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Rearing of *Scolytus Multistraiatus* (Marsham) (Scolytidae: Coleoptera) for Toxicological Experiments

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REARING OF *SCOLYTUS MULTISTRIATUS* (MARSHAM) (SCOLYTIDAE: COLEOPTERA) FOR TOXICOLOGICAL EXPERIMENTS[1]

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In a study of the oral and contact toxicity of methoxychlor residues to the smaller European elm bark beetle, *S. multistriatus*, it is essential to have beetle material available which is of uniform physiological condition and age (Riedl, 1973). Several rearing containers for bark beetles have been described in the literature (Clark and Osgood, 1964; Fox, 1958; Germain and Wygant, 1967; Schmitz, 1972). A common problem in such containers appears to be fungus growth on the logs due to insufficient ventilation and high humidity. Although these environmental conditions might not cause high mortality, they can render emerging beetles unsuitable for bioassays. In order to guarantee fresh beetle material of uniform age newly emerged beetles must be extracted immediately. This paper describes emergence drums with a ventilation system that prevents fungus growth. Also described is an efficient extraction device which prevented the insect from moving back into the rearing container once it reached the collecting apparatus.

The rearing unit consisted of a 35-gallon steel drum to which an extraction container was attached (Fig. 1: A, B). The drum was covered in front with a circular black plastic sheeting which was conveniently tied down with rubber cord. A circular air screen was inserted in the lower half of the plastic cover to aid air circulation. This screen was covered loosely by a piece of black plastic sheeting which prevented light from penetrating to the inside of the drum. The extraction device proper consisted of a 2″ long piece of polyvinyl chloride (PVC) pipe glued into a circular hole close to the lower rim of the drum. A transparent plastic bottle from which the bottom had been cut was fitted snugly over the PVC pipe. One end of a short piece of tygon tubing was inserted into the mouth of the bottle and the other end led straight down into a 1-gallon carton. Paper towels were placed in the carton to increase the surface upon which extracted beetles could move about. A 20-watt cool white neon bulb provided the necessary light stimulus to attract emerging beetles into the collection containers.

The ventilation system (Fig. 1: C, D, E) consisted of the blower (the speed of which could be varied with a 3-way switch) an 8 ft long PVC pipe with several air outlets, and an adjustable valve to regulate the airflow. Tygon tubing guided air into each emergence drum. One end of the 8ft PVC pipe was supported by the blower housing and the other end rested on a wooden support which consisted of ¼″ Masonite board sandwiched between two pieces of plywood. A sliding piece of Masonite board allowed continuous regulation of airflow into the drums. If desired the ventilation of each individual drum could be regulated by means of adjustable clamps on the tygon tubing.

For comparison purposes, relative humidity and temperature data were recorded for the rearing room, and for an unvented and a vented rearing unit over a two-week period. The same number of fresh beetle-infested logs were placed in each of the two units. Temperature in the two rearing units did not, as might be expected, differ from the temperature in the rearing room. However, relative humidity for the rearing room averaged 55%. It was higher by 13% in the vented drum, but was constantly 100% in the unvented rearing unit. The logs in the vented drum were free of fungus and yielded high beetle emergence and low mortality. The 100% relative humidity in the unvented drum caused extensive fungus growth and an overall unsatisfactory environment for beetle development which resulted in poor emergence.

For optimum rearing air flow for all units was adjusted to maintain between 70% and 80% R.H. when filled with elm logs. Desiccation of logs due to constant air exchange in the drum was not excessive. The temperature in the rearing room was maintained at

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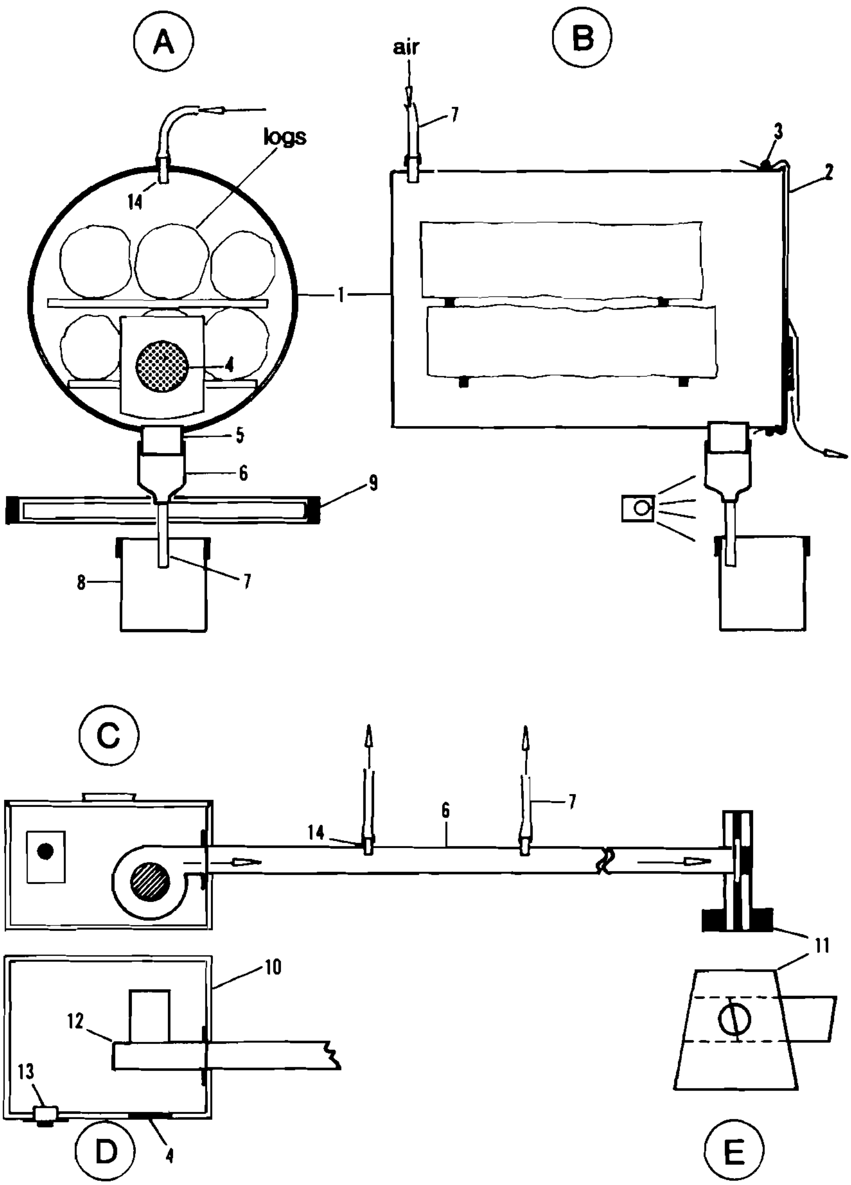

Fig. 1. Design of emergence drum plus extraction device (A: front view, B: side view) and ventilation system (C: front view; blower housing and air pipe plus support, D: view from above; blower housing, E: side view; support of air pipe with valve half closed). 1. 35 gal. steel drum; 2. Black plastic sheeting; 3. Tie-down rubber cord (3/16″); 4. Air-screen; 5. PVC pipe (3″); 6. 500 ml transparent plastic bottle; 7. Tygon tubing (¼″); 8. 1 gal. ice-cream carton; 9. 20 WATT cool white neon light; 10. Blower housing; 11. Wooden support with adjustable valve; 12. Dayton blower (model 2C781); 13. 3-way switch; 14. Copper tubing (5/8″).

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26° C ± 1.5. For a continuous supply of *S. multistriatus,* fresh elm logs were infested in completely closed cardboard boxes at intervals of two weeks. After 10 days they were transferred to emergence drums where the first adults emerged after roughly five weeks. The adult beetles obtained under these standardized conditions displayed great vigor and were very uniform in size.

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