in favor of the male, and malformed F_1 adults were observed in the progeny. These results indicate possible F_1 progeny in the field from crosses of parents irradiated with 17.5 Krad although these progeny are sterile.

Mating and dispersal of released pink bollworm males--Moths were labeled with P^{32} for field studies. Laboratory reared moths did not disperse as far as native moths in one test and were found predominantly within a few hundred feet of the release point in other tests. In tests where individual males were located in the field after release, all males were found in the soil within 6 inches of the plant stalks early in the season before a plant canopy was formed. After a canopy was formed about 50% of the males were located in the soil within 6 in. of the plant stalks, the remainder were in the lower 10 in. of the plant canopy and most of these were located in old blooms in the process of drying out.

Mating by released labeled males in the field was found by autoradiography of native females. However, evaluation of competitiveness of released males was not possible to determine accurately since native moth populations were highly variable. Irradiation (20 Krad) appeared to have little effect on mating of released males in the field.

PATHOLOGY

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Total increase in titer of alfalfa looper nuclear polyhedrosis virus in a tissue culture cell line--A study was conducted to determine the total increase in titer of the alfalfa looper nuclear polyhedrosis virus in Hink's cabbage looper cell line. In addition, the rate of replication was also studied. After flasks containing cells were inoculated with virus, titer increase was measured at 0, 6, 12, 16, 24, 48, 72, and 96 hours afterward. The contents of the flasks were then fed to neonate cabbage looper larvae for each time period and the dilution causing 20% mortality determined. Six, twelve, and sixteen hours after inoculation no measurable increase in virus titer occurred; 24 hours after inoculation, titer had increased 80 fold over the original inoculum. By 96 hours, virus titer had increased by three million over the original inoculum. These studies showed that virus titer increases rapidly in the cell lines and reaches a peak about 96 hours after inoculation.

Comparative susceptibility of Heliothis virescens and Heliothis zea to the Autographa californica nuclear polyhedrosis virus--Previous tests conducted in cooperation with the Brownsville, Texas, laboratory showed that H. virescens was more susceptible to this virus than to the nuclear polyhedrosis virus (NPV) isolated from H. zea. Assays at our laboratory confirmed these findings and have also shown that Heliothis zea is much less susceptible to the virus compared to H. virescens. The lower susceptibility is manifested in both higher LD_{50} and LT_{50} values. In addition, the symptoms in H. zea are not typical of NPV infections and the number of Polyhedra in cadavers appears to be much lower. Detailed histopathological and cytological studies of the virus in the two hosts has been initiated.

Field tests with Autographa californica nuclear polyhedrosis virus for control of Pectinophora gossypiella--The A. californica NPV, which infects most of the lepidopterous pests of cotton, was tested under field conditions at Parker, Arizona during the summer of 1973. Twelve applications at a rate of 1.0×10^{12} polyhedra/acre were made between July and September. Samples of bolls did not indicate that the virus gave sufficient control and field collected larvae showed a low incidence of disease. This is the first record of a spray application of a nuclear polyhedrosis

virus causing infection of the pink bollworm under field conditions. Further tests are planned for next summer using modified application and formulation techniques.

The effect of the nuclear polyhedrosis virus of Autographa californica (ACNPV) on first generation pink bollworm, Pectinophora gossypiella--Eight field cages containing a standard planting of DPL-16 cotton were equally infested with 52 ♀ and 101 ♂ wild pink bollworm moths over a 28-day period beginning at the onset of squaring. Four cages were sprayed with ACNPV at the rate of 1 x 10^{12} polyhedra/Ac. in 50 gallons of water. Shade®, a viral protectant, and Buffer-X® were added at the rates of 4 lbs/acre and 1 pt/acre, respectively. All open blooms from each cage were collected daily for 27 consecutive days. Each bloom was examined for evidence of pink bollworm infestation. All larvae were incubated in their respective blooms in 3/4 oz cups for a maximum of 14 days at 27° C. All dead larvae were examined for evidence of virus infection, i.e., the presence of polyhedra in the cadavers.

The observed larval mortality rates due to the virus from 2,478 infested blooms in the untreated cotton was 0.5% compared to the virus-treated cotton in which there was 0.6% mortality from 2,355 infested blooms. This similarity in mortality suggests that virus contamination occurred while the blossoms were handled in the laboratory rather than in the field.

Field trials with Autographa californica nuclear polyhedrosis virus, Yuma, Arizona--This trial consisted of three different formulations of ACNPV and an untreated check. The virus dose for all treatments consisted of 5 x 10^{12} polyhedra/50 gallons/acre. The treatments were as follows:

1. Virus plus 4 lbs Shade® and 1 pt Buffer-X® per acre.

2. Virus plus 4 lbs lignin sulfonate and 1 pt Buffer-X® per acre.

3. Virus plus 50 gallons 1/4 strength Heliothis bait.

Applications were on a 7-day schedule and were made with high pressure, ground spray equipment. Each treatment was replicated four times. Plot size was 16 rows by 300 ft. (0.4 Ac.).

Mortality rates due to the virus were obtained by incubating 50 bolls collected from each plot for 7 days at 27° C. The bolls were then cracked, the larvae removed and placed in 3/4 oz cups containing artificial diet, and reincubated at 27° C for a maximum of 14 days. All cadavers were examined for the presence of polyhedra. No mortality due to the virus was observed among larvae from untreated checks. A 1.1% mortality occurred from the 216 larvae collected from Treatment 1 plots; 0.6% mortality from 315 larvae from Treatment 2 plots; 4.4% mortality from 68 larvae from Treatment 3 plots.

The results of these two experiments indicate that the virus, as applied in these tests, is not a significant mortality factor in the pre-boll generation or later generations of the pink bollworm.