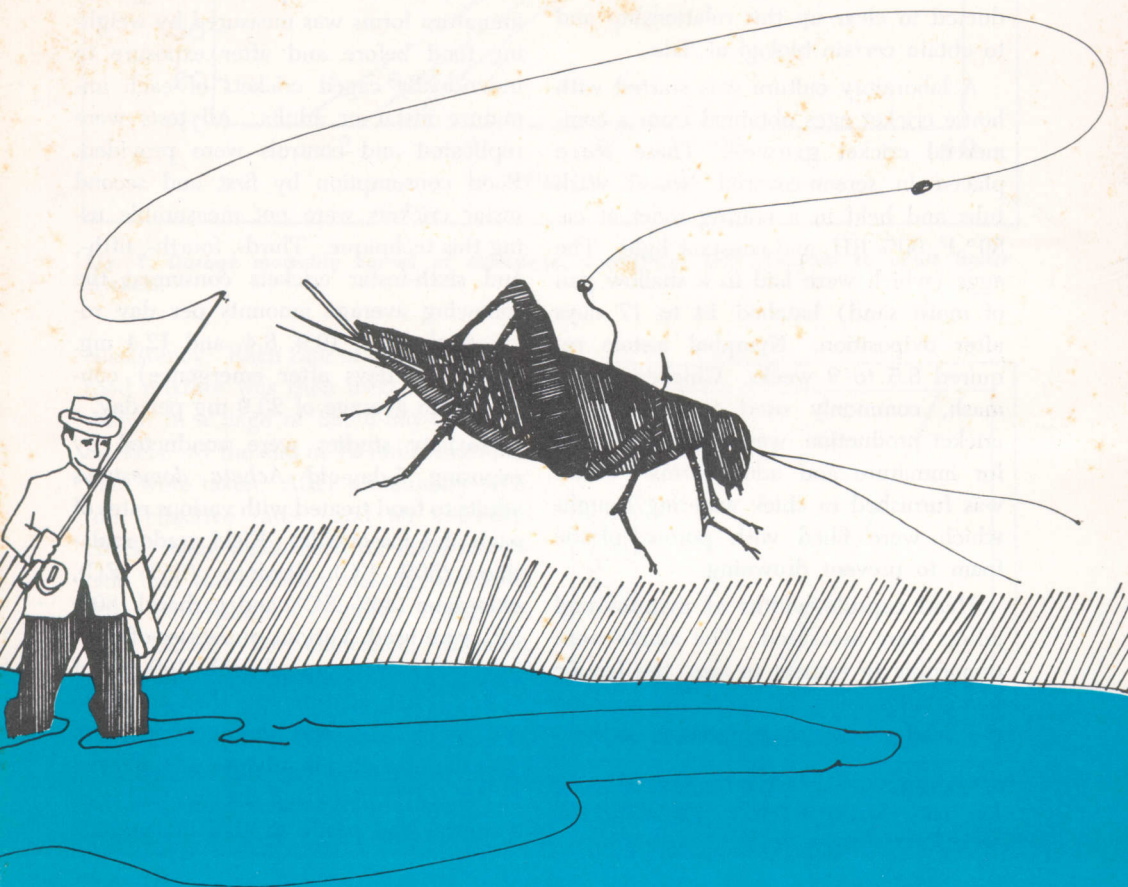


BIOLOGICAL and TOXICOLOGICAL NOTES on the HOUSE CRICKET

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HOUSE CRICKETS (*Acheta domestica* L.) are mass reared commercially for laboratory use and fish bait. Mass rearing techniques were described by Swingle (1945).¹ Commercial growers often encounter high mortality in their cultures, and insecticidal residues in commercial feeds have been a suspected cause. The following tests were conducted to clear up this relationship and to obtain certain biological data.

A laboratory culture was started with house cricket eggs obtained from a commercial cricket grower. These were placed in screen-covered No. 2 wash tubs and held in a rearing room at ca. 80° F, 90% RH, and constant light. The eggs (which were laid in a shallow pan of moist sand) hatched 14 to 17 days after oviposition. Nymphal instars required 8.5 to 9 weeks. Chicken laying mash, commonly used in commercial cricket production, was supplied as food for immature and adult forms. Water was furnished in chick watering troughs which were filled with porous plastic foam to prevent drowning.

Head capsule widths of nymphs and adults were measured. The adults were dimorphic in respect to size, the female being larger than the male. By grouping the head capsule measurements of thou-

sands of nymphs, it was shown that they fell into six groups, see table. When the means of these measurements were plotted against six-instar development, a near straight line was obtained. *Acheta domestica* appears to have six nymphal instars when reared under the described conditions.

Daily food consumption of adults and immature forms was measured by weighing food before and after exposure to individually caged crickets of each immature instar or adults. All tests were replicated and controls were provided. Food consumption by first and second instar crickets were not measurable using this technique. Third-, fourth-, fifth-, and sixth-instar crickets consumed the following average amounts per day respectively: 7.3, 10.9, 8.4, and 12.4 mg. Adults (5 days after emergence) consumed an average of 23.9 mg per day.

Toxicity studies were conducted by exposing 5-day-old *Acheta domestica* adults to food treated with various rates of each of 4 insecticides. Field grade malathion (50% EC), diazinon (25% EC), chlordane (44% EC), and carbaryl (80% SP) were used. Various quantities of each insecticide were mixed with 100 ml of water. Each mixture was then added to 100 g of food and thoroughly mixed. The food-insecticide mixture was allowed to dry for 24 hours and then ground with a mortar and pestle to give the original

HEAD CAPSULE MEASUREMENTS OF IMMATURE HOUSE CRICKETS SHOWING RANGES FOR THE VARIOUS INSTARS AND MEANS OF THESE RANGES (IN MM)

	Instar I	Instar II	Instar III	Instar IV	Instar V	Instar VI
Range	.644-.736	1.196-1.656	2.208-2.760	2.990-3.588	3.680-3.956	4.140-5.060
Mean	.686	1.516	2.371	3.369	3.762	4.2393

¹ Swingle, H. S. 1945. Raising Crickets for Bait. Ala. Poly. Inst. Agr. Exp. Sta. Leaflet No. 22.

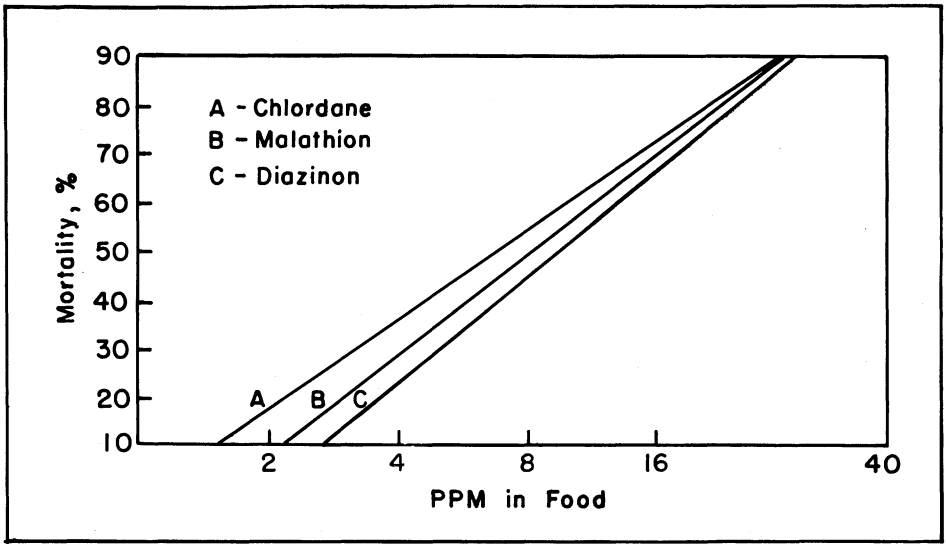


Fig. 1. Dosage mortality curves of chlordane, malathion, and diazinon to adult house crickets.

consistency. Each rate of the insecticide-food mixture was then used as the food source in a cage of 20, 5-day-old adult crickets. At the end of 72 hours mortality data were taken. After preliminary tests, four effective rates (and an untreated check) were again used for each insecticide and the resulting dosage-mortality data were plotted (Figures 1 and 2). The LD-50's for chlordane, diazinon, malathion, and carbaryl were, respectively: 8, 11, 9.5, and 2,050 ppm. Residual deposits approaching these amounts in commercially prepared feeds would be extremely hazardous to crickets.

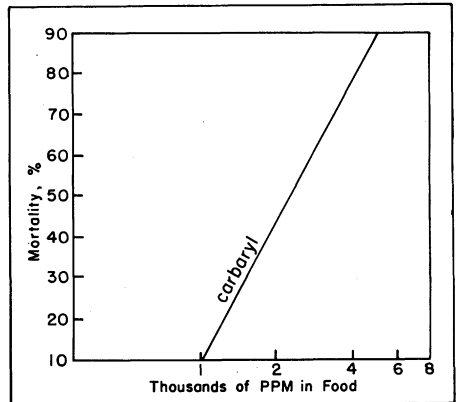


Fig. 2. Dosage mortality curve of carbaryl to adult house crickets.

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