chromosomal constitution of the pink bollworm to establish a base for comparison with irradiated insects. The number of chromosomes has been established as N=30. More detailed analyses are in progress.

Studies will be conducted on the dose required to induce sterility of the pink bollworm by irradiation. Laboratory and field studies of the competitive ability of irradiated vs. unirradiated individuals will be made. Searches will be made for suitable genetic markers for use in laboratory and field studies.

Counts of chromosomes have been made for two other economically important cotton pests: *Lygus hesperus* Knight has been found to have N=18 chromosomes; *Euschistus impictiventris* Stål has N=7 chromosomes.

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REARING INVESTIGATIONS

Raymond Patana, Entomologist, E.R.D., A.R.S., U.S.D.A.
William McAda, Agricultural Research Technician
E.R.D., A.R.S., U.S.D.A.

Objective:

To improve rearing and mass-production techniques of insects infesting cotton for use in sterile insect release programs and to serve as hosts in the production of parasites and predators for field release.

Summary of Progress:

Laboratory cultures of boll weevils, *Anthonomus grandis* Boheman, bollworms, *Heliothis zea* (Boddie), beet armyworms, *Spodoptera exigua* (Hübner), cabbage loopers, *Trichoplusia ni* (Hübner), pink bollworms, *Pectinophora gossypiella* (Saunders), tobacco budworms, *Heliothis virescens* (F.) and salt-marsh caterpillars, *Estigmene acrea* (Drury), are maintained at the U.S.D.A. Cotton Insects Laboratory in Tucson. The pink bollworm is being used for studies of irradiation-induced sterility. The other lepidoptera are used in studies of parasites and predators oriented toward biological control.

The laboratory bollworm culture is currently in the 24th generation (no outside stock has been introduced). The culture of tobacco budworms was begun to provide an alternate host for bollworm parasites. It serves in this capacity quite well since the host larvae can be bulk-reared.

At the present time, 7 separate boll weevil cultures are being maintained, 5 started originally from weevils collected from domestic cotton at 5 locations in Arizona. Also, 2 strains of thurberia weevils, *Anthonomus grandis thurberiae* Pierce, are being maintained that were originated from weevils collected in the Santa Catalina and Santa Rita Mountains. The boll weevils are cultured for ecological, biological, and physiological research.

Artificial diets are constantly being improved, and techniques for rearing are being tested for use in mass production.

An egg parasite believed to be a _Trichogramma sp._ was recovered from parasitized bollworm eggs during 1967. A laboratory culture is being maintained on bollworm and cabbage looper eggs. In laboratory studies, this egg parasite has successfully parasitized eggs from bollworms, tobacco budworms, cabbage loopers, salt-marsh caterpillars, beet armyworms, and pink bollworms. Further tests are to be conducted to determine host preference.

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INVESTIGATIONS OF SAMPLING AND STATISTICAL METHODS FOR THE ASSESSMENT OF COTTON INSECTS

R. O. Kuehl, Statistician
C. D. Bonham, Ecologist
R. E. Fye, Entomologist, U.S.D.A.

Objective:

To determine methods to properly assess populations of cotton insects for purposes of biological and chemical control of injurious cotton insects.

Summary of Progress:

During 1967 data were obtained to determine: (a) the distribution of insects on individual plants; (b) the distribution of insects in the field; (c) the effect of ecological factors on insect distribution; (d) the proper sampling unit for the various pests.

The insects studied include: (a) the cotton bollworm; (b) the pink bollworm; (c) the cabbage looper; (d) the beet armyworm; (e) the salt-marsh caterpillar; (f) the boll weevil.

The data are in the process of detailed analysis.

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INSECT PARASITES AND PREDATORS OF INSECT PESTS OF ARIZONA CROPS

T. F. Watson, Associate Entomologist
P. H. Johnson, Assistant in Research

Objectives:

A. To determine the identity, distribution, relative abundance, host relationships, and life histories of representative common and