

9113

Library

UNITED STATES

DEPARTMENT OF AGRICULTURE

LIBRARY
STATE PLANT BOARD



BUREAU OF
ENTOMOLOGY AND PLANT QUARANTINE
NEWS LETTER

VOLUME III

Vol. 4



Digitized by the Internet Archive
in 2016

<https://archive.org/details/newsletter3819wash>

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
NEWS LETTER

FOR JUNE 1936

Vol. III, No. 8

(Not for publication)

August 1, 1936

FRUIT INSECT INVESTIGATIONS

Correction.--In the Bureau News Letter for May, 1936 (vol. III, no. 7) paragraph 1, line 12, on page 2, "per 100 linear feet" should read "per linear foot."

Biological control of citrus blackfly in Cuba.--Following a trip to Cuba early in May, D. L. Van Dine, Washington, D. C., reports on the control of the blackfly on citrus by an introduced parasite. In cooperation with the Plant Quarantine Service and the Department of Agriculture, Commerce, and Labor of Cuba, the parasite Eretmocerus serius Silv. of the blackfly (Aleurocanthus woglumi Ashby) was introduced into Cuba in the spring of 1930 from Malaya by C. P. Clausen and released through facilities supplied at the Cuban Agricultural Experiment Station at Santiago de las Vegas, Province of Havana. In the two localities visited the groves were heavily infested by the blackfly before its parasite was introduced. In one section of the first grove inspected, only occasional leaves could be found with small colonies of the blackfly on them. In another section of the same grove the blackfly was not so difficult to find but the infestation was of no consequence. No evidence of the parasite was found, but S. C. Bruner stated that this was on account of the blackfly colonies being in an early stage of development and that if the infested leaves were placed in a breeding jar the parasite would surely develop from them. On one side of the second grove visited near Santiago de las Vegas, the outer trees had quite a large infestation of blackfly on the older leaves in an advanced stage of development. Mr. Bruner said that the host would build up this way in what he termed a "wave" that would shortly be completely suppressed by the parasite. Here the parasite was found emerging from the host. Mr. Bruner stated that they have not failed to breed the parasite from any blackfly material collected by them or received by the experiment station from growers since 1931, the year following the liberation of the parasite. The second locality visited was the Ceballos district in the Province of Camaguey. It was found that the blackfly has ceased to be a problem in that section also since 1931. This is in great contrast to the conditions familiar to the writer prior to the introduction of the parasite, when blackfly infestation rendered all the groves conspicuous because of their sooty appearance. Several of the orange growers in Ceballos said that if the expenses of blackfly control had continued during the recent years of low prices they could not have financed their places. A grower who has 98 acres of oranges

in bearing under irrigation used 1,000 gallons of an oil spray every year. Since 1931 it has not been necessary for him to use a single barrel of this spray material, a saving of \$500 on material alone each year for 5 years. The entire citrus colony at Ceballos purchased 300 barrels of this spray material for blackfly control. This is an indicated saving of \$37,500 in spray for the 5-year period. When the labor cost of spray applications is added, and the low prices which prevailed during the period are considered, it is seen that the part played by the parasite in the maintenance of orange production in that section is an important one, and that for the island as a whole, the role of the parasite is very important.

Dried fruit beetle overwintering in soil and surface debris of fig plantings.--By use of the Shirck soil washer (described in ET-71) Dwight F. Barnes and Charles K. Fisher, of the Fresno, Calif., laboratory, made a survey of soil in fig plantings during the winter and spring. For the first time extensive data were made available, showing that large numbers of the dried fruit beetle and associated nitidulids may pass the winter in soil under fig trees. Samples taken in January and February in three locations averaged 1,250, 1,858, and 1,707 larvae, pupae, and adults per tree. Early in March samples averaged 490, 325, and 714 stages per tree. Late in March, after spring plowing, none were found in the samples. Examinations of undisturbed soil sampled late in March and early in April indicated that emergence was completed between March 28 and April 6. The figures given include all insects identified as nitidulids, the greater portion of which were probably Carpophilus hemipterus L. Surface debris, consisting largely of decaying leaves, was removed from unit areas under fig trees and the nitidulis population recorded by means of a chloropicrin separator (see ET-21). Smaller populations were found in debris than in soil, but as many as 950 adults per tree were indicated. Larvae were not obtained in samples taken after rains in February and adults had left the debris by the middle of March. Pupae were not found in these samples.

Winter mortality of the raisin moth.--Perez Simmons, Fresno, reports that a study of winter mortality of full-grown larvae of the raisin moth (Ephestia figulilella Greg.), hibernating in the soil and under timbers, was made by H. C. Donohoe from December 19, 1935, to March 26, 1936. Larvae webbed beneath timbers lying on the ground in a dry location showed the lowest mortality (30 percent) by March 26. In soil that occasionally became moist 75 percent of the larvae had died by the same date, whereas those in soil that stayed wet all winter showed a mortality of about 96 percent at the end of the observation period.

Codling moth stages a swift comeback.--Although the 1935 season was characterized by an abnormally low level of codling moth population at most points in the West Central States, conditions appear to have been unusually favorable for the insect last spring. According to reports submitted by L. F. Steiner, of the Vincennes, Ind., laboratory, in a single generation the moth population has built up considerably above normal for the first brood in that section. Mr. Steiner says that for the first time in several years the peak of emergence of first-brood moths was higher than that for spring-brood moths. Similar conditions have been reported by Howard Baker,

St. Joseph, Mo., for the section of the Missouri River Valley in which he is located.

MEXICAN FRUIT FLY CONTROL

Conditions in lower Rio Grande Valley.--Except for scattered showers during the last few days of June, this area has experienced extremely dry weather. By the end of the month general rains were needed and considerable grove irrigation was being done. No Anastrepha ludens Loew were trapped in Texas in June nor were any larvae found in off-bloom fruit removed from the trees. Trap inspections for the whole area totaled 38,408; wild host collections amounted to 917; and 5,359 insect specimens were submitted for identification.

DATE SCALE CONTROL

Control work completed.--Spot inspection was completed in the Imperial Valley during the month and no scale was found. No scale has been found in the Imperial Valley since February 1934, in Arizona since October 1932, and in the Coachella Valley since November 1931. This completes the Federal-State Date Scale Eradication Project.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Infestational ability of hessian flies from hard- and soft-wheat areas.--E. T. Jones, Manhattan, Kans., reports that results of a test to determine the importance of biological strains of flies in hessian fly resistance work show that, although some differences may exist between flies from hard-wheat and from soft-wheat regions, in choice of varieties for oviposition and ability of flies to develop on certain varieties of wheat, the differences are not great enough to affect seriously the results of resistance tests. Results of infestation of wheat varieties with hessian flies from Wichita, Kans., and from Springfield, Mo., are summarized below. Each variety of wheat and each strain of fly is represented by averages based on 150 egg-infested plants in 6 replications of 25 plants each.

Variety of wheat	Wichita flies			Springfield flies		
	Average	Plants	Average	Average	Plants	Average
	eggs	in-	eggs per	eggs	in-	eggs per
	per	festod	puparia	per	festod	puparia
	plant	:	plant	:	:	
	Number	Percent	Number	Number	Percent	Number
Illini Chief Sel. 223415	:	:	:	:	:	:
(resistant)-----	13.3	73.0	2.9	12.4	84.0	2.3
Kanred (susceptible)-----	12.7	51.0	3.5	15.1	89.0	2.8
Kawvale (resistant)-----	14.6	79.0	2.8	14.1	95.0	1.7
Marquillo (resistant)-----	10.7	55.0	5.5	14.1	60.0	5.5
Dawson (resistant)-----	9.5	78.0	1.5	15.6	78.0	3.1
Averages for all	:	:	:	:	:	:
varieties-----	12.2	67.2	2.9	14.2	67.4	2.6

Resistance of foreign wheats to hessian fly in Kansas.--Mr. Jones also reports that in recently completed greenhouse tests to determine the reaction of 166 varieties and selections of foreign wheat to hessian fly, 3 strains have shown strong resistance to hessian fly development. Gelou (Sel IV y), Renaciminto, and Strain Cl II, three wheats from Uruguay, were infested 18, 32, and 25 percent, respectively. The average infestation of the Marquillo checks was 34 percent and Kawvale, Ceres, and Tonmarq checks were infested 81, 93, and 95 percent, respectively. The average infestation of the 116 strains tested was 92 percent. The average intensity of infestation per infested plant was 14 puparia each and the average number of plants per strain was 31. Plants were tested in uniform duplicate series.

Comparative attractiveness of different small grains to chinch bugs.--C. M. Packard, Lafayette, Ind., reports that as a result of the common observation that chinch bugs tend to congregate in certain small grains in preference to others for feeding and breeding, the question is often raised as to whether or not the complete elimination from a neighborhood of the grains most attractive to the bugs would also eliminate the bugs and their injury to both small grains and corn. The question as to the feasibility of using small plantings of the most attractive grains as trap crops in which to concentrate and destroy the bugs is also frequently asked. The answers to these questions have an important bearing on practical chinch bug control. Field studies have therefore been conducted during the past 3 years for the purpose of obtaining definite information regarding them. The studies show decisively that the small-grain preferences of chinch bugs migrating from winter quarters vary with the climatic character of the spring season and the condition of the respective grains. Under certain conditions any of the small grains, including oats, may become severely infested. While oats are the least attractive, the elimination from an area of all the small grains except oats would not do away with chinch bug troubles, although they might be reduced to some extent. Even where all small grains were eliminated from an area, some infestation developed directly on corn, although infestation in general was probably materially reduced by the absence of small grain. No one small grain was sufficiently more attractive than the others to serve as an effective trap crop in which the bulk of the bugs in a neighborhood could be concentrated and destroyed. These findings are based mainly on actual counts about every 10 days by Curtis Benton of chinch bug abundance in all small-grain fields in several 1-mile-square areas in northern Illinois containing representative crops. A brief summary of the data is given in the following table.

Kind of grain	:Number of fields: :examined in--			:Average spring infestation of adult bugs per :linear foot of drill row			
	:1934:	:1935:	:1936	:1934:	:1935:	:1936:	:3-year weighted average
Rye-----	: 13 :	: 5 :	: 10	: 43 :	: 13 :	: 1.2:	22.7
Winter wheat--	: 22 :	: 8 :	: 23	: 42 :	: 12 :	: 0.6:	19.5
Barley-----	: 7 :	: 3 :	: 3	: 20 :	: 23 :	: 2.5:	16.7
Spring wheat--	: 3 :	: 2 :	: 2	: 17 :	: 13 :	: 0.8:	11.2
Oats-----	: 74 :	: 78 :	: 86	: 2 :	: 2 :	: .04:	1.3

Six varieties of vetch found unattractive to vetch bruchid.--J. S. Pinckney, Carlisle, Pa., has continued research work on Bruchus brachialis Fahr. since April 15. Through the cooperation of R. E. Stitt he has been conducting a nursery of rod row tests at Statesville, N. C., with various varieties of vetch to determine their resistances to Bruchus infestation. The results of the varietal tests for this year have not been completed. The following varieties were found to be entirely unattractive to the bruchid for the purpose of egg deposition: Vicia ludoviciana, V. sativa, V. angustifolia, V. ervila, V. pannonica, and V. monantha. The complete list of varieties grown in these tests is presented in the following table, together with notes as to condition of plants and bruchid resistance. Both V. sativa and V. pannonica are grown in Oregon and V. ludoviciana is grown to a limited extent in northwestern California and western Oregon.

Row	Variety	Effect of winter	Attractiveness to bruchids
A-1----	<u>Vicia ludoviciana</u> (25016)	Some winter killing	Unattractive
A-2----	<u>Vicia sativa</u> (22301)	Uninjured	Unattractive
A-3----	<u>Vicia angustifolia</u>	Practically whole row winterkilled	Unattractive
A-4----	<u>Vicia sativa</u> (02830)	Uninjured	Unattractive
A-5----	<u>Vicia dasycarpa</u> (19130)	Uninjured	Attacked
A-6----	<u>Vicia villosa</u> (29073) Oregon	Uninjured	Attacked
A-7----	<u>Vicia ervila</u> (13410)	Uninjured	Unattractive
A-8----	<u>Vicia villosa</u> (19261) Latvia	Badly winter-killed	Attacked
A-9----	<u>Vicia pannonica</u> (22180)-	Uninjured	Unattractive
A-10----	<u>Vicia villosa</u> (19262) Sweden	Winterkilled in spots	Attacked
A-11----	<u>Vicia monantha</u>	Some winterkilling	Unattractive
A-12----	<u>Vicia villosa</u> (20110) North Carolina	Uninjured	Attacked
A-13----	<u>Vicia atropurpurea</u>	Entirely winter-killed except 3 plants	
A-14----	<u>Vicia dasycarpa</u> (19130)	Uninjured	Attacked
A-15----	<u>Vicia villosa</u> (19198) Hungary	Uninjured	Attacked

New location for corn earworm investigations.--A new location as headquarters for the corn earworm investigations, formerly situated at Rosslyn, Va., has been set up in the Post Office Building, Broadway and East Elm Street, Urbana, Ill., in cooperation with the State Agricultural Experiment Station and Illinois Natural History Survey. Ralph A. Blanchard is in charge. The mail address is P. O. Box 32, Urbana, Ill.

Webster Groves, Mo., field laboratory discontinued.--The field laboratory formerly located at 65 North Frisco Avenue, Webster Groves, Mo., was

discontinued effective July 1. A. F. Satterthwait, formerly located there, is now located at the Urbana, Ill., laboratory, where he is continuing his studies of the sunflower insects, bill bugs, and the corn earworm.

JAPANESE BEETLE CONTROL

Aerial scout spots wilted elms.--Aerial scouting with the division's autogiro has proved an efficient method of surveying rough terrain. Systematic autogiro scouting in the northwestern counties of New Jersey was started on June 10. Fifteen suspects were spotted the first week. The flagged or wilted tree is located by the observer on an aerial photographic map. This map is then turned over to a ground crew, which locates and samples the tree. On June 25, Lee A. Strong, Chief of the Bureau, and Paul H. Appleby, Assistant to the Secretary of Agriculture, made flights in the autogiro to observe its practicability as an adjunct to the usual type of systematic scouting.

Scouting for escaped elm logs.--Scouting for 42 miles on both sides of the Passaic River from its source in Somerset County, N. J., to a point in Essex County resulted in the recovery of 47 elm logs that had been floated down stream from clear-cutting areas during the spring floods. In the stretch scouted, the river flows past two clear-cutting areas, the Great Swamp in Morris County and the Great Piece Meadows in Essex and Morris Counties. Twelve logs that had floated approximately 20 miles from the Great Swamp were found on a small island. In the Great Piece Meadow section logs were scattered 1,000 feet inland from the original piles when the river covered the lower portion of the meadows with from 5 to 9 feet of water. Lodged on a mud bank at the far end of the stretch scouted was a 38-foot section of an elm with a butt-end diameter of 32 inches. Logs recovered were loaded on trucks and hauled to burning locations in the swamps.

Dutch elm disease scouting in isolated areas.--Outside scouting is now completely organized at 16 points outside of the major infected zone of New Jersey, New York, and Connecticut. Specimens have been collected from about 1,000 elms. Laboratory reports giving the determinations of about 600 of the samples show them to be divided about equally between Verticillium, Cephalosporium, miscellaneous diseases, and sterile cultures. Four cases of the Dutch elm disease have been located. One tree at Baltimore and another at Norfolk showed symptoms of infection of 3 years' standing. Two trees at Indianapolis bore evidence of more recent infection. All four elms were in the general area where confirmed trees were found previously. Scouting in the outside areas will be continued with W. P. A. workers during July.

Dutch elm disease scouting in New York State.--During the week ending June 20, the scouting force in New York was increased by the addition of 21 State scouts for work on Long Island, 38 State scouts in Westchester County, and 1 scout on Staten Island. In addition, 10 State-appointed men have been scouting since June 1 in heavily infected spots and in the general vicinity of the isolated infestations. The State scouts have their own area foremen who work as assistants to Federal county supervisors.

Native elm bark beetle observed in two cities.--Reports have been received from the scouts in Kansas City and Louisville that infestations of Hylurgopinus rufipes Eich. have been observed in the two cities. These were not noticed in these cities last year. The beetle population has not built up to the extent found in the major Dutch elm disease zone, but it is possible to find this species.

Locust damage confused with elm disease symptoms.--Scouts working at both Baltimore and Brunswick, Md., report that injury to elm twigs by the periodical cicada had caused wilting, which from the ground is readily mistaken for symptoms of the Dutch elm disease. This has resulted in considerable sampling of trees that otherwise would not be necessary.

Confirmations in June.--Confirmations received from the laboratory during the 4-week period May 29 to June 27 numbered 1,037. During this period a maximum of 890 W. P. A. laborers, 901 C. C. C. enrollees, and 516 Federal and State employees of other classifications were engaged in the work.

Gypsy moth defoliation.--District inspectors throughout the New England area report from 75 to 100 percent less defoliation than was observed last year. Owing to early hatching of egg clusters in some localities, the moth larvae vary considerably in size. A few gypsy moth pupae were observed in Westford, Mass., on June 22. This is unusually early for the caterpillars to pupate.

Wisconsin corn borer clean-up campaign.--Sponsored by the Wisconsin Department of Agriculture and Markets, Wisconsin farmers cleaned up fields that were found infested with the European corn borer by W. P. A. scouts working under State supervision last summer. The farmers were paid \$2 per acre for cleaning up their infested fields. This work, performed in addition to their regular cultural practices, consisted in picking up and burning all pieces of cornstalks remaining above ground after the field had been cultivated and seeded to small grain or corn.

Japanese beetle trapping.--By the end of June traps were in operation in St. Louis, Mo., Detroit, Mich., and at a number of points each in Georgia, North Carolina, South Carolina, and Virginia. The earliest beetle capture was on May 30. A few beetles were trapped in 13 communities where infestations were determined in previous years. First records of single beetles each were reported from two cities.

Japanese beetle emergence.--Initial reports of adult Japanese beetle emergence in the regulated area were received from Philadelphia, Pa., on June 2 and Glassboro, N. J., on June 9. The first beetle observed in northern New Jersey was reported from Bloomfield on June 20.

FOREST INSECT INVESTIGATIONS

European spruce sawfly.--H. J. MacAloney, of the New Haven, Conn., laboratory, reports that on June 28 six adult females of the European spruce sawfly emerged from larvae collected at Orange, Conn., on June 15. This indicates that the sawfly completed one generation before July 1 in southern Connecticut. Cocoons were present in the field at Petersham, Mass., on June 22, while on the same date at Tupper Lake, N. Y., in the Adirondacks, the insect had reached the fifth larval instar.

Fir bark louse.--On June 23 Mr. MacAloney conferred at Speculator, N. Y., with H. K. Henry and O. R. Thompson, of the New York Conservation Department, regarding the fir bark louse situation in that State. Several new infested areas have been found near Speculator and some of the larger trees are heavily attacked. About half of the infestations located thus far are on State-owned land and it is expected that the Conservation Department will carry out some experimental control operations during the summer in some of these areas.

Forest tent caterpillar.--J. V. Schaffner, Jr., of the New Haven laboratory, reports on the forest tent caterpillar situation in Vermont, as follows: "A 2-day survey, accompanied by H. L. Bailey, State Entomologist of Vermont, revealed that defoliation was, in most cases, far more extensive in 1936 than in the same region in 1935. Several sugar orchards noted as defoliated in 1935 were again defoliated in 1936. Thousands of acres were from 50 to 75 percent defoliated. Shade trees were completely stripped in many Vermont villages. Sixty-eight sugar maples, representing about one-fourth of an orchard in Bennington, were tagged in 1935 and the tree condition noted. These trees were completely defoliated in 1935 and were reported to have been heavily defoliated in 1934. In 1935 the crown condition on 63 was noted as fair and on 5 as poor. In 1936 the crown condition was as follows: 11, fair; 16, top dead; 8, upper one-fourth dead; 7, upper one-third dead; 11, upper one-half dead; 7, upper two-thirds dead; and 8, dead or dying."

Notes on parasites.--P. B. Dowden and P. A. Berry, New Haven, report on parasite investigations. The final shipment of Coleophora laricella Hbn. material was received from England from W. F. Sellars on June 2. A total of 102,000 full-grown cases of this species were received in May and June. About 20,000 cases are being held at room temperatures while the bulk of the material is held at 50° F. to retard issuance of parasites. To date about 150 male and 50 female Angitia? nana Grav. and 500 male and 500 female Chrysocharis laricinellae Ratz. have issued. Three shipments of hymenopterous parasite material reared from Rhyacionia buoliana Schiff. have also been received from England from W. F. Sellars. This material includes the following material: 177 Omorgus sp. cocoons, 270 pimpline cocoons, and 435 Cremastus interruptor cocoons. These parasite cocoons are being held at 62° to retard issuance of adults. The rearing of Anachaetopsis nitidula Vill. from elm leaf beetle adults received from France last winter was concluded on June 23. A total of 6,329 beetles hibernated successfully but only 57 Anachaetopsis were reared. These were liberated at Assonet, Mass., on June 16. The work with Digonochaeta

setipennis Fall. was closed out on June 10 with the liberation of a colony of 249 males and 320 females (most of them mated) at Newport, R. I. About 500 males and 200 females of an undescribed species of Delomerista issued this spring from cocoons of Neodiprion tsugae Middleton collected at Sweet Home, Oreg., last fall. Females readily attack exposed Diprion polytomum Htg. cocoons in the laboratory, laying an external egg on the hibernating host larva. A number of full-grown Delomerista larvae have been obtained, but apparently there is only one generation a year, as no adults have issued. Colonies containing 80 females (mated) and about 200 males have been liberated at D. polytomum infestations at Tupper Lake, N. Y., and Orange, Conn. Messrs. Dowden and Berry report that recovery collections of Coleophora laricella Hbn. and Rhyacionia buoliana Schiff. were completed this month. The imported Coleophora parasite, Chrysocharis laricinellae Ratz., has been recovered for the first time at Sidney, Maine, Berlin, N. H., Sharon, Vt., and Saranac, N. Y. Both males and females were reared at each point. The species was liberated at Saranac and Sidney in 1933 and at Berlin and Sharon in 1935. The only imported parasite recovered from R. buoliana has been Orgilus obscurator Nees. This species was obtained from collections made at Branford and Fairfield, Conn. The Branford record is not new, as the species was also taken there in 1935. The collected material will, however, all be examined for Tetrastichus turienum Htg., which will not issue until next spring.

New parasite unit at New Haven.--Messrs. Dowden and Berry with J. E. R. Holbrook, New Haven, report the completion of a laboratory unit for handling foreign parasite material under quarantine. The unit consists of two rooms each 15 by 30 feet. All windows are supplied with 1/4 inch reinforced, opaque glass. Entrance to the unit is through three doors enclosing two hallways, the one nearer the quarantine rooms being completely dark and the outer one dimly lighted by a trap light. The doors are set in felt. Ventilation is obtained by an 18-inch fan. The entrance and outlet for the air are covered with two layers of 60-mesh copper screening. Facilities are provided for sterilizing all material removed from the unit. One room is furnished with two vaults, each 7 by 6 by 6 feet, where controlled temperature and humidity conditions may be obtained.

Experimental spraying.--S. F. Potts, New Haven, reports that an early and a late series of 1/2-acre plots were sprayed at Assonet, Mass., for the control of the gypsy moth. The outstanding features of these experiments were: (1) Effective control of the gypsy moth was obtained in both the early and later series of plots with a derris spray containing 0.5 percent fish oil at a concentration of 3 pounds of derris per 100 gallons of water; (2) effective control was obtained in the early series of experiments with pyrethrum at a concentration of 3 pounds per 100 gallons of water, with fish oil added; (3) good adherence, no foliage injury, and effective control was obtained in both series with 1-1/2 pounds of calcium arsenate added to a 2-2-50 bordeaux mixture.

More autogiro experiments.--Mr. Potts also reports that nine 10-acre plots were sprayed in two series by an autogiro at Assonet, for the control of the gypsy moth. The lead arsenate and calcium arsenate spray contained, by weight, 1 part arsenical, 0.4 part fish oil, and 2.1 parts water. In

the derris spray the ratio of derris to water by weight was 1:6. Excellent adherence, fairly good distribution, and fairly good control was indicated.

Dutch elm disease vectors.--C. W. Collins, of the Morristown, N. J., laboratory, reports that adults of the elm borer (Saperda tridentata Oliv.,) and one of the elm bark weevils, Magdalis armicollis Say, can carry the Dutch elm disease fungus with them when they emerge from infected trees, as do adults of the smaller European elm bark beetle (Scolytus multistriatus Marsh.). The fact that neither S. tridentata nor M. armicollis have been proved to infect healthy trees is apparently because their adult habits are not so well adapted to transmission of the disease as are those of S. multistriatus adults.

Destruction of Douglas fir terminal buds increases seriousness of spruce budworm defoliation.--An epidemic of the spruce budworm has been present within the Douglas fir stands of the Cody Canyon, Shoshone National Forest, for a number of years. For several seasons the trees around resorts, summer homes, and camp grounds have been sprayed in an effort to preserve their scenic values. Although, until this year, this treatment has been successful in preserving the trees within these areas, the seriousness of this season's defoliation has been increased by an unusual injury to the terminal buds. On many of the trees a large percentage of the terminal buds has been destroyed, presumably by some unseasonable climatic condition, and as a result produced no 1936 growth. As only a few of the terminal buds escaped this injury, the feeding of the budworm larvae was concentrated on the surviving new growth, resulting in practically complete defoliation. This concentrated defoliation, with the previous injury to the buds, has resulted in practically a complete elimination of all 1936 growth. The destruction of the terminal buds on Douglas fir is a condition reported from this general area and is in no way due to the budworm injury.

Termite-proofing of buildings gaining recognition.--It is interesting to note that slowly but surely the demands are increasing for reliable information concerning termite-proofing of dwellings, based on proper construction, according to specifications prepared by the Bureau of Entomology and Plant Quarantine. Recently the State Board of Education, Richmond, Va., was supplied upon request with sufficient copies of literature relating to termite control to distribute to each school division in the State. Architects, contractors, builders, and lumber dealers are constantly consulting the Bureau for termite information and often request that illustrated talks be given on the subject. Such a talk was given recently by R. A. St. George before a group of lumber dealers in Bridgeport, Conn., who are interested in getting the proper information before the public regarding the status of the termite problem, because so much misinformation has been disseminated that prospective home owners are afraid to use lumber in buildings any more. Within the past week a development company in the vicinity of Washington revealed plans for constructing a series of buildings and requested that the Bureau supply them with specifications for termite-proofing. It is believed that in the near future home owners will insist upon proper construction of buildings to protect them from termites, just as they now take precautions against fire.

PLANT DISEASE CONTROL

Blister rust control in the Southern Appalachian States.--During the first 6 months of 1936, blister rust control was carried on in six Southern Appalachian States, namely, Georgia, Maryland, North Carolina, Tennessee, Virginia, and West Virginia. During this period 2,036,392 Ribes bushes were destroyed from an area of 291,059 acres. In addition, 12 nurseries and their environs, representing 13,877 acres, were inspected and cleared of Ribes by W. P. A. workers; a nursery at Parsons, W. Va., was protected from blister rust by E. C. W. labor, and another at LeSage, W. Va., was resurveyed for Ribes. Preeradication surveys during this period resulted in the mapping of the white pine on 152,464 acres. On June 30, 424 persons were employed on blister rust control work, of whom 397 were security-wage workers.

Three newly infected counties reported from Wisconsin.--T. F. Kouba, State leader in blister rust control work in Wisconsin, reports that in June blister rust was located for the first time in three new counties: (1) Vilas County, where about 20 fruiting trunk cankers were found on pine, the infection dating back to about 1928, and near which infected Ribes cynosbati plants were also found; (2) Price County, where two branch cankers were found on pine; and (3) Sauk County, where R. cynosbati were found heavily infected.

White pine log drive.--A log drive of 5,000,000 feet of white pine down the Saco River in Maine is being delayed by low waters. This white pine was cut last winter near Fryeburg, Maine. A crew of more than 30 men are working on this drive, which began April 15 and is expected to reach its destination at Biddeford, Maine, sometime in August.

Barberry eradication.--There has been little opportunity so far this year for stem rust to develop because of extremely high temperatures and dry weather. There is a liberal sprinkling of rust throughout the spring-wheat region, but only in areas of North Dakota and Minnesota where wheat is still green is there possibility for further development. Much of the grain, however, is at least badly dried, and this will have a tendency to prevent extensive development of rust, even if there were abundant rains. While it is still a little too early to predict definitely what will happen, the indications are that only in relatively small areas is there likely to be any appreciable damage. In the winter-wheat States east of the Mississippi River, there is little likelihood of damage. From Wisconsin to Ohio, inclusive, wheat is either mature or almost mature and further development of rust is unlikely. The use of emergency funds to employ laborers in connection with the barberry-eradication program during the past year has made possible the destruction of more than 35 million bushes in the 17 States participating in the stem-rust control program. Barberry bushes were eradicated on a total of approximately 50,000 square miles of hill and timbered land along rivers and streams, thus providing a much-needed opportunity to bring under control extensive areas of infestation that had not been reached with regular appropriation funds. During the period from July 22, 1935, to June 30, 1936, an average of 2,265 men were employed and control work was conducted in 278 counties.

COTTON INSECT INVESTIGATIONS

Presquare poisoning for boll weevil control,--K. P. Ewing and R. L. McGarr, Port Lavaca, Tex., report that conditions were favorable for boll weevil control tests during the presquare stage this spring. Several tests were started between May 18 and June 4. Infestation counts, as well as close observations in different fields, showed conclusively that two presquare applications of poison were necessary for boll weevil control. Much better control was obtained where an entire field was treated than where only a part of a field was treated. There was little difference in these tests between the control obtained from calcium arsenate dust and from the molasses mixture applied with a mop. In a test at Edna, Tex., an acre plot (actually 1.36 acres) and an entire field of 9.3 acres were compared. Both were dusted on May 20 and on June 5. On May 18 there were 8 weevils per 100 plants in the untreated check, 7.7 weevils per 100 plants in the acre plot, and 4.7 weevils per 100 plants in the field that was to be treated. On June 4 the number in the untreated check field had increased to 9.5 weevils per 100 plants and had decreased to 4 weevils per 100 plants in the acre plot and 1.3 weevils in the larger field. The square infestations in the untreated check, the treated plot, and the treated field on June 11 were, respectively, 70.7, 34, and 19 percent. By June 18 these infestations had dropped to 45.3, 29.7, and 1.7 percent. By June 25, or 20 days after the second presquare treatment, the infestations were 63, 60, and 30.7 percent. Ewing and McGarr state: "The above infestation records really do not do justice to the excellent control obtained from dusting the entire field, as compared to the field plot. The field was surrounded on three sides by woods. On June 25 this field had practically a bale to the acre set in bolls, whereas the dusted portion of the field plot did not have one tenth of a bale. The planter stated that at least one hundred cars, with from one to five farmers each, coming distances from a few miles to 150 miles, had visited this demonstration and had gone away very much enthused over early season or presquare poisoning."

Boll weevil hibernation and survival at College Station, Tex.--R. W. Moreland and A. B. Beavers report concerning 35,000 boll weevils installed in 70 hibernation cages in the fall of 1935. The total emergence from all cages during May and June was 839 weevils, or 2.4 percent, as compared to 88 weevils, or 0.25 percent, from similar cages in 1935. Of the 15,000 weevils installed in cages in the open field with cornstalks as shelter, 558, or 3.72 percent, survived, whereas only 255, or 1.7 percent, survived in similar cages with Spanish moss for shelter. Of 2,500 weevils installed in the woods on November 1 in cages with Spanish moss, 13, or 0.52 percent, survived, and exactly the same number survived from the 2,500 weevils installed in similar cages with leaves and twigs for shelter. (In 1935 the survival was higher in both sets of experiments in the cages where Spanish moss was used, when in the open field cages 58 weevils survived in Spanish moss to 21 in cornstalks and in the woods 9 survived in the Spanish moss to none in the leaves.) From 10,000 weevils installed on October 15 there was a survival of 23, or 0.23 percent. From 15,000 weevils installed on November 1 the survival was 177, or 1.18 percent, and from 10,000 installed on November 15 the survival was 492, or 6.39 percent. (In 1935 there was no

survival from the October-15 installations, only 0.17 percent from the November-1 installations, and 0.65 percent from the November-15 installations.) These tests during both years emphasize the importance of early fall destruction of cottonstalks as a means of reducing boll weevil losses.

Boll weevil population in untreated and treated cotton fields in June.--Messrs. Moreland and Beavers also report that 9 weevils were found on 2,500 cotton plants in bottom-land fields during May, or an average of 1 weevil to 278 plants. On 1,800 plants in upland fields, 51 weevils were found, or an average of 1 weevil to 35 plants. During the week ending June 6, the weevil population decreased in the bottom lands and increased in the upland fields. Only 1 weevil was found in 500 plants of bottom-land cotton examined, but 149 weevils were found on 2,600 plants in upland fields, or 1 weevil to 17 plants. During June, 43 acre-plot applications with calcium arsenate dust and 22 acre-plot applications with molasses-calcium arsenate were made in upland fields to control the boll weevil. During the second week of June, on untreated cotton plants there was an average of 1 weevil to 21.5 plants, while on 600 plants following one presquare application of calcium arsenate 1 weevil was found, and on 400 plants in fields that had received one presquare application of the molasses-calcium arsenate mixture 4 weevils were found. During the third week of June the untreated check plots had an average of 1 weevil to each 21.8 plants, while in the treated plots the average was 1 weevil to 200 plants. The square infestation on the plots receiving presquare treatment ranged from 8 to 44 percent, with an average of 21.2 percent, and in the treated plots the infestation ranged from 0.7 to 3.6 percent, with an average of 2.3 percent. For the week ending June 27 the infestations in the untreated fields ranged from 11.3 to 38.7 percent, with an average of 24 percent, and in the treated plots ranged from 0 to 7.2 percent, with an average of 2.9 percent. In untreated fields of bottom land the infestation ranged from 0 to 27 percent, with an average of 10 percent.

Thrips on cotton in Alabama.--H. C. Young, State College, Miss., investigated a serious infestation of thrips in the cotton fields of Cullman County, Ala., during the last week of June and has started several field tests to determine the value of various insecticides in the control of thrips on cotton. Troy Thompson, of the Alabama Department of Agriculture, wired on June 18 that thrips were causing incalculable damage to cotton in Cullman County. In that county from June 22 to 25 from 40 to 60 percent of the plants in some fields had been so seriously damaged that all of the leaves had fallen off and in some instances the terminal buds had been killed. Many of the damaged plants had begun to put out leaves and branches at all nodes. On July 2 considerable improvement was noted, but from 16 to 40 percent of the plants showed appreciable injury and from 2 to 12 percent were devoid of leaves. Mr. Young concludes: "If favorable weather conditions exist for cotton during the latter part of July and throughout August, it is probable that the damaged plants will produce a fair crop, owing to the extremely light boll weevil infestation. It can be said at present that thrip damage has delayed the setting of the crop from 2 to 3 weeks."

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Trap-plot cotton in the Big Bend.--The trap-plot work in the Big Bend area of Texas has been carried on throughout June. The original program called for 10 plots, ranging in size from $1/4$ to $1/2$ acre. As one of the plots had to be replanted, the cotton did not get a good start over the field cotton and was therefore abandoned. Another plot had to be eliminated because some field cotton was planted just after the plot, so that there was very little difference in the size of the cotton. All of the remaining plots were worked throughout the month. In view of the increased size of the plots this year it has been impossible to count and inspect all of the blooms daily. Enough blooms had been inspected to give a very good idea of the progress of the infestation. Up to June 20, it was apparent that the number of worms trapped daily was considerably higher than last season. This may be due partly to the fact that the plots are much larger, and it is also possible that the cool weather in April may have delayed the emergence of moths. By the end of the month there was a considerable decrease in the number of worms trapped, indicating that the peak of the moth emergence had passed. The field cotton is now reaching the fruiting stage and a few worms are being found in it, especially in the Castolon section. The plot work will be continued into next month.

Wild cotton eradication.--The eradication of wild cotton in southern Florida was discontinued for this season on June 25. Working conditions were rather disagreeable during the last 10 days work was carried on, but the inspectors desired to continue work until their respective districts were in good shape. During the month a first clean-up was made on 12 acres, from which 725 mature and 5,015 seedling plants were destroyed. A recleaning was made on 1,383 acres, on which 594 mature, 27,497 seedling, and 5,686 sprout plants were destroyed. When work was discontinued all of the known wild cotton area in southern Florida had been cleaned at least once, and many of the locations had been cleaned several times. For the past several seasons many of the more accessible locations have been kept free of mature plants, and at each recleaning there is a noticeable decrease in the number of seedling and sprout plants that occur. Last season a first cleaning was made on over 5,000 acres, and 101,781 mature and 86,158 seedling plants were removed. From the area recleaned 11,350 mature, 2,734,676 seedling, and 56,746 sprout plants were removed. The work has been carried on with W. P. A. funds, which has permitted the use of larger crews, thus accounting for the fact that so many mature plants were located and destroyed on areas previously cleaned. The clean-up figures show, however, that 97 percent of the mature plants had been removed during the first clean-up, which, considering the area in which the plants occur, is a very good record. Additional wild cotton bolls were inspected throughout the month and 98 specimens of the pink bollworm found. All of the specimens found this season have been on several keys located off the coast of Dade and Monroe Counties. These are the southernmost counties of Florida, which makes the infestation as far removed from the cultivated cotton as is possible.

Thurberia plant eradication.--Satisfactory progress has been made in eradicating Thurberia plants in the Santa Catalina Mountains of southern Arizona. This work is also being carried on with W. P. A. funds, and during

the month 9,760 acres were covered, from which 20,548 plants were destroyed. On June 11, a forest fire broke out about 6 miles west of where the crews were working. Incidentally, this fire was discovered by one of our laborers. During the afternoon the Forest Service requested aid in fighting the fire. All of the men responded and worked on through the night and part of the following day. Other than this there was no interruption. Work in the Santa Catalinas was begun in the southwest corner of the range, and a strip about 2 miles wide has now been covered, extending some 9 miles northward along the westward slope and about 17 miles eastward along the southern slope. Practically all of the plant colonies removed are infested with the *Thurberia* weevil and, as the work is being conducted to remove this menace from commercial cotton, it will be seen that much good has been accomplished.

Laboratory inspection.--Laboratory inspection of green bolls and bollies collected both within and outside the regulated areas has been continued at San Antonio and a number of field stations. So far this season, the results have all been negative for material originating outside regulated areas. During the month 10 specimens of the pink bollworm were found in bolls collected in the upper El Paso Valley, which is within the regulated area. Laboratory inspection had previously indicated that a light infestation continues to exist in this section.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Pyrethrum dust highly toxic to tobacco moth adults.--W. D. Reed and E. M. Livingstone, of the Richmond, Va., laboratory, report that recent experiments at Richmond in tobacco warehouses of the closed type have shown that dusting with pyrethrum is a very effective method of combating *Ephestia elutella* Hbn. when directed against the adults. The effectiveness of pyrethrum dust was determined by making a comparison between the number of adults of the tobacco moth captured in suction light traps in dusted sections of the warehouse, versus the number captured in undusted sections. This comparison indicated that the pyrethrum dusting operation had reduced the population of tobacco moths by approximately 97.5 percent.

Cube dust mixtures effective against tobacco flea beetle.--E. W. Howe, of the Clarksville, Tenn., laboratory, reports that experiments against *Epitrix parvula* Fab. in tobacco plant beds have indicated that a cube root dust mixture having a rotenone content of approximately 1.5 percent proved to be the most toxic of the materials tested against the flea beetle on dark-fired tobacco, but that a similar dust mixture containing 2 percent rotenone was most efficient in the tests with burley tobacco. In general, however, it appeared that the dust mixture containing 1.5 percent rotenone was so nearly equal to the mixture containing 2 percent rotenone that the former dilution is preferable because of its lower cost. The cube dust mixture proved more effective than a mixture of 50 percent cryolite and 50 percent kaolin, or a mixture composed of 8 percent paris green, 42 percent lead arsenate, and 50 percent kaolin. Results indicated that there was very little difference in the relative toxicity to flea beetles on tobacco plant beds between the two last-mentioned dust mixtures.

Calcium arsenate and sulphur mixture give best results in controlling strawberry weevil.--W. A. Thomas, of the Chadbourn, N. C., laboratory, reports that in experiments to determine the relative value of various dilutions and combinations of insecticides containing rotenone, pyrethrum, calcium arsenate, and sulphur against Anthonomus signatus Say, the most satisfactory material for reducing the number of weevil-cut buds is a mixture of calcium arsenate and sulphur in the proportion of 1 to 5 by weight. The nonarsenical materials proved to be less effective. Although the plots treated with a dust mixture containing 0.5 percent of rotenone ranked first in production of marketable fruit, there was no significance in the number of weevil-cut buds on any of the treated plots except where the calcium arsenate-sulphur mixture was applied. However, the plots where this mixture was applied showed a corresponding decrease in fruit production, indicating that the difference in yield of marketable berries from the different insecticide treatments may be attributable to visible or invisible plant injury induced by insecticide applications and not to an increased production of cull fruits.

Wireworm damage to onions reduced by soil fumigation with naphthalene.--R. S. Lehman, of the Walla Walla, Wash., laboratory, reports that onion plants have been severely damaged by wireworms in the Walla Walla district this year. The principal species of wireworms involved are the sugar beet wireworm (Limonius californicus Mann.) and the Pacific coast wireworm (L. canus Lec.). Detailed studies in one onion field disclosed that 30 percent of the onion plants in one part of the field were destroyed by the wireworms whereas in the remaining part, which had been fumigated with naphthalene in 1934, only 3.5 percent of the plants had been destroyed.

Location of tomato fruit worm eggs on tomato plant.--J. C. Elmore, of the Alhambra, Calif., laboratory, reports that preliminary cage experiments with adults of the tomato fruit worm (Heliothis obsoleta Fab.) have disclosed that nearly 54 percent of the eggs were deposited on the upper surface of the leaves and that 36 percent were deposited on the lower surface. The remaining 10 percent of the eggs were deposited on the stems of the plants, and none of the eggs were deposited on the fruit. If these observations regarding the oviposition habits of the tomato fruit worm moths in confinement are substantiated by field observations, it is believed that advantage may be taken of such oviposition habits in devising control measures for this important pest of tomatoes.

Corn-meal bait more effective than wheat-bran bait against tobacco webworm.--As a result of recent field experiments at Appomattox, Va., J. U. Gilmore, of the Oxford, N. C., laboratory, reports that a bait consisting of 25 pounds of corn meal, 1 pound of paris green, and 1 ounce of oil of mirbane proved more effective against the corn root webworm (Crambus caliginosellus Clem.) on tobacco than a similar bait wherein wheat bran was used as a carrier for the poison and the attractant. In the experiment where corn meal was used as a carrier approximately 2 percent of the plants were killed by webworms, as compared to 5 percent of the plants where wheat bran was used. Approximately 17 percent of the plants were killed by webworms in the untreated check plots.

Field studies indicate source of beet leafhoppers reaching Grand Valley of Colorado.--O. A. Hills, of the Grand Junction, Colo., laboratory, reports that studies to determine the source of beet leafhoppers infesting the western Colorado sugar beet fields this year indicate that the leafhoppers migrated from southern Arizona. These studies further indicated that the leafhoppers reached the Grand Valley by way of the Colorado River drainage, although this route may not have been followed the entire distance from Arizona. Migration studies, wind-vane trap collections, and sweeping operations indicate that April 21 was the probable date that the first beet leafhoppers reached the Grand Valley. The influx of leafhoppers extended over a period of approximately 3 weeks. Studies in the beet leafhopper breeding area of southeastern Utah indicated that this area could not have contributed many insects to the western Colorado beet field populations in 1936.

INSECTS AFFECTING MAN AND ANIMALS

Vitality of house fly observed in spraying experiments.--Conclusions drawn from preliminary spraying experiments with house flies carried out by C. W. Eagleson, of the Dallas, Tex., laboratory, are reported as follows: Of milk-fed flies, the female flies showed a markedly greater resistance to pyrethrum spray than did males. The difference in vitality increases with the age of the flies. Flies fed on a special gel medium showed less difference in vitality of the sexes. Flies from cages receiving different kinds of food displayed a significant difference in vitality. Those receiving the special gel diet lived longer and throughout were more resistant than flies fed banana and milk. The vitality of flies subjected to sublethal but paralyzing doses of pyrethrum was compared. As indicated by initial knock-down and knockdown from subsequent sprayings, such doses of pyrethrum demonstrate no lasting deleterious effects. Flies sprayed at 30° C. recover more quickly than when sprayed at lower temperatures. Within limits, the lower the temperature, the slower the recovery.

Floodwater and snow-pool mosquitoes are persistent pests.--H. H. Stage, of the Portland, Oreg., laboratory, reports: "It has been well established in the vicinity of Portland that any flood of the Columbia and Willamette Rivers over 10 feet will cover the mosquito egg beds and that larvae will hatch there any time after late in March. The first hatching this season was on April 21, when the river rose to a height of 10.7 feet. Larvae were generally abundant over the entire county after that date. In addition to this primary brood, which resulted from the initial rise of the rivers, there were two successive hatchings on May 18 and June 11, respectively. These were occasioned by the two falls and rises of the flood crest. These broods were not as large as the primary brood, but their occurrence did demonstrate how effectively a certain drying of the soil will stimulate remaining eggs to hatch. Adults of Aedes vexans Meig. and A. aldrichii Dyar and Knab were first numerous on May 10 at Portland. These mosquitoes continued to be very annoying throughout June. The mountain or snow species were first reported to be abundant in the Cascade Mountains on May 2 and are still numerous."

Relation of sand fly breeding to type of marsh.--J. B. Hull, of the Savannah, Ga., laboratory, reports: "Samples of soil from different types of marshes were collected during the spring emergence of sand flies. Adult sand

flies emerged from soil collected from areas which were previously thought to receive too much tidal action to breed sand flies. Few larvae could be isolated from soil from such marshes, but marsh soil kept in a moist condition in the laboratory did produce adult sand flies. From a series of such samples collected at the edge of marshes that receive no tidal action, sand flies emerged in the following ratio: Culicoides dovei Hall, 71 percent; C. canithorax Hoppman, 27 percent; C. melleus Coq., 2 percent. Samples from the open marsh produced the following: C. dovei, 16.5 percent; C. canithorax, 80 percent; C. melleus, 3.5 percent. During April recovery cages along the edge of marshes captured C. dovei, C. canithorax, and C. melleus. Recovery cages in the open marsh took C. dovei and C. canithorax. The greater number of C. dovei were from cages in the edge of the marsh, while more C. canithorax were found in cages placed in the open marsh. These recovery cages have largely given the same results during May and June, with one exception. The percentage of C. dovei emerging from cages on tree lines has increased and the percentage of C. canithorax decreased. The only C. melleus collected from cages was on the edge of marshes. During June few C. canithorax were collected from cages. C. dovei were collected most frequently; and a few C. melleus were taken, all of them from cages on the marsh edge."

Life history of the fire ant.--Bernard V. Travis, who is studying game-destroying insects with particular attention to fire ants in relation to quail on the Forshala Plantation near Tallahassee, Fla., reports: "As many as 1,244 sex forms of Solenopsis geminata Fab. were collected from one ant nest. The indicated sex ratio for 910 individuals was 1 male to 1.7 queens. One colony contained 240 sex forms, only 4 of which were males. Exclusive of this colony the sex ratio was about 1:1. Fire ant eggs started to hatch 14 days after oviposition. The eggs are opaque and white when freshly laid, but become transparent as embryonic development progresses. The prepupal period for 59 queens was 5.5 days, with a range of 5-6; this same period for 97 males was 6.1 days, with a range of 5-8. The pupal period for 73 queens was 18.5 days, with a range of 18-21; this period for 125 males was 19.0 days, with a range of 18-21 days."

The effectiveness of sodium cyanide against fire ants.--Mr. Travis also says: "A total of 569 ant colonies that were poisoned with sodium cyanide were marked and placed under observation. The treatment employed consisted of pouring a sodium cyanide solution (1 oz. sodium cyanide to 1 gal. H₂O) into each ant nest. About 1 month after treatment 37.8 percent moved from the original nest, 5.4 percent were active in the original nest, 3.4 percent showed scattered activity, and 50.7 percent were inactive. Eighty-eight fire ant colonies were treated with cyanide on a 5-acre tract that had been poisoned five times last year. Only 51.1 percent are inactive at this time (June 22)."

Artificial breeding medium for screwworms.--Roy Melvin and Raymond Bushland, of the Dallas, Tex., laboratory, have developed an artificial medium for rearing larvae of the primary screwworm (Cochliomyia americana Cushing and Fatton). In this medium normal-sized flies are produced with facility and at very reasonable expense, both for the materials and for the labor involved. Heretofore this species has been reared satisfactorily only

in the tissues of living warm-blooded animals. This has been expensive, rather difficult, and not without objections from a humanitarian viewpoint. The medium is made as follows: "To 750 cc of whole milk add 250 cc of citrated blood and 0.5 cc of 40-percent formaldehyde solution. Mix thoroughly in a 6-quart enameled pan and stir in 500 g of ground lean beef. A small piece of wet cotton is added to the mixture to form a raft for the newly hatched larvae. We have found that neither constant nor high temperatures are essential."

Migration of the screwworm flies *Cochliomyia americana* and *C. macellaria* Fab. in Texas.--D. C. Parman, of the Uvalde, Tex., laboratory, states: "Migration studies of *C. macellaria* and *C. americana* have indicated that *C. macellaria* travels much more rapidly than does *C. americana*. Both species overwintered along the escarpment of the Edwards Plateau and southward, but by the first of May *C. macellaria* had migrated to northern Texas. The *C. americana* migration from overwintering area was approximately from 50 to 75 miles during March and April, from 125 to 150 miles during May, and from 175 to 200 miles during June. This work has been carried along one usually heavily traveled route, but the several means of transportation included highway, railway, and airplane routes between San Antonio, Dallas, and Fort Worth. The second route has been farther west, where there is very little or no north or south travel. The work indicates that the line of migration has been rather faster where there was no opportunity for traffic, rather than over the heavy traffic areas. The dispersion of *C. americana* has been rather uniform and there is no indication of any areas in Texas having become infested much before the natural migration."

Work on maggot therapy leads to important medical discovery.--William Robinson, of the Washington, D. C., laboratory, while investigating the means by which blowfly maggots produce their remarkable healing effects in chronic discharging wounds, has discovered a second chemical substance, with outstanding healing properties, which is excreted by maggots into the wound. This material is urea, $\text{CO}(\text{NH}_2)_2$. Urea has been given thorough tests by a number of physicians and surgeons throughout the country in cooperation with the Bureau and found effective in healing such conditions as osteomyelitis, extensive infected heat and X-ray burns, diabetic and varicose ulcers, infections of the mouth, "athlete's foot", carbuncles, gangrene, and certain skin infections. Wounds that remained unhealed for months under other treatments have yielded promptly to the urea treatment. Urea appears to be as effective as allantoin, the first constituent found to have healing properties, and is very much cheaper. It is reported as soothing in its action, reducing pain and promoting growth of healthy tissue. While urea does not act directly as a bactericide, the number of pus-forming bacteria is rapidly reduced during treatment, probably through increasing cell resistance and stimulation of a vigorous tissue development in the wound. Urea is made synthetically and can be purchased from local pharmacists. An article reporting on its use has been published in the August issue of the American Journal of Surgery.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Nine living larvae of the fruit fly Anastrepha suspensa (Loew) were intercepted at New York on April 7 in five guava fruits in ship's stores from Cuba. Thirty living larvae of this fruit fly were collected on January 29 in guavas in the field at Bayamon, P. R. Living adults of the bruchid Bruchidius dorsalis Fahr. were taken at Chicago, Ill., on March 4 in seeds of Gleditschia sinensis in the mail from Japan. Two living adults of the cerambycid Neoclytus cacticus Chevr. were intercepted at San Francisco on October 14, 1935, in lignumvitae logs in cargo from Nicaragua. The larvae of this species were tunneling deep in the wood. A living adult of the chrysomelid Disonycha militaris Jac. arrived at Galveston, Tex., on January 13 with banana debris in cargo from Honduras. Living adults of Taeniothrips fumosa Trybom were intercepted at New York on January 6 on chinkerichee (Ornithogalum thyrsoides) in the mail from South Africa. A living adult of Anacentrinus deplanatus Csy. was taken at Brownsville, Tex., on March 7 on an onion in baggage from Mexico. A living adult of the weevil Brachyrhinus porcatus Hbst. arrived at Baltimore on March 19 in the packing about violet and cedar plants in the mail from Germany. Two living and two dead adults of the scolytid Stephanoderes guatemalensis Hopk. were intercepted at New Orleans on January 27 in a flamboyant (Poinciana regia) seedpod in baggage from Mexico. Four living larvae of the weevil Orthorhinus cylindrirostris F. arrived at Norfolk, Va., on April 4 under the bark of walnut logs in cargo from Australia. An adult of the chrysomelid Phytodecta (Spartophila) olivaceus Forst. was taken at Washington, D. C., on January 24 with seed of Scotch broom (Cytisus scoparius) in the mail from France. A living larva of Mamestra brassicae L. was intercepted at New York on January 18 on a cauliflower leaf in stores from Germany. A living larva of this noctuid was taken at the same port on March 2 on a leaf of Savoy cabbage (Brassica oleracea bullata) in store from the Netherlands. This insect is not recorded from the continental United States.

Pathological interceptions of interest.--Aphelenchoides sp., probably a new species, was intercepted in iris bulbs from Holland on December 17, 1935, at Washington. Bacterium marginatum McC. was intercepted from Madeira Islands for the first time on June 22 at New York on gladiolus corms. A nematode closely related to Cephalobus symmetricus Thorne but probably a new variety was intercepted in an onion bulb from Portugal on January 10 at Philadelphia. Cercospora sp., probably not named and one that would bear watching, was intercepted on March 30, at Washington on Cypripedium caudatum from Guatemala. Cercospora atricincta Held and Wolf, first interception, was found on zinnias in baggage from Mexico on June 24, at Brownsville. Coniothyrium olivaceum Fr., first interception, was found on camellia in mail from Japan on December 9, 1935, at San Francisco. Our first interception of Coryneum microstictoides Sacc. and Penz. was made at San Francisco on March 2 on Paeonia moutan from France. Cryptosphaerella sp., no species reported on wisteria, was intercepted on Wisteria multijuga stems from Japan on November 27, 1935, at Seattle. Cylindrosporium chrysanthemi Ell. and Dearn., first interception, was found on chrysanthemums from Mexico on June 5 at Brownsville. Didymosphaeria sp., no species reported on peony, was intercepted on January 12 at San Francisco on Paeonia moutan from Japan.

? Dothiorella dasycarpi Oud. was intercepted on February 28 on a maple from Japan at San Francisco. Dothiorella sp., no species reported on chrysanthemum, was intercepted at San Francisco on February 3 on chrysanthemums from Japan. Gloeosporium aglaonemae Frag. and Cif., first interception determined to species, was found on aglaonema from China on February 17 at San Francisco. Gnomonia aceris Feltg., first interception, was found on maple from Japan on February 11 at San Francisco. Java was added to the list of countries from which Helminthosporium allii Campanile has been intercepted on June 25 at Norfolk, the host being garlic. Heterodera marioni (Cornu) Goodey, first interception and apparently first report for the host, was found producing numerous galls on Artocarpus communis from the Canal Zone on June 6 at Washington. Hexameris sp., apparently an undescribed form, was found in a carrot from England intercepted on February 17, at New Orleans. Mendogia bambusina Rac., first interception, was found on a native harrow of bamboo from the Philippine Islands when it was intercepted at New York. Paranthostomella sp., no species reported on peony, was intercepted at San Francisco on March 2 on Paeonia moutan from France. Phyllosticta sp., "does not agree with any of species reported on camellia", was found on camellia from Japan on February 28 at San Francisco. Australia, Ceylon, and Siam were added to the list of countries from which Sclerotium oryzae Catt. has been intercepted by collections made at New York on May 23, June 2, and May 1.

Correction.--Further study of the fungus listed as Phyllosticta nigromaculans Sacc., on orchid from Belgian Congo (see News Letter, vol. III, no. 6, page 19, dated June 1, 1936) shows that it is not that species, but its identity has not been established.

Grape insect found in packing.--An example of potential pests which may be gaining entrance into this country as stowaways was the interception at New York on April 22 and April 29 of specimens of Bostrychulus scabratus Erich. in grape packing from Chile. This insect is reported as attacking the woody stems of grapes in Chile and appears to be an insect of economic importance which does not occur in the United States. Messrs. Max Kisliuk, Jr., and C. E. Cooley collected an adult of this insect over a pile of newly dug potatoes in a field at Atuaisol Elqui Valley, Chile, on February 20, 1932.

Pink bollworm intercepted with Mexican tomatoes.--On April 2, a living adult of the pink bollworm was intercepted at Nogales, Ariz., on a tomato in a car of tomatoes shipped from Verdura, Sinaloa, a locality in which pink bollworm is not supposed to occur. The presence of this pink bollworm has not been explained.

Mediterranean fruit fly in candy box.--At New York on May 8 a fancy candy box was found on the deck, where some baggage from Bermuda had just been cleared and removed. The box contained 35 fruits of Surinam cherries (Eugenia uniflora). Of these, 33 were infested with 145 larvae of the Mediterranean fruit fly.

DOMESTIC PLANT QUARANTINES

Extensive areas in Texas inspected for citrus canker.--The search, in cooperation with State inspectors, for citrus canker in Texas has covered nearly the entire Gulf coast area from Orange and Hardin Counties on the north to the southern tip of the State, as well as certain interior citrus-growing counties, since the work was placed on an intensive basis about 18 months ago. A thorough working of the Galveston-Houston area where canker had recurred over a period of years, disclosed the disease on some 35 properties. Inspections were then extended to counties, both to the north and south of this area, and an infection center was located in Jefferson County, and three properties were found with canker in Harris County. More recently, under an expanded program and an increased force, the work was extended to a number of southerly counties, with special attention given to properties on which the disease was found in earlier years. During this 18-month campaign, 23 counties have been worked, of which 4 were found to have infected trees. No canker has been found in this period in the area south of Brazoria County. Properties found infected have been inspected several times. As a result of such repeated and intensive inspections, supplemented by eradication measures effected by relief labor, a marked reduction in canker in this State has been accomplished.

Progress in peach mosaic disease control.--Surveys for the peach mosaic disease have been made during the current field season in orchards and nurseries in 41 counties in Kansas, 16 in Nebraska, and 15 in Iowa, and no instances of the disease have been found in these States. Surveys and inspections now in progress in 31 counties in Texas have thus far brought to light infection in 3 counties in which the disease was not previously known to exist. The peach mosaic had formerly been reported in 10 counties in Texas. In Colorado, a recent survey of 11 peach-growing counties in the eastern section and on the Western Slope, disclosed peach mosaic on one tree each in Montezuma and Garfield Counties. The work is done jointly with State inspectors of these various States, and, in the infected area in western Colorado, State inspectors are also serving as foreman and leaders of the 100 men on relief rolls who are destroying diseased and escaped trees and abandoned orchards in this important peach-producing area. The rapid spread of the disease, as observed in the Colorado area in 1933 to 1935 when the annual increase was from four- to five-fold, shows the necessity of prompt eradication in any outbreak of the peach mosaic disease. The marked decrease of infection in that area, as shown by the 1936 survey after the eradication work in previous seasons, also demonstrates the practicability of this method of control.

White pine blister rust control areas established in Ohio.--Zones surrounding a number of nurseries growing white pine in Ohio, including State forest nurseries, have been set aside as blister rust control areas, within which currant and gooseberry plants are required to be removed. Any plantings, nurseries, or parks growing white pines of sufficient value to warrant such protection may be declared control areas, together with the surrounding zones, under provisions of the Ohio regulations concerning the suppression and control of the rust. The European black currant, Ribes nigrum, is

declared a public nuisance throughout the State and the intrastate shipment of white pines is conditioned upon their protection from the rust since the time of planting the seeds.

Transit inspectors examine cars from Japanese beetle regulated area.-- During the early summer when Japanese beetles are in active flight, transit inspectors have arranged their tours so that daily examination of shipments of fruits and vegetables consigned by express and freight from the heavily infested areas may be made to determine compliance with the regulations of the quarantine. At Philadelphia, the screening and covering of containers of restricted articles is being checked by transit inspectors to determine whether the responsible persons are taking precautions to protect the shipments while in transit in the infested area, as required by the quarantine.

Phony peach disease control activities.--Plans for a survey, to determine the possibility of the existence of phony peach disease in States north of the known infected region are being made with plant-pest control officials of the States of Indiana, Ohio, Michigan, Virginia, West Virginia, Pennsylvania, Delaware, New Jersey, and New York, and the work is now under way in Pennsylvania. Similar work is to be done in counties in the States known to be lightly infected. In the more generally infected States inspection of orchards and nurseries has been conducted on 31,067 properties in 11 States to June 15.

INSECTICIDE INVESTIGATIONS

Chemical work on Japanese beetle transferred to Insecticide Division.--Effective July 1, 1936, the chemical work under way in connection with the investigations on the Japanese beetle at the Bureau laboratory, Moorestown, N. J., was transferred to the Insecticide Division. This work includes extensive research in insecticides in connection with the development of more effective materials for both the immature and adult stages of the Japanese beetle, as well as analytical work carried on for the Division of Japanese Beetle Control to determine the additional quantities of lead arsenate needed annually to maintain the required concentration in the soils of nurseries from which stock is certified for shipment outside the infested area. The chemical work is also involved in the problem of the fixation of arsenic in the soil in areas that have been treated and need no further treatment. The transfer of the supervision of this work carries with it the following personnel: R. D. Chisholm, associate chemist; Louis Koblitsky, junior chemist; R. W. Coles, junior scientific aide; J. J. Lockowitz, assistant field aide; H. B. Allen, field assistant. Mr. Chisholm has been designated in charge of the work for the Insecticide Division at Moorestown.

Derris as a repellent for Japanese beetles.--A report has been prepared by Mr. Chisholm covering the laboratory investigations since September 1935 on the effect upon the original deposit of adding various materials to derris, the resistance of the deposits to washing, and the resistance to decomposition by light. A summary of the most important results is as follows: The rosin residue emulsion, type I, can be made more effective as a sticker for derris by increasing the amount of rosin residue from 50 to 66.6

percent, substituting 5.5 percent of gum arabic for the 4.75 percent of ammonium caseinate, and reducing the amount of water from 45.25 to 27.9 percent. The impregnation of derris with rosin before adding the above sticker was found to be the most effective of the methods tested for increasing the amount of the original deposit, enhancing the resistance of the deposit to washing, and in reducing the decomposition of the derris by light. The composition of the best of the derris-rosin combinations is as follows: (a) Derris 65 percent, rosin 10 percent, zinc oxide 25 percent; (b) derris 88 percent, rosin 10 percent, phenol 2 percent; (c) derris 90 percent, rosin 10 percent. Intimately mixing equal weights of derris and sulphur was found to increase the resistance of the deposits to washing and to reduce the decomposition of the derris by light. When derris in combination with rosin and other materials was ground to 100 mesh the deposits were much more resistant to washing than when the materials were of 40 mesh. Impregnating derris with rosin increased the original deposit of derris and the resistance to washing and decomposition by light. Grinding derris with rosin was of no value. Several grades of gum rosin and wood rosin appear to be equally as effective. The addition of violet, yellow, or orange dyes to derris impregnated with rosin increased the resistance of the material to decomposition by light. Red, green, blue, and black dyes gave no better protection than was obtained with rosin alone. Grinding derris with wood charcoal or bone black had little effect upon the resistance of the derris to washing or decomposition. The decomposition of derris is affected by the intensity of the light and by the temperature at which the deposit is exposed.

BEE CULTURE

European foulbrood a menace in California.--F. E. Todd, in charge of the Pacific States Bee Culture Laboratory at Davis, Calif., writes as follows: "European foulbrood is a menace to beekeeping in certain sections of California and many producers consider this problem unsolved. The lack of pollen reserves may affect this situation. Beekeepers in southern California desire to have further work done on European foulbrood as they now fear it more than they do the American form, which has been largely taken care of by the State inspection service."

Airplane dusting causes moving of Bureau's bees.--Mr. Todd also reports that the laboratory colonies which were mostly destroyed by airplane dusting last summer were increased considerably this spring. It was considered advisable to move them from the Davis area rather than expose them again to this danger. Keeping bees at Davis has become impossible during July, August, and September, because of airplane dusting. If the situation continues it will be necessary in the future to consider the cost of moving the apiary as an annual expense to the laboratory.

Impurities the cause of variations in beeswax.--According to Mr. Todd, detailed physical and chemical studies of crude beeswax indicate that impurities (such as propolis and iron stains) are the cause of the extreme variations in the crude waxes. Wax itself is quite a uniform product. A special study of the common impurities is required in order to set up a basis for commercial grading.

Native vegetation a competitor of fruit blossoms in Oregon.--From observations made by G. H. Vansell, also of the Pacific States laboratory, fruit blossoms in the Oregon fruit area have a worthy competitor for the attention of honey bees in the native vegetation. The greater attractiveness of nectars of higher concentrations has been observed repeatedly. Refractometer readings indicate that a number of native plants, such as willow, maple, and mustards, have higher nectar concentrations and would therefore be more attractive than certain fruits.

Queen shippers demanding assistance.--Dr. Warren Whitcomb, Jr., of the Southern States Bee Culture Field Laboratory, Baton Rouge, La., writes that demands for assistance with queen-rearing problems have been received from several shippers but have had to be deferred or refused owing to lack of labor and equipment. One shipper is conducting experiments in his own yard and sending queens and queen cells to the laboratory for testing. In this way advantage can be taken of commercial equipment and the actual measurements and other data can still be handled at the laboratory.

Caucasian bees may be resistant to European foulbrood.--At the Beltsville, Md., laboratory, C. E. Burnside inoculated several colonies with European foulbrood in June. The first inspection on these inoculated colonies seems to indicate that Caucasian bees possess a high degree of resistance to the disease. Pure Caucasian colonies cleaned out the dead brood more promptly than did the other races, the black ones being the least active in this respect.

Advantage of abundant pollen reserves again observed in Colorado.--The abundant pollen reserves in southern Colorado, where one-third of the colonies being used in the supersedure study are located, gave much larger populations of young bees at the close of the inactive season than in the other region located along the South Platte in northeastern Colorado, where pollen reserves were negligible last fall, writes A. P. Sturtevant of the Intermountain Bee Culture Field Laboratory at Laramie, Wyo.

Poor queens are important factor in supersedure.--C. L. Farrar, also of the Intermountain laboratory, writes as follows: "No analysis has yet been made of the influence of brood or added bees on supersedure but the impression has been gained this far in the work that poor queens are the cause of colony replacements of queens other than those lost through manipulation, rather than unbalanced populations. Most colonies superseding had first scattered brood nest and queen cells, followed by loss of the old queen 2 to 4 weeks later, and small, poorly shaped, or injured queens, and so rank high in the loss from supersedure. Queens that showed a good performance at any or all previous examinations have not been superseded."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Only females of the vegetable weevil found.--Evidence supporting the belief that Listroderes obliquus Klug reproduces parthenogenetically and is always thelytokous was obtained as the result of L. L. Buchanan's dissection of 1,186 Mississippi specimens submitted by the Division of Truck Crop and



Garden Insects, for a determination of sex. All proved to be females.

Additional Museum records for the alfalfa weevil.--Material recently submitted for identification by J. C. Hamlin, of the Division of Cereal and Forage Insects, has included adults, identified by L. L. Buchanan as Hypera postica Gyll., from western Nebraska; also larvae determined as this species by A. G. Boving, from Dawes County, Nebr.; Fall River County, S. Dak., and Eagle County, Colo. These are all new distribution records so far as the Museum collections are concerned.

Association of larva and adult of an interesting clerid.--Recently J. C. Bridwell has succeeded in rearing adults from certain beetle larvae taken in the bark of Pinus rigida near Vienna, Va. The beetles were identified by E. A. Chapin as Lecontella cancellata Lec., the larvae of which have not previously been known. A. G. Boving reports that the larvae provided by Mr. Bridwell represent a valuable addition to the Museum collection. A study of these supports the correctness of Dr. Chapin's establishment of the new genus Lecontella as distinct from Cymatodera, in which the species was formerly placed.

Vesiculaphis caricis (Fullaway) on azalea from Japan.--This aphid, which is known in literature as feeding on sedges, was first found on azaleas in the Department greenhouses by P. W. Mason in 1927. In 1932 it was received on azaleas from South Carolina, and recently specimens intercepted by the Division of Foreign Plant Quarantines, under San Francisco No. 7480, on azalea from Japan, have been identified by Mr. Mason as this species. These accumulating records suggest that azalea is perhaps the alternate host for V. caricis, which is the only species that has been referred to the genus Vesiculaphis.

The aphid Amphorophora azaleae Mason from France.--A single specimen of what P. W. Mason believes to be the alate form of this aphid was taken on azalea plants from France by the Division of Foreign Plant Quarantines under New York interception No. 58692. The species was described from the apterous form only; taken in a nursery at Glen St. Mary, Fla., in 1924. It has remained unknown since that time. This interception from France not only adds the alate form to our knowledge of the species, but also raises the question as to whether A. azaleae is a native of Europe or of America.