing in a container of water. The sand/muck mix will, for the most part, settle to the bottom after a few minutes and the viable eggs will float to the top. The eggs can then be carefully poured off into a funnel lined with a cloth to collect the eggs while allowing the water to pass through. Rinse the sand/muck again to collect more eggs. Plug the funnel and fill with water, allowing the eggs to refloat and then gently blow the eggs onto the cloth as the water is released. The cloth then can be spread out on a paper towel and the eggs are ready to inoculate.

Maggot rearing and pupae collection- Turnips are set into a bed of washed, sifted sand in a 16 oz squat cup. Sand is prepared by washing to remove fine dirt particles, and the dry sand is then sifted through a 1.0 mm screen to remove larger particles and aid in pupae collection as will later be explained. The eggs can be easily gathered from the cloth with a small paintbrush. With the brush, place about 100 eggs around the circumference of the turnip, above the sand level. Once this is done, rinse the eggs down with a wash bottle to the soil line of the turnip, cover the eggs with a layer of sand and moisten the sand. Keep the sand moist as needed. The eggs will hatch after about 3 days and larvae will feed inside the turnip. The turnips will turn black and will become very soft inside. After 2.5-3 weeks, the larvae will leave the turnip to pupate in the sand. At 3.5 weeks, the turnip may be discarded and the pupae collected. The sand containing the pupae should be spread out on trays and allowed to air dry. Once it is dry, the pupae can easily be collected by sifting the sand through a 2.0 mm and a 1.4 mm sieve. Since the sand has already been sifted through a 1 mm sieve, the sand should easily flow through these larger sieves, leaving the pupae behind. The pupae can then be placed into an oviposition cage to repeat the cycle.

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The sand and the sand/muck mix can be reused when dry.