determined with Difco nutrient gelatin. The methyl red, Voges-Proskauer, and pectate gel liquefaction tests were carried out as recommended in the Manual of Microbiological Methods.

Discussion

The data are presented in Table 1. The data indicate the Arizona isolate resembles E. carotovora more than the others in its reaction in maltose and dextrin; its reaction to ethanol, however, is the same as E. atroseptica. The plant inoculation studies indicated that our isolate did not coincide with E. carnegieana. These carbohydrate fermentation studies tended to support those observations. The Arizona isolate appears to be more similar to E. ariodeae in the physiological tests other than carbohydrate fermentations, particularly in the Voges-Proskauer reaction and in the production of gas and indole. E. chrysanthami seems to agree with our organism in its physiological characteristics, but some bacteriologists feel that E. chrysanthami should be considered as a formae specialis of E. atroseptica. The Arizona isolate is culturally close to E. chrysanthami but no more so than to E. atroseptica when all characteristics are considered. It thus appears to be an unusually virulent isolate of either E. ariodeae or E. atroseptica. It is of importance to point out that it reacts as E. ariodeae in gas production but as E. atroseptica in growth in 1% ethanol. These reactions are considered by some to be distinguishing characters between the two species.

Table 1. Reactions of bacterial isolates in physiological tests.

Isolate	Maltose fermentation	Dextrin fermentation	Ethanol fermentation	Gas production	Voges-Proskauer	Indole
E. carotovora	-	-	+	±	-	±
E. carnegieana	+	±	-	-	+	-
E. chrysanthami	+	++	-	±	+	-
E. ariodeae	++	++	+	-	±	+
E. atroseptica	±	±	-	+	-	±
Arizona isolate	-	-	-	-	+	+

+ positive reaction
- negative reaction
± variable reaction

Low Volume Spray Applications of Technical Malathion to Vegetable Crops

(Paul D. Gerhardt)

Abstract: An experimental application of technical grade malathion was made by helicopter to a mixed planting of vegetables on the University of Arizona Mesa Experiment Station. Technical malathion at the rate of one pint per acre was not phytotoxic to onions, carrots, lettuce, cabbage, broccoli and cauliflower. This dosage did not satisfactorily control cabbage loopers and beet armyworms.

Introduction

Considerable interest has been recently shown in the low volume aircraft application of technical grade pesticides for control of a variety of pests.

Previous tests in other parts of the United States have indicated satisfactory results on cereal crops and cotton with malathion. Because of the interest in this new approach the following trial was set up.

Methods

In conducting this experiment, there were two main objectives. One was to determine if the low volume application of technical grade malathion would be phytotoxic to onions, carrots, lettuce, cabbage, cauliflower, and broccoli.

Secondly was to determine if 1 pint (1.2 lbs.) of technical grade malathion would control cabbage looper and beet armyworm larvae.

The application was made by a Bell 47-D-1 helicopter, fitted with six No. 8001 flat fan nozzles on the boom. Pressure of 60 psi was provided by an electric pump. The helicopter flew approximately 20 feet high at a speed of 50 knots, covering a swath approximately 60 feet wide. The swaths were applied across the rows of vegetables in an east-west direction.

The spray was very fine, invisible except right below the boom and appeared to give good coverage of the upper leaf surface with little drift.

Counts were made on twenty plants per variety three days after the application had been made. A second count was made at the end of a week.

Results and Discussion

The low volume spray application appeared to be satisfactory with the fine spray giving good coverage on the upper surface of the leafy vegetables and only a slight drift. The spray could only be observed close to the boom while being applied.

Results of the experiment indicated that one pint of technical malathion per acre did not cause phytotoxicity to the previous mentioned vegetables when applied in the manner indicated above.

The one pint per acre dosage did not give good control of cabbage looper larvae on lettuce, cabbage, cauliflower, and broccoli. Both the lettuce and cabbage were heading at the time of application with looper larvae being present on the under sides of the leaves which did not receive adequate coverage.