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A simple laboratory rearing method for chalcid wasps

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Protocol status: Working
We use this protocol and it's working

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Abstract

For several years, studies on insect behavior, larval development, infestation patterns, parasitism, and identification of species have been possible by the implementations of methods and equipment to rear insects in controlled environments. Rearing methods vary from being simple duplication of nature, such as holding insects and their feed resources to those where years of practice are required to tuning the optimal conditions. The vast majority of the rearing protocols are derived empirically from experimenting with a variety of materials and procedures until success is achieved. Because the determination of infestation caused by *Megastigmus specularis, a seed-parasite,* on Fraser fir seeds and their relation to its parasitoid *Mesopolobus,* are fundamental to biological control and related fields, accurate data are of great importance. Our method was established to obtain chalcid alive, using an economic and fast setting-up. This method has been used in our lab for different studies related to chalcids and their parasitoids. We present a very simple method to rear these species under laboratory conditions. The protocol can be used in experiments in which variation in day length and temperature is required. The rearing mounting can be easily placed in any laboratory or inside of a more controlled environment chamber and use inexpensive materials. This rearing method facilitates the observation and capture of adult insects while maximizing the number of experimental units (EUs) that could be evaluated.

Guidelines

Bags per Rack: up to 96
Distance From Light to Bags: 11cm
Distance Between Lamps: 21 cm
# of lamps/rack: 1-2
Rack dimensions: 56cm x 30cm

Materials

Rearing mounting

Metal rack
Plastic sealable bag: 10cm x 14cm
Lamp Wattage: T5-54W fluorescent lamps
Dissecting needle
Timers with different time set-ups
Binder clips

Preserving insects

70% Ethanol
Microdissection forceps
Eppendorf tubes or small glass vials

Observation

Stereo Microscope Model: ACCU-SCOPE 3078 Zoom Stereo Microscope Series

Before start

- Prepare punctured bags

- Look for the most convenient location to set up your rearing mounting. Users can locate the mounting next to a window if the experiment is intended to follow the natural light variation and the fluorescent lamps will supplement the exterior light. Mounting can be set-up in the interior of a controlled chamber (e.g. a cold room).

- Soil media or substrate can be added to the bags to simulate natural conditions. Adult insects will emerge and flight towards the top of the bags and stay there for several days. This facilitates the capture of insects. However, if the main goal is to capture all insects, we do not recommend adding any media, especially if the EUs are not being monitored daily because, within a week, insects will die and fell down into the media. Time for emergence is not affected by the lack of soil media.

Rearing protocol

1 Holes were punctured into 10 cm x 14 cm clear, plastic, sealable bags for air exchange using dissecting needles.

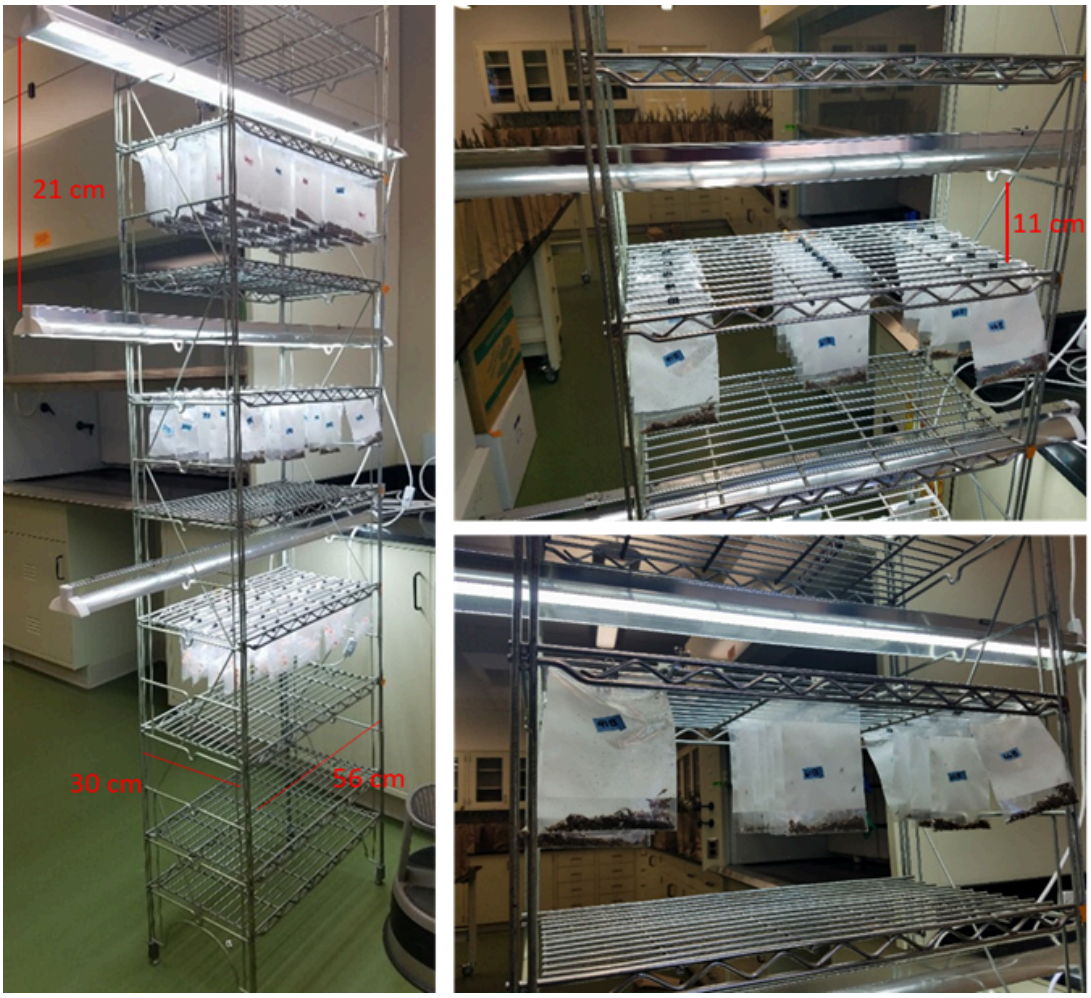
Place approximately 80-100 Fraser fir seeds in each bag. This will be referred to as an experimental unit (EU).

Soil media or substrate to the bags can be added to simulate natural conditions. **Note**: *M. specularis* and its parasitoid *Mesopolobus* do not require media in the bags to emerge.

Display at constant temperature (CT) and natural photoperiod (NP):

EUs are hanged in a metal rack using small binder clips. The rack is located in a room at room temperature (22±2 C°) next to a window at 11 cm under (1-2) T5-54W fluorescent lamps.

The lamps are connected to a timer and adjusted to turn on and off following natural photoperiod (NP). These means timers turn on when the sun rises outside and off when it set outside.



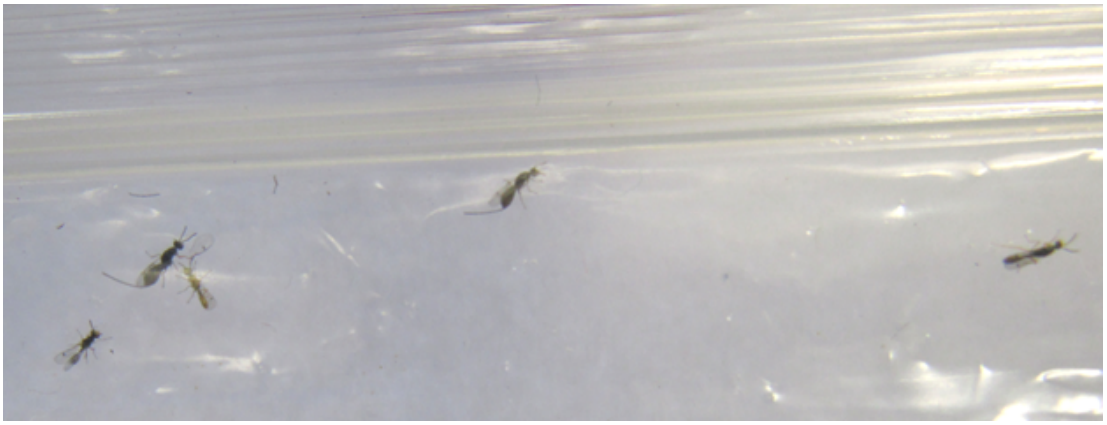
Rearing mounting with experimental units hanging from the racks.

Display in cold (C) and darkness (D)

EUs are hanged in a metal rack using small binder clips. The rack is located in a controlled-environmental chamber at (6±2 C°) and complete darkness.

Insect collection

Bags were unclipped from the racks for examination at least three times every week to characterize and capture adult insects.



Females and males of *M. specularis* trap at the top of a sealable bag.