BIOLOGY AND ECOLOGY

G.D. Butler, Jr. and A.G. Hamilton

Biology of a dark strain of cabbage looper--The duration of the larval and pupal stages of a dark strain of cabbage looper was compared with that of a normal strain at several different temperatures. There were no differences in the rate of development. Adult longevity and fecundity were also compared and no significant differences observed. From the standpoint of development in relation to temperature, the dark strain appears suitable for field-release programs.

Biology of the cabbage looper--Extensive studies were conducted on the development of the egg, larval, and pupal stages and on the survival of adult stage at different constant and fluctuating temperatures, as well as at fluctuating temperatures in greenhouses and outdoor insectary. The purpose of these studies was to provide information for input into a computer simulation model and data to validate the model.

Biology of the tobacco budworm, Heliothis virescens--The development of the larval and pupal stages of the tobacco budworm at different constant and fluctuating temperatures was determined as well as the survival of adults at these temperatures.

Biology of two species of Microplitis--The life history of two species of Microplitis recovered from field-collected cabbage looper larvae was determined at several temperatures in the laboratory.

Computer simulation of insect development--Computer simulation models (WATBUG) have been developed for several important cotton insects: pink bollworm, bollworm, tobacco budworm, cabbage looper, and beet armyworm. During the past year, the models have been used for various types of evaluation.

HOST PLANT RESISTANCE

R.L. Wilson and E.M. Dawson

Lygus bugs--For two consecutive years, Stoneville 7A frego bract cotton has yielded as well as Stoneville 7A normal bract. The cottons were planted through the center of an alfalfa field in order to insure an adequate lygus bug population. There were no significant differences between the cottons in the number of squares, flowers, or bolls produced. There were significantly more lygus bugs collected from the frego bract plots as compared to the normal bract plots.

Cotton leafperforator--Field tests have shown significantly fewer numbers of CLP on very hairy cotton as compared to cotton with normal hairiness. In tests performed at Phoenix, regular TM-1, with 125.0 hairs/cm^2 on the lower leaf surface, averaged 3.3 CLP/gram leaf tissue as compared with TM-1(H_2), with 1100.0 hairs/cm^2 on the lower leaf surface, which averaged 0.5 CLP/gram leaf tissue. Tests at Yuma averaged 1.52 CLP/gram leaf tissue on TM-1 as compared with 0.26 CLP/gram leaf tissue on TM-1(H_2).

Pink bollworm--In laboratory bioassays we have screened around 300 Texas race stocks for pink bollworm resistance. Approximately 10% of these have been selected for further evaluation. They will be screened in a greenhouse whole plant test in which larvae are placed on 10-day-old bolls and then monitored for growth and development. The selected lines are also crossed in the greenhouse with DPL-16 and Stoneville 7A and later evaluated in the field and laboratory to determine whether the "resistant" character is genetically transferable to commercial cottons.

PINK BOLLWORM CONTROL

L.A. Bariola, J. Farris and B. Beard

Timing of insecticide applications to cotton by trapping of pink bollworm males in hexalure-baited traps--A test was conducted in 8 cotton fields in which insecticide applications were timed according to catches of pink bollworm males in hexalure-baited traps. Population of pink bollworms in each field were monitored by the traps (4 to 10 per field, depending on size) and also by cutting and examining 100 or 200 green bolls for larvae each week. Populations of lygus bugs, bollworms, and beneficial insects were monitored by taking 100 sweeps with a net in each field per week. Insecticides were applied to 2 of the fields when 12% of the bolls were infested; treatments were repeated on a weekly schedule until the infestation was below 12%. The other six fields were treated when an average of 5 or 6 moths per trap per day were caught.

The fields are being harvested and all the data has not been analyzed. However, the 2 fields treated on the basis of infested bolls were each sprayed 6 times and the other fields were sprayed only 2 to 4 times throughout the season. The percent boll infestation in the latter fields did not reach damaging levels until late in the season. Thus, it appears that timing of insecticide applications on catch of moths in traps prevents the buildup of larval populations in the bolls and requires fewer insecticide applications throughout the season to protect the crop.

Chemical termination of cotton fruiting as a means of controlling pink bollworms--This is a continuation of a project begun 2 years ago using chemical termination of fruiting to eliminate late season green bolls and reduce the buildup of diapausing pink bollworms. During 1973, tests were conducted at Parker, Arizona, in a 36 acre field, divided into 24 plots of 1.5 acres each. During the growing season, 8 plots were treated each week with a nuclear polyhedrosis virus isolated from A. californica, 8 plots were treated with insecticide, and 8 plots were untreated. On August 21, 4 plots of each were treated with 2,4-D (0.025 lb/Ac.) + chloroflurenol (Maintain®) (1/2 lb/Ac.) to terminate fruiting. All plots were defoliated in mid-October and picked on October 30 and 2nd pick made on December 5. On October 30, a count of green bolls on the plants was made by counting all green bolls on 100 ft. of row per plot. Also, on October 30-31 and on November 6-7, the number of diapausing pink bollworm larvae/Ac. were estimated by taking a soil sample from each plot and processing it through a gin trash machine (revolving screens). Each sample was 3 ft. long X 3 1/3 ft. wide (= 10 sq. ft.) and 2 to 6 in. deep. Also all green and unopened fruiting forms on the plants in the 3 ft. sample area were picked and examined for PBW larvae.

The chemical termination significantly reduced the number of green bolls and number of diapause pink bollworm larvae. Generally, these reductions were at least 90% or greater. The in-season treatments had less effect on the number of PBW larvae; however, the insecticide treatment had a greater yield and fewer larvae.