

ENTOMOLOGY

Makes Roaches Run

Pyrethrum is unique in effects in that it first causes violent muscular excitation, then convulsions, paralysis and perhaps death.

➤ A SMALL amount of pyrethrum, an insecticide used in exterminating roaches and other household insects, at first causes the German cockroach to run wildly. Experiments conducted by Dr. John M. Hutzel of Ohio State University and reported in the *Journal of Economic Entomology*, indicate that pyrethrum is unique in this effect.

Obtained from flowers similar to a daisy, pyrethrum will not harm humans or their pets, but is effective against roaches and other insects. Roaches treated with pyrethrum in either powder or liquid form first show violent muscular excitation, then convulsions, paralysis, and death or recovery, depending on the dose. The initial excitation caused by pyrethrum is of practical value because small amounts cause the roaches to desert their hiding places, and once in the open, they are easier to spray and kill.

Using the adult German roach as his "guinea pig," Dr. Hutzel employed four methods of studying the exciting effect of pyrethrum. Each method demonstrated different features of the effect, and it was found that no other insecticide tested, including those containing N-butyl

carbitol thiocyanate, rotenone, or nicotine, caused similar violent reactions.

Roaches were allowed to run over a dusted surface, and observations were made of their footprints in the dust after they had been treated with pyrethrum. This experiment showed that treated roaches ran in a crouched position and dragged their abdomens, thus increasing the amount of powder sticking to their bodies. As pyrethrum is a contact poison, this effect is important in the extermination of roaches.

Roaches were put one at a time into a treadmill wheel, and the rotation of the wheel caused by the running of the insect was recorded. The normal rate of running was three centimeters per second, but after applications of pyrethrum had been made, the rate shot up to an average maximum speed of eleven centimeters per second. Other insecticides used in this experiment produced no acceleration.

In the modified entomotograph method, the roach was held stationary, but its legs were left free. As the roach attempted to move normally or in response to the treatment, the writing lever

moved up and down against a revolving kymograph drum and the action was recorded. Almost immediately after pyrethrum was applied to the abdomen of the roach, a series of sharp forward movements was recorded. The reaction to doses of the thiocyanate and nicotine was not noticeable.

In the fourth experiment a roach was fastened on its back with scotch tape, leaving only the right hind leg free to move. A human hair looped over the end of the free leg was attached to a crank lever, and the response recorded with a kymograph. The action of the free leg of untreated insects and of insects treated with the thiocyanate and nicotine contrasted sharply with the leg jerk of roaches that had received doses of pyrethrum.

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ENGINEERING

Tin Can Maker Converts to "Tin Fish"

➤ SHIFTING production from tin cans to "tin fish," American Can Company now turns out the naval torpedoes six times faster than authorities thought possible a few months ago.

Navy experts cooperating with company engineers designed precision machinery that eliminates many former hand operations, thereby telescoping manufacturing time.

The same engineering skill that devised machinery to roll 400 cans per minute off each of hundreds of automatic lines has applied mass production to a vital piece of ordnance that had been made largely by tool-shop operations.

Daily torpedo output already equals the goal set by Navy contract for January, 1944. The contract calls for more torpedoes than any other in the country, each one costing about \$12,000 to produce.

Another can plant in the St. Louis area has been converted to torpedoes and is equalling the production record of the sister plant. The company now furnishes other firms with machinery and parts for getting aircraft torpedo production under way.

Before leaving the plant every torpedo receives tests for speed, horsepower and endurance; additional range tests are made by firing over a measured course.

The finished torpedo weighs about 3,000 pounds, including hundreds of pounds of explosives in its war-head.

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CONVERTED—This is one of the new products of a maker of tin cans. The American Can Company has converted from tin cans to tin fish and now is turning out naval torpedoes like this one at unexpected speed.