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UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JULY 1936

Vol. III, No. 9

(Not for publication)

September 1, 1936

FRUIT INSECT INVESTIGATIONS

Preoviposition period of plum curculio.--Oliver I. Snapp and J. R. Thomson, Jr., have just completed a study at the Fort Valley, Ga., laboratory to determine the period between transformation of females of the plum curculio from pupae to adults and the formation of eggs within their bodies. A number of adults were removed from their soil cells on June 19 and 20, just after they had transformed. The first immature eggs were observed on July 18, but the first fully developed eggs were not observed until July 25. This explains why the new beetles do not begin to deposit second-generation eggs immediately after emerging from the soil. Observations in other years revealed the fact that the individuals of the first generation usually do not begin to oviposit until a month or more after emergence. Studies are also being made to determine the percentage of first-generation females that deposit second-generation eggs during the season in which they emerged. Peach harvest was completed at Fort Valley on July 22 and by that date 45 percent of the new beetles had started to oviposit. Forty-eight percent of the new beetles had begun to deposit second-generation eggs by July 31.

Ability of Japanese beetle to withstand submergence.--I. M. Hawley, of the Springfield, Mass., sublaboratory, reports that beetles have emerged in large numbers from at least four points in New England which were under from 3 to 10 feet of water during the heavy floods last spring. These points are Hartford, Conn., Concord, N. H., and Springfield and West Springfield, Mass.

Native diseases of Japanese beetle in relation to introduced parasites.--On June 23 an exploratory survey was made by R. T. White, Moorestown, N. J., at the Overbrook Country Club, Philadelphia, Pa., to determine the relationship between diseased host grubs of the Japanese beetle and one of the imported parasites, Tiphia vernalis Rohw. Thirty-six diggings were made and the grub population averaged 12 per square foot; 48.3 percent were found to be parasitized by T. vernalis; 26.9 percent of all larvae were diseased; and 18 percent of the Tiphia-parasitized grubs were so diseased that the parasites would be unable to develop upon them.

Percentage frequencies of stages of Japanese beetle in July.--T. N. Dobbins, Moorestown, reporting on the percentage frequencies of stages of the soil population of Japanese beetle for July 1936, submits a comparison

of the situation for July 1935 and 1936. The following table summarizes the relative proportion of the various stages represented among the soil population by 10-day periods during July 1935 and 1936.

Periods	Percentage frequency of--						
	Eggs	Larval instars			Premupae	Pupae	Adults
		1st	2d	3rd			
1935							
July 1-10----	3.9	0	0	19.3	3.4	20.8	52.7
July 11-20----	77.3	8.8	0	6.3	0.9	3.8	2.7
July 21-31----	63.3	34.2	0	0.6	0	0	1.7
1936							
July 1-10----	0	0	0	40.5	11.9	26.2	21.4
July 11-20----	34.8	0	0	38.1	5.0	22.0	0
July 21-31----	82.7	11.8	0	4.7	0	0	0.7

As shown by the table, a decided retardation has occurred during the present year in the replacement of the older brood by a new brood, the new brood being represented in the table by the eggs and the first-instar larvae, the remaining stages representing the old brood. This condition is due, in large part at least, to the extremely dry soil conditions that have prevailed during the present season, delaying the development of the insect and, particularly, the laying of eggs during the current season.

Seasonal fluctuations in soil population density of Japanese beetle at regular survey stations.--I. M. Hawley and T. N. Dobbins, Moorestown, report that one of the outstanding features of the present season has been the unusually heavy reduction in the soil population which has occurred at the points of survey during the period September 1935 to June 1936. A summary of soil population surveys conducted over a period of 7 years indicates that the reduction in soil population during the above-mentioned period is normally approximately 35 percent. The following summarizes the reduction in population at the regular survey stations during the same period in 1936: Merchantville, N. J., 91.4 percent; Haddonfield, N. J., 81.0 percent; Jenkintown, Pa., 75.0 percent; Rydal, Pa., 74.2 percent; Philmont, Pa., 56.7 percent; general average, 75.6 percent.

MEXICAN FRUIT FLY CONTROL

No fruit flies trapped in lower Rio Grande Valley.--July trapping results in the valley, as regards Anastrepha ludens Loew, were identical with those for the same month the last 4 years, that is, no A. ludens was trapped. As usual, several A. ludens were trapped in the city of Matamoros, but no larval infestations have yet been found in any of the fruit grown locally. The absence of larval infestations in Matamoros and Reynosa is probably accounted for by the strict sanitary measures being enforced around the markets and the close inspection of all fruit before it is offered for sale. Weather and growing conditions for the present citrus crop have been excellent during the past month.

CEREAL AND FORAGE INSECT INVESTIGATIONS

European corn borer survival.--A. M. Vance, Toledo, Ohio, reports that the mortality of overwintering European corn-borer larvae remained relatively low in most parts of the infested territory and that the insect in general appeared to reach pupation in a vigorous condition. However, a comparatively high pupal mortality, of 21 percent among 911 specimens examined, was found by K. D. Arbuthnot in a series of counts taken from July 15 to 21 within 10 Ohio and Michigan counties west of Lake Erie. This mortality was a result of prolonged intense heat early in July. On the other hand, preliminary data obtained in the vicinity of Toledo indicate a good survival of borers from a large number of egg masses deposited. In both the Lake and Eastern States the average seasonal development of the borer was earlier in 1936 than in 1935. Egg deposition of the first-generation moths in southern Connecticut this year occurred fully 1 week earlier than last year, about the same number of eggs being laid in each of the 2 years. Despite heavy precipitation in that region during the period of oviposition and egg hatching, a relatively small proportion of the egg masses were washed off the plants and early larval survival of the first generation was apparently as high in 1936 as in 1935. In western New York oviposition has been light this season and on the Eastern Shore of Virginia, according to D. W. Jones, unusually dry conditions resulted in a low survival of the first-generation corn borer and a consequent light infestation.

Status of European corn borer parasites at the close of 1935.--W. A. Baker, Toledo, reports that surveys were conducted at the close of the 1935 season of parasite activity. The collections were confined to restricted areas around 10 test points for parasite colonization, in four States in the one-generation area, and 11 points in six States in the multiple-generation zone. With few exceptions, each of these points was sampled by the section random-sampling method, the location of samples being determined by the use of polar coordinate designs of a type suitable to the objectives sought at each point. The following tables present the results of observations in these two areas.

Parasites taken in one-generation area^{1/}

Locality	Foreign										Total	
	Total borers	<u>Lydella</u> ob-	<u>grises</u> served	<u>R. D.</u>	<u>Roman.</u>	<u>Inareo-</u> lata	<u>Chelonus</u> annul-	<u>punctoria</u> ipes	<u>Westm.</u> determined	<u>Native</u> and un-		
	Number	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	
<u>Indiana</u>												
York, Steuben-----	441	0	0	0	0	0	0	0	0	0	0	
<u>Michigan</u>												
Fairfield, Lenawee---	678	0	0	0	0	0	0	0	0	0	0	
Erie, Monroe-----	5,174	110	2.14	1	0.02	0	0	0	23	0.45	134	2.61
Oxford, Oakland-----	698	0	0	0	0	0	0	0	0	0	0	
Columbus, St. Clair--	499	0	0	0	0	0	0	0	2	0.40	2	0.40
<u>New York</u>												
Catt. Ind. Reserv.---	897	0	0	1	0.11	0	0	0	11	1.23	12	1.34
Adams, Jefferson-----	675	0	0	0	0	0	0	0	1	0.01	1	0.01
<u>Ohio</u>												
Perkins, Erie-----	3,839	9	0.24	0	0	1	0.03	0	12	0.31	22	0.58
Jerusalem, Lucas-----	5,142	223	4.36	0	0	0	0	0	28	0.54	251	4.90
Perry, Wood-----	676	0	0	0	0	0	0	0	0	0	0	0
Total-----	18,719	342	1.84	2	0.01	1	0.01	0	77	0.41	422	2.27

^{1/} Percentage of parasitization based on the number of borers observed minus the number lost.

^{2/} One Labrorychus prismaticus Nort. from Erie Township, Monroe County, Mich., and one from Adams Township, Jefferson County, N. Y.; remainder mostly Zenillia caesar Ald.

1/

Parasites taken in multiple-generation area

Locality	Foreign												Total
	Lydella		Inareolata		Chelonus		Cremastus		Native		2/		
	Number	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
<u>Massachusetts</u>													
Bridgewater----	697	3	0.43	0	0	0	0	0	0	2	0.29	5	0.72
Dighton-----	692	54	7.85	36	5.23	34	4.94	0	0	2	0.29	126	18.60
Falmouth-----	438	26	5.95	15	3.43	0	0	(3)	(3)	0	0	41	9.38
Malden-----	2,927	131	4.48	211	7.22	0	0	0	0	3	1.02	345	11.80
<u>Rhode Island</u>													
E. Providence---	1,181	47	3.99	8	0.68	0	0	0	0	0	0	55	4.66
Portsmouth-----	661	21	3.18	17	2.58	0	0	0	0	0	0	38	5.77
<u>Connecticut</u>													
E. Hartford----	589	11	1.87	18	3.07	0	0	0	0	1	0.17	30	5.11
Milford-----	675	1	0.15	0	0	(3)	(3)	0	0	2	0.30	3	0.45
<u>New York</u>													
Long Island----	2,337	82	3.51	4	0.17	0	0	0	0	8	0.34	94	4.03
<u>New Jersey</u>													
Atlantic-----	417	2	0.48	(3)	(3)	(3)	(3)	2	0.48	0	0	4	0.96
<u>Virginia</u>													
Lee-----	408	1	0.25	(3)	(3)	(3)	(3)	0	0	0	0	1	0.25

1/ Percentage of parasitization based on number of borers collected minus those lost.

2/ Includes the following species: Zenillia caesar, Bassus agilis (Cress.), Phorocera erecta Coq., Nemorilla maculosa Meig., Labrorychus prismaticus.

3/ No release of this species at this point.

In the one-generation area, Lydella stabulans var. grisescens R. D. appeared at 3 of the 10 points surveyed and at each of these points it had extended its limits of spread. In Jerusalem Township, Lucas County, Ohio, it was found that the area from which parasites were recoverable was approximately double that of last year. At this point parasitization in 2 of the fields was over 49 percent. Recoveries were made in close proximity to Lake Erie. Comparable data on percentage of parasitization for 2 years in the vicinity of these points are as follows:

Year	Within radius from release point of---	
	1½ miles	3½ miles
1934-----	11.53	8.33
1935-----	10.06	6.55

The difference in parasitization within 1½ miles of the release point was statistically insignificant, whereas within the larger area there was apparently a 21-percent decrease. In this county, however, between 1934 and 1935 a decided increase in host population was recorded. The host increase, combined with the decided enlargement of the parasitized area, probably indicates a substantial increase in parasite population within the area observed. Inareolata punctoria Roman was recovered from the same points at which it appeared last year. No increase in numbers was indicated. One specimen of Chelonus annulipes was recovered from Perkins Township, Erie County, Ohio. Adults were released at this point in 1934, and no supporting releases were made in 1935. During the course of egg studies in July 1935, egg masses were observed to be parasitized by Trichogramma minutum Riley in the vicinity of Toledo, Ohio, and Rochester, N. Y., the first known record of this species as a parasite of Pyrausta nubilalis Hbn. in the one-generation area. Parasitization of borers by all native species remained low in 1935. Zenillia caesar appeared most frequently in the collections. A comparison of corn-borer parasitization in the multiple-generation area, in 1934 and 1935, based on figures derived by comparable methods, is presented in the following table:

Location	1935	1934
<u>Massachusetts</u>		
Bridgewater-----	1.07	3.51
Falmouth-----	10.96	12.76
Malden-----	16.05	15.87
<u>Connecticut</u>		
Hartford-----	6.09	1.99
Milford-----	0.51	0.75
<u>New York</u>		
Long Island-----	4.57	1.90
<u>Rhode Island</u>		
Providence (Sec. 1-7)-----	6.49	5.76
Portsmouth-----	9.31	1.83

It is apparent that there was little change in percentage of parasitism in the Malden, Mass., and Providence, R. I., areas in the fall of 1935, as compared with the previous year. Bridgewater and Falmouth showed a decrease, whereas Hartford, Conn., Portsmouth, R. I., and Long Island, N. Y., showed marked increases in parasitization.

Corn-borer infestation in early market sweet corn near Toledo.--A. M. Vance and K. D. Arbuthnot, Toledo, report that 25 fields, comprising 114 acres, of market sweet corn located west of Toledo, planted late in April and early in May, were surveyed for corn borer infestation from July 15 to 31. An average infestation of 469 borers per 100 plants was found. In 1935 an average of 328 borers per 100 plants was obtained in a similar survey in this locality. Populations of the insect in individual fields examined in 1936 ranged from 220 to 990 borers per 100 plants, with 60 per cent of the fields showing over 400 borers per 100 plants.

Summer pupation of corn borer at Toledo.--K. D. Arbuthnot reports as follows on summer pupation of corn-borer larvae in the vicinity of Toledo: Pupation that normally should occur in June 1937 occurred to a greater extent in 1936 than has such pupation during any previous year on record. In a total of 1,314 individuals observed from July 28 to 31 in early sweet corn, 81 pupae were found, representing an average pupation in this crop of 6.2 percent. Four of the pupae had already emerged and egg masses deposited by second-generation moths were found in late corn on August 6. During 1934 and 1935 pupation in the locality was almost negligible, less than half a dozen pupae being found in either of the 2 years.

Laboratory production of corn-borer egg masses.--G. T. Bottger reports that to provide corn-borer eggs for hand infestation of corn plants in experimental plots concerned with studies on varietal and cultural control during June and July at Toledo, a total of 102,333 egg masses were produced as a result of collecting 47,011 moths from large field cages and handling them under controlled incubator conditions. The average number of masses laid per female moth was 5.66, and the average number of eggs per mass was 29.46.

Shipments and liberations of corn borer parasites in July.--C. A. Clark, Moorestown, N. J., submits the following data.

State	: C. flavoorbitalis:	I. punctoria:	M. tibialis:	L. stabulans:	Total
New Jersey---	600	600	--	600	1,800
Virginia-----	2,400	1,200	--	3,900	7,500
Ohio-----	--	9,000	--	--	9,000
New York-----	--	1,800	--	--	1,800
Pennsylvania--	--	--	--	2,000	2,000
Connecticut--	--	1,800	--	--	1,800
Canada-----	10,800	600	2,025	4,500	17,925
Total----	13,800	15,000	2,025	11,000	41,825 ^{1/}

^{1/} Some of the parasites shipped or liberated during July emerged in June.

Mr. Clark states that shipments to Virginia were for release in Virginia and Maryland, those to Ohio for release in Ohio, Indiana, and Michigan, and those to Connecticut for release in that State and in Massachusetts.

Winter wheats lack resistance to hessian fly in Kansas.--E. T. Jones, of the Manhattan, Kans., laboratory, reports that the wheat harvest of 1936 and the hessian fly infestation records of last fall on 214 rows of 104 supposedly resistant selections of winter wheat show the winter wheats to be far more susceptible to hessian fly infestation than was an F₁ winter selection of Marquillo x Oro. This selection, bearing a fall infestation of 38 percent, averaged 117 heads to a row in our Springfield, Mo., fly-resistance-test nursery. The 104 winter wheats in the same comparable duplicated series, owing to killing by a 99 percent fall infestation of fly, averaged only 9.7 heads to the row, with a maximum of 44 heads for a Kawvale x Tenmarq selection. Selections of Marquillo x Oro, Marquillo x Tenmarq, Marquillo x Minturki, Kawvale x Marquillo and (Kanred x Hard Federation) x Marquillo in another test series at Springfield, Mo., proved to be equally as resistant to hessian fly injury as the Marquillo-Oro hybrid.

Hessian fly in the Eastern coastal regions.--Hessian fly surveys made by E. J. Udine, of the Carlisle, Pa., laboratory, showed that light infestations were present in Virginia, Delaware, Maryland, and eastern Pennsylvania. Heavier infestations were found in central and western Pennsylvania, with a maximum of 54 percent in one field in Union County.

Colonization of Collyria calcitrator Grav. for wheat sawfly control.--In continuation of the colonization work with this species begun last year, a record supply of these parasites was shipped to this laboratory by the Canadian Department of Agriculture. They were met at Buffalo by E. J. Udine and were distributed at four points located in Ontario County, N. Y., Cumberland and Butler Counties, Pa., and Mahoning County, Ohio. A total of 10,340 adults were released. Weather and host conditions were optimum for successful colonization.

Pleurotronis benefica Gahan as a parasite of the black grain-stem sawfly.--On June 4 Mr. Udine released 125 P. benefica in wheat fields near Ellsworth, Mahoning County, Ohio. In eastern Pennsylvania this chalcidoid is a major parasite on the black grain-stem sawfly (Trachelus tabidus Fab.). This sawfly, however, has disseminated much faster than P. benefica, with the result that the heavy outbreaks of T. tabidus in eastern Ohio have occurred unchecked by parasitization. Careful search has failed to reveal the occurrence of P. benefica in the parts of Ohio where the wheat was most heavily attacked. It was, therefore, the purpose of this experiment to encourage its presence by planting a colony in the heart of the most heavily infested area.

Vetch bruchid infestation heavy in vetch in North Carolina.--According to J. S. Pinckney, this summer Bruchus brachialis Fahr. has been found heavily infesting vetch seed in all counties in which infestations were found last year and also in four additional counties in the State, these counties being: Alexander, Anson, Montgomery, and Richmond. Infestations have averaged at least 50 percent in all fields examined and have run as high as 90 percent. Weevils were still emerging from this year's seed on July 17, but the peak of emergence was reached on July 11.

Wheat sawfly in the East.--Surveys made this summer by Mr. Udine, Carlisle, Pa., for wheat sawflies (T. tabidus and Cephus pygmaeus L.) showed the range of both pests steadily increasing, with C. pygmaeus, which was originally confined to New York State, now also getting a firm foothold in eastern Pennsylvania, and T. tabidus spreading farther west in Ohio and becoming well established in Virginia. Mr. Pinckney found it present in Campbell County in southern Virginia, but no traces of it as yet in North Carolina. Damage from this pest was not as severe this summer as last in Pennsylvania, owing to the early ripening of the grain, which enabled wheat growers to harvest a few days prior to the complete severance of the stems by the sawfly larvae. The peak of infestation this year was found in Mercer County, Pa., and in parts of eastern Ohio.

JAPANESE BEETLE CONTROL

Status of Dutch elm disease eradication.--From the beginning of scouting on June 8 to the end of July, scouts sampled 30,189 trees showing wilting symptoms. Of this total, 4,334 have been confirmed as infected with the Dutch elm disease. Sixty of these were in Connecticut, 3,073 in New Jersey, and 1,179 in New York. Infections outside the tri-State area comprised 19 trees in Indianapolis, and one each in Old Lyme, Conn., Baltimore, Md., and Norfolk, Va. On July 31 there were 189 W. P. A. and 95 C. C. C. scout crews in the field. Men employed on relief funds numbered 2,161. There were also engaged in the work 439 C. C. C. enrollees, 61 appointed and 12 per diem men on Department funds, 137 W. P. A. supervisory appointees, and 171 State employees. In the first survey of the work area, scouts had covered 3,953 square miles, and 1,395 square miles had been gone over twice. Progress in the season's scouting in most sections at the end of July was equivalent to the accomplishments as of late August in 1935. Tree-removal work was being performed by 27 eradication crews and 7 sanitation crews. Confirmed trees standing numbered 1,937. Trees removed to July 31 in connection with this and previous years' eradication, sanitation, and clear-cutting activities totaled 1,710,614.

Railroad scouting organized.--Organization of railroad scouting began on July 31 and was completed on August 3. One four-man crew will scout the Baltimore & Ohio railroad right-of-way from Harpers Ferry to Clarksville, W. Va. This survey will cover trees in a strip one-quarter mile on either side of the railroad, increasing to one-half mile in towns. Ten two-man crews will scout the other railroads over which elm logs traveled to veneer mills.

Moth defoliation in New England.--Reports from district inspectors concerning observations of gypsy moth defoliations continue to indicate a considerable decrease in the number of acres showing from 75 to 100 percent defoliation, as compared with last summer. In towns located within a radius of 25 miles of Boston, a comparative increase in the degree of defoliation is reported. Satin moth infestation is reported by the inspectors to be heavier and more generally spread throughout the infested area than during the past several years. The satin moth is now present in all four stages--caterpillars, pupae, moths, and egg clusters.

Gypsy moth quarantine violator convicted.--After pleading guilty to a violation of the gypsy moth quarantine regulations involving the shipment via boat of 344 cedar poles from Stonington, Conn., to Greenport, N. Y., Frank Shippee, of Westerly, R. I., was sentenced to pay a fine of \$25, to a 1 month's suspended jail sentence, and was placed on probation for 6 months.

Early deposition of egg clusters.--Report has been received from the district inspector at Concord, N. H., that gypsy moth egg clusters were deposited in southern New Hampshire as early as June 30.

Heavy concentrations of Japanese beetle in Metropolitan area.--There are heavy infestations of the Japanese beetle in practically all of the Metropolitan district surrounding New York City. One of the heaviest infestations is reported on Governors Island, in New York Harbor. Similar conditions exist at Bedloes and Ellis Islands. Although there is but a limited amount of foliage at the immigration station on Ellis Island, the beetles have eaten the ivy that covers part of the building. Staten Island may be considered generally infested, with considerable beetle damage in all sections of the island. A motor-boat owner cruising in Raritan Bay reported that beetles flew aboard his craft and practically covered the decks. Fire buckets of water on ferry boats plying between Hoboken and Coney Island contain a layer of floating beetles. This year's flotation of beetles that have flown to sea and been swept back by the tides has been in progress since about July 15. Windrows of dead adults may be found along the southern shore of Long Island as far east as Long Beach. The beetles have also reached the nuisance stage in Brooklyn, from Fort Hamilton north to Columbia Heights. Upper Manhattan and the Bronx are also invaded with a greatly increased beetle population. Communities along the Hudson River north to Hastings upon Hudson are badly infested. In New Jersey heavy infestations have been observed in sections of Essex and Hudson Counties.

Accrediting of bean-growing farms discontinued in Maryland and Virginia.--Men assigned to scout bean farms on the Eastern Shore of Virginia and the Eastern and Western Shores of Maryland as a means of accrediting the farms and permitting certification without inspection of produce from uninfested premises found first-record infestations on 41 farms in Maryland and 42 farms in Virginia. This indicates that the beetle has spread quite generally throughout the bean-growing sections. Accordingly, it was necessary on July 16 to discontinue farm scouting as previously practiced over a period of years and to require that all beans from these areas be given actual inspection before being loaded in cleaned or fumigated refrigerator cars for removal from the regulated zone. Maryland State officials have obtained 12 W. P. A. workers to assist in the bean-inspection work. Some of these men will start to work on July 27.

Single adult beetle may spread infestation.--Ordinarily, finding of one adult Japanese beetle in a lot of material intercepted at a road station involves little hazard of spread of the pest. This, however, was not the case with a potted plant, intercepted at the Amissville, Va., post on July 17,

in the possession of a motorist driving from Noank, Conn., to Louisville, Ky. While removing the soil from about the plant preparatory to certifying it, the inspector found a female adult beetle in the act of oviposition, three eggs having just been laid. Judging by the conditions of infestation in the locality where the plant originated, the eggs were probably fertile.

Berry fumigation resumed in New Jersey.--Fumigation houses at Whites Bog and Hammonton, N. J., are now in full operation. Raspberries and blackberries purchased at the community auction market at Hammonton are the products fumigated at that point. Fumigation at Whites Bog is confined to cultivated blueberries shipped to nonregulated points by the cooperative grower's association. Carbon disulphide is the fumigant used at both houses. The extreme heat that prevailed throughout New Jersey during the week ending July 11 threatened to curtail the blueberry crop, as the green berries were literally cooked on the bushes.

Japanese beetle emergence in New England.--Japanese beetles were first noted in Concord, N. H., on June 30 and in Keene, N. H., on July 7. The first beetle was trapped in Boston this season on July 9, the day the traps were set. Sixteen hundred traps have been placed by the Park Department of Springfield, Mass. The first beetles caught in the city-owned traps were captured on June 27. These traps are now catching an average of 1,000 beetles per day. On July 4, 1,600 beetles were caught.

FOREST INSECT INVESTIGATIONS

Douglas fir beetle.--A survey of the Douglas fir beetle infestation in the Shoshone Canyon, Shoshone National Forest, Wyo., was instituted on August 3 by A. L. Gibson, of the forest insect laboratory at Coeur d'Alene, Idaho. Artificial control measures, first instituted in 1931, have successfully preserved the scenic trees along the highway and around the many resorts and summer homes. If control measures are again found to be necessary the work will be conducted by C. C. C. enrollees.

Cooperation in study of blue stain.--J. C. Evenden, Coeur d'Alene, states that Caroline Rumbold, forest pathologist of the Bureau of Plant Industry, who is located at the Forest Products Laboratory, Madison, Wis., visited the Coeur d'Alene laboratory district during the last week of July for the purpose of obtaining cultures of blue stain associated with the mountain pine beetle.

C. C. C. enrollees used to study mountain pine beetle infestation.--Mr. Evenden also states that a crew of ten C. C. C. enrollees are being used on the Coeur d'Alene National Forest as assistants in the making of an intensive study of the mountain pine beetle infestation in white pine. This study includes the analysis of bark-beetle broods under all environmental conditions and periods of attack: In the execution of this work trees are felled and brood data are taken at different heights along the infested length of the bole.

Two-year cycle of Black Hills beetle at high elevations.---J. M. White-side, of the Fort Collins, Colo., laboratory, reports that between elevations of 9,000 and 10,000 feet in southern Wyoming, a period of nearly 2 years is required for complete development of parts of some broods of the Black Hills beetle. From limber pine and lodgepole pine trees attacked in 1934 he obtained large numbers of beetles during the summer of 1935, although in November, when the emergence ceased, there were still many mature larvae and callow adults beneath the bark. These insects emerged heavily late in June and early in July in 1936 and attacked a great many additional trees. From a cage covering 2 square feet of bark on the north side of a limber pine tree attacked in 1934 he collected 204 beetles in 1935. From this same cage emergence began again late in 1936 and by the end of the first week in July, 81 additional beetles had emerged. A smaller number were collected from other caged trees. These "second season" beetles can be found in the dry outer bark from the ground line to a height of about 6 or 8 feet. An occasional larva or pupa can still be found in the very dry bark. Emergence and attack by these "second season" beetles occurring late in June and early in July is about 6 weeks earlier than the main flight, which usually occurs late in August at this elevation.

The lodgepole pine beetle considered in marking lodgepole and white-bark pine stands.---J. A. Beal, Fort Collins, reports that on the Washakie National Forest in northwestern Wyoming Dendroctonus murrayanae Hopk. is a very important factor in the death of mature lodgepole and white-bark pine trees in the vicinity of the operations.

Trap-tree experiments for Dutch elm disease vectors.---C. W. Collins, of the Morristown, N. J., field laboratory, reports that a trap log experiment has been conducted by that laboratory in cooperation with the Dutch elm disease eradication unit, the Morristown laboratory of the Division of Forest Pathology of the Bureau of Plant Industry, and the State officials engaged in Dutch elm disease eradication in New Jersey, New York, and Connecticut. Four pieces of elm about 3 feet in length and from 3 to 6 inches in diameter were put out at each of 466 points within and just outside the major disease area. These points were approximately 4 miles apart. The logs were cut outside the area just before they were placed at the points. After an exposure of approximately 4 weeks they were brought into the laboratory and peeled. The number of galleries of the smaller European elm bark beetle (Scolytus multistriatus Marsh.) and the native elm bark beetle (Hylurgopinus rufipes Eich.) were counted and sample galleries and beetles were submitted to the Division of Forest Pathology. These were cultured to ascertain whether or not the Dutch elm disease fungus (Ceratostomella ulmi (Schwarz) Buisman) was present. Some of the logs were heavily infested with the bark beetles, whereas many sets of logs were uninfested. The fungus was recovered from galleries of both bark beetles in logs that were exposed at points within the known infected zone.

Insects attracted to cut elms.---Mr. Collins also reports concerning progress of another experiment in which the Morristown laboratory and the Dutch elm disease eradication unit are cooperating. Since late in May a man has been stationed at each of six points located in New Jersey areas where

elms are numerous and where trees attacked by the Dutch elm disease have been and are being removed. These men collect insects attracted to three felled elm trees. Six weeks after a tree has been felled it is burned and another is felled in its place. The insects are collected alive and individually in gelatine capsules and sent to the laboratory for identification. After they have been identified those insects known to breed in elm are submitted to the Division of Forest Pathology for culturing to determine whether they are carrying the Dutch elm disease fungus. Adults of Scolytus multistriatus have been collected in greatest numbers, but the elm bark weevils, Magdalis armicollis Say, Magdalis barbata Say, and Magdalis inconspicua Horn., and the red-headed ash borer (Neoclytus acuminatus Fab.) have been frequently taken. Other beetles taken in smaller numbers are Hylurgopinus rufipes Eich., Saperda tridentata Oliv., Chrysobothris femorata Oliv., Anthaxia viridifrons Say, Xylotrechus colonus Fab., and Xylobiops basilare Say. At one point the introduced ambrosia beetle (Xylosandrus germanus Bldfd.) and the cambium curculio (Conotrachelus anaglypticus Say) have been commonly attracted to the felled trees. The Dutch elm disease fungus has been cultured from S. multistriatus beetles collected at four of the points and from H. rufipes adults from another point.

European spruce sawfly.--H. J. MacAloney, of the New Haven, Conn., laboratory, reports a high emergence of adults of the European spruce sawfly from cocoons collected on July 1 and 2. From 269 cocoons, 245 adults issued, two being males--the first males reported from the United States. Three cocoons produced hymenopterous parasites. On July 31 all instars of this sawfly were present at Orange, Conn. Apparently some larvae of the second generation were ready to spin cocoons. A recent survey of conditions in northern New Hampshire and Vermont indicated no apparent increase in sawfly infestation. It is everywhere light in this region.

Imported parasites of pine shoot moth.--P. B. Dowden and P. A. Berry, of the New Haven laboratory, report that the following pine shoot moth parasites were received from England during July: 8,283 cocoons of Cremastus interruptor Grav.; 1,800 cocoons of Orgilus obscurator (Nees); 240 cocoons of Omorgus and miscellaneous species; and 916 naked pupae of Pimpla sp. A shipment of 1,040 pine shoot moth eggs, said to be parasitized by Trichogramma, was received from Austria via Hyeres, France.

Parasite liberations.--Messrs. Dowden and Berry report that the following parasite liberations were made during July:

Locality	Host species	Parasite			
		Species	Males	Females	Total
		Number	Number	Number	
<u>Connecticut</u>					
Branford-----	<u>Rhyacionia buo-</u> <u>liana</u> Schiff.	<u>Cremastus interruptor</u>	50	400	450
Easton-----	do.	do.	89	400	489
Fairfield-----	do.	do.	97	747	844
Do-----	do.	<u>Campoplex</u> sp.	19	19	38
Hamden-----	do.	<u>Cremastus interruptor</u>	50	400	450
<u>Massachusetts</u>					
Lee-----	<u>Coleophora lari-</u> <u>cella</u> Hbn.	<u>Chrysocharis lari-</u> <u>cinellae</u> Ratz.	1,033	1,054	2,087
Do-----	do.	<u>Angitia nana</u>	158	73	231
Do-----	do.	<u>Dicladocerus west-</u> <u>woodi</u> Steph.	180	270	450
<u>New Jersey</u>					
New Vernon-----	<u>R. buoliana</u>	<u>Cremastus interruptor</u>	484	495	979
Do-----	do.	<u>Orgilus obscurator</u>	183	184	367
<u>New York</u>					
North Castle-----	do.	<u>Cremastus interruptor</u>	474	496	970
Roslyn, L. I-----	do.	do.	495	500	995
Syosset, L. I----	do.	do.	500	500	1,000
Tupper Lake-----	<u>C. laricella</u>	<u>Chrysocharis lari-</u> <u>cinellae</u>	998	1,003	2,001

Practically all females of Angitia, Dicladocerus, Cremastus, and Orgilus were mated before liberation. Mating was occasionally observed with the other species.

Recoveries of introduced parasites.--Messrs. Dowden and Berry report the recovery of the following introduced parasites: Bassus pumilus Ratz., parasite of Coleophora laricella, was recovered for the first time in this country at Sydney, Maine, Berlin, N. H., and Saranac, N. Y. It was liberated at Sydney in 1933 and at the other two points in 1934. Tetrastichus turionum Htg., parasite of Rhyacionia buoliana, was recovered at New Vernon, N. J., and Forest Hills, Mass. Orgilus obscurator, also a parasite of R. buoliana, was recovered at North Castle, N. Y. Mr. Berry reports that from 24 adult Ephialtes examiner Fab., which successfully hibernated last winter, 3,764 adults have been reared in the laboratory from Cacoecia cerasivorana Fitch.

Gypsy moth studies.--W. L. Baker, New Haven, reports on the results of a survey of gypsy moth infestations in the town of Petersham, Mass. This survey was made cooperatively with A. C. Cline, Assistant Director of the Harvard Forest. Mr. Baker says: "In 1935 there was a total of 82 completely defoliated areas ranging in size from 0.25 acre to 20 acres. In 1936 there was not one completely defoliated area in the town, and but 13 areas in which the defoliation ranged from 50 to 75 percent. These areas ranged in

size from 0.25 acre to 7 acres. Twelve of the 13 defoliated stands of 1936 were new locations; that is, in only 1 of the 82 defoliated stands of 1935 was any appreciable feeding noticed in 1936." Mr. Baker further reports on the factors apparently largely responsible for the widespread reduction in intensity of gypsy moth infestation in certain parts of New England. In northern and western New England there was a rather low percentage of hatch of the eggs deposited both below and above the snow line. In 1936 the "wilt" disease was very noticeable about 2 weeks earlier than in 1935. In 1936 this disease was very prevalent in light infestation, and in certain areas of central Massachusetts and south-central New Hampshire mortality ranging from 95 to 100 percent was observed. The greatest amount of control in 1936 probably resulted from killing frosts which occurred principally throughout western and northern New England about May 25. In some instances oak foliage was completely killed, eliminating the supply of favored food for the small larvae for a period of from 1 to 2 weeks and causing tremendous mortality through starvation. The development of the surviving larvae was not as closely synchronized with foliage development as in a normal season.

PLANT DISEASE CONTROL

Barberry-eradication project.--As a result of rust surveys made since June 1 the physiologic forms present in approximately 150 collections have been identified, and 250 more are now in the process of being identified. Because of the extreme hot and dry weather during much of July it was necessary to suspend operations in the greenhouse, as it was impossible to keep grain plants in a condition suitable for making identifications. In connection with other observations made to determine the extent of migration of rust from south to north and the development of rust near barberries, approximately 515 microscope slides exposed at various places within the Mississippi River Valley have been partially examined but final conclusions cannot yet be drawn. It is estimated, however, that there were far fewer spores in the air this year than in 1935 and probably fewer than in the average season. In the course of rust surveys this summer, records have been obtained of approximately 100 local epidemics of stem rust. It is probable that if the weather had not been so hot and dry many destructive epidemics would have developed near barberry bushes, not only in the Mississippi River Valley but as far east as Virginia and Pennsylvania. The development of rust, however, was checked by extreme high temperatures, lack of precipitation, and low atmospheric humidity.

Work in Michigan.--Since April 1 an average of more than 400 men have been employed in connection with the survey for barberry bushes in Michigan. During the period April 1 to August 1, a detailed inspection was made of more than 5,000 square miles and work has been completed in Huron, Sanilac, Wayne, Livingston, Gratiot, Clinton, St. Joseph, and Ingham Counties. The July report for Michigan shows that nearly 100,000 bushes and seedlings were eradicated during the month from 239 properties.

Work in Illinois.--As a result of 1 year of work with funds appropriated under the Emergency Relief Appropriation Act of 1935, more than 8,000 common barberry bushes have been destroyed in 17 counties in Illinois. More than 600 men have been given from 1 to several months employment during the year.

COTTON INSECT INVESTIGATIONS

Pink bollworm studies in the Laguna district of Mexico.--C. S. Rude, Tlahualilo, Durango, Mexico, reports that during May the greatest emergence from the hibernation tests occurred from both bolls and cocoons that were buried on December 10 and irrigated immediately. The second highest emergence occurred with both groups where the bolls and cocoons were left on the surface and irrigated on December 10. The best results were obtained when the bolls and cocoons were left on the soil surface until March 1 and then buried and irrigated, there being no emergence of moths in the tests with this treatment. (The results in the hibernation tests in Mexico vary from those obtained in the Big Bend of Texas where light emergence occurs from bolls buried and irrigated in December. This difference is probably due to the variations in soil moisture. The soil where the tests were made in Mexico was very dry and the irrigation only added sufficient moisture to make conditions favorable, whereas in Texas the soils contained more moisture and the irrigation was detrimental to survival of the worms.) Infestation counts made during May in several fields where the cotton was small and had not begun to fruit heavily showed no pink bollworms. In a number of fields in other localities the infestation was from 2 to 4 percent. However, in one region near San Pedro three fields were found where the infestation was between 70 and 80 percent in squares and blooms. A survey of this region revealed that a 900-acre field, adjoining the heavily infested fields, was in cotton last year and was heavily infested. The stalks were not cut until late and a great many infested bolls fell to the ground and were not cleaned up. The field was not plowed. This improperly cleaned field was probably the source of this season's heavy infestation. Specimens of two native parasites, Microbracon platynotae (Cush.) and Perisierola cellularis var. punctaticeps (Kieffer) were collected in one of the fields near San Pedro where the pink bollworm infestation was between 70 and 80 percent.

Breeding and shipping the pink bollworm egg parasite Chelonus blackburni.--L. W. Noble and W. T. Hunt have continued to rear at Presidio, Tex., the egg parasite Chelonus blackburni Cameron, which was obtained from Hawaii by the Division of Foreign Parasite Introduction. From a start of one male and four females that reached Presidio alive on June 16, 1935, many thousands of these parasites have been reared and distributed to the pink bollworm infested cotton fields of Puerto Rico and Mexico, as well as in the vicinity of Presidio. These parasites were reared successfully through the winter and spring on the Mediterranean flour moth (Ephestia kuehniella Zell.). After about May 1 most of the eggs failed to hatch. This sterility was apparently due to high temperatures that began the last of April. The daily maximum temperature for that week ranged from 100° to 102° F. and the moths were being reared in a room where the temperature fluctuated. The same trouble occurred in an underground room where the average temperature was 83°, the maximum not over 85°, and the relative humidity, 70 percent. Although the extremely high temperatures were eliminated in this room, the average temperature was rather high and the nearly constant temperature and humidity may have caused this sterility. A Mexican official, visiting the Presidio laboratory, took a stock of parasites with him on his return to the Mexican pink bollworm laboratory at Torreon, Coahuila, on May 2. Approximately 2,000 parasite larvae

with the Epehstia host were supplied. These parasites are being propagated in Mexico for release in the Laguna district. A colony of 5,000 adults was released in the Presidio Valley on May 18. No pink bollworm eggs were available then, but on wild plants growing along an irrigation ditch at the point of liberation several species of Coleoptera and Lepidoptera were feeding. Thus far none of the parasites have been recovered from these other possible host insects. Between June 2 and June 11 after cotton had started to bloom and pink bollworm infestations were noted approximately 10,000 adults were released in cotton fields. These liberations will be supplemented by later releases, but this was prevented during the latter part of June because of the difficulties in breeding the parasites already discussed.

Pink bollworm parasite, *Elasmus platyedrae* Ferr. died out at Presidio laboratory.--In May 1935 the Division of Foreign Parasite Introduction shipped a supply of *E. platyedrae* from Egypt to Presidio, Tex. No effort was made to colonize this species in 1935, as all available space and personnel were needed for work that had been planned with other species. A small supply was maintained for breeding stock with the idea of colonizing this species in 1936. No particular trouble was experienced in keeping the stock, but it was observed that the parasites did not increase rapidly in number. In case of host decay, the larvae would die when transferred to fresh hosts. During the latter part of March the supply of pink bollworms for use as hosts became heavily infested with mites, and consequently the breeding room and cages also. Fumigation of the room and cages, together with other sanitary precautions and destruction of mite-infested hosts, resulted successfully with all the species being reared on these hosts except *E. platyedrae*. The number of adults of this species decreased steadily until finally the only material left was a number of hosts in cocoons which had been exposed to the parasites and from which no adult parasites ever emerged.

Egg parasites of cotton flea hopper in Texas.--K. P. Ewing, Port Lavaca, Tex., reports that in June H. J. Crawford first observed many minute insects which later proved to be parasites of the cotton flea hopper, emerging from horsemint in small cages. On both croton and horsemint plants, *Psallus seriatus* Reut. eggs appeared normal, except that they were dark in color. One parasite was removed from a *Psallus* egg, and later during June 7 were reared by placing small pieces of croton bark, each containing a dark-colored *Psallus* egg, in separate glass vials. During July these studies were continued and 27 parasites emerged from 27 cotton flea hopper eggs. Many parasitized eggs were examined under a microscope and each contained 1 parasite that practically filled the egg shell. Apparently there is not room for 2 of the parasites to develop in one flea hopper egg. The parasites are the smallest insects observed emerging from croton plants. During July experiments were conducted to determine the amount of parasitization of cotton flea hopper eggs. Thirty-eight collections of croton plants were made from Brazos, Calhoun, Jackson, Matagorda, Nueces, Refugio, Robertson, Victoria, and Wharton Counties. Each collection consisted of 10 croton plants, which were stripped of their leaves and placed in an emergence cage (regular boll weevil parasite cage). Some flea hopper egg parasites emerged from collections

made in each of these nine counties. From these samples, 902 cotton flea hoppers and 957 parasites emerged in July. From the first 10 collections made near Port Lavaca before July 14, 364 flea hoppers and 753 parasites emerged, showing that 67.4 percent of the flea hopper eggs were parasitized. However, during the first 2 days, 191 parasites and 25 flea hoppers emerged, showing that 88.4 percent of the flea hopper eggs were parasitized, which is thought to approximate field conditions this year. A. B. Gahan determined 54 of the specimens submitted as Erythmelus n. sp. and 3 as Anaphes anomocerus Gir.

Cotton-variety studies for boll weevil resistant characters.--Last season E. W. Dunnam and assistants at Stoneville, Miss., studied the varietal differences affecting boll weevil damage to cotton. A large number of varieties having different boll characteristics were planted in single row blocks at five localities in Mississippi and two localities in Louisiana. Dated tags were placed on freshly opened blooms each morning throughout the season. About the time the first tagged bolls began to open, collections of green bolls were made at five localities, regardless of age of bolls, and preserved in a solution of zinc sulphate for laboratory study. In two places a second collection of bolls was made about 10 days later. In two places all bolls were allowed to remain on the plants until they were mature and the cotton opened. A study of the green bolls showed that the weevil damage was invariably greater for those with thin carpel walls. A typical example was the results of a collection of bolls made at Raymond, Miss., on September 7. For 25 varieties bearing bolls with thin carpel walls, the number of boll weevils in all stages per lock was 0.090, while for 6 varieties bearing bolls with thick carpel walls, the boll weevils in all stages per lock were 0.071. In one locality where all the tagged bolls were allowed to mature on 40 varieties, it was found that the boll weevil damaged locks varied from 2.2 to 18.6 percent, and the destroyed locks ranged from 3.4 to 16.9 percent. The lightest percentages of damaged and destroyed cotton were found among the varieties bearing bolls with thick walls. In this study it was also found that weevil egg deposition in green cotton bolls was over a very short period, usually at the time when squares became scarce. In a series of green bolls from 24 varieties collected at Natchez, Miss., on August 5 and August 16, it was found that the average damage per lock was 3.4 times as great in the second collection as in the first collection, made 11 days earlier.

Field cricket controlled by poisoned-bran mash in cotton fields in Mexico.--C. S. Rude, Tlahualilo, Durango, Mexico, reported as follows on April 14: "Crickets continued to be a serious pest in the cotton fields. In some places the cotton is recovering from the cricket damage, but in others; replanting will be necessary. This is a serious situation, as there is not enough seed in the Laguna for replanting." On April 27, Mr. Rude reported that in a few cases a poisoned-bran mash made according to the Kansas formula for grasshopper control, in which white arsenic and wheat bran were used, gave fair results. He found that white arsenic was more effective than calcium arsenate, when used in the bran mash against crickets. Mr. Rude sent in eight adult crickets, which were determined by A. B. Gurney as Gryllus assimilis (Fab.).

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

New pink bollworm infestation.--A new pink bollworm infestation has just been located in the lower Rio Grande Valley on both the Texas and Mexican sides of the river. On August 5 an inspector left San Antonio with a gin-trash machine for Matamoros, Mexico. This place is located just across the river from Brownsville, Tex., and there are eight gins in Matamoros and vicinity. Inspection of gin trash was begun on August 6, and pink bollworms were found in the first sample inspected. Work was continued at that point during the remainder of the week, by which time specimens had been found in trash at all but one of the gins. A total of 113 specimens have been found in the 46 bushels of trash inspected. Infestation has also been located at Reynosa, about 60 miles up the river from Matamoros. It is estimated that approximately 40,000 bales of cotton will be produced in the Matamoros area this season. Immediately after the above finding, additional gin-trash machines were sent to the valley to begin inspection on the Texas side. During the first 2 days' work specimens were found at gins in Brownsville and San Benito. The cotton area on the Texas side is about 125 miles long and perhaps an average of 25 miles in width. It is located in four different counties, and it is estimated that about 70,000 bales will be produced this season. These findings are a further indication of the value and efficiency of gin-trash machines in our inspection work. It is expected that this large cotton area will have been covered very thoroughly within the next week or 10 days. On the Texas side six large and one small machines are in operation, while on the Mexican side a large and a small machine are being operated.

Trap-plot cotton in the Big Bend.--The trap-plot work in the Big Bend district of Texas was brought to a close on July 30. This season 10 plots were used, and they began blooming the latter part of May. A rather large number of worms were trapped up until about June 20, after which there was a considerable decrease. In spite of the fact that cool weather considerably retarded the plot cotton in the early spring, it is believed that a great deal of good was accomplished. Infestation is showing up in the field cotton and, with one or two exceptions, indications at this time are that there is not a great deal of difference between the infestations of this year and last. There is one 10-acre field at Castolon, in Brewster County, which was planted considerably before the recommended date of April 15. Many infested blooms were found during June, and as bolls reached sufficient size they also became infested. An inspection on July 9 showed a 70-percent infestation. By the end of the month the cotton was fruiting much heavier and the infestation had dropped to about 50 percent.

Thurberia plant eradication.--The eradication of Thurberia plants in the Santa Catalina Mountains of southern Arizona has continued to make good progress. Practically all of the plants are infested with Thurberia weevil, and they are being eradicated with W. P. A. funds to remove this menace from cultivated cotton. During July 6,720 acres were covered, from which 105,922 Thurberia plants were destroyed. Most of the work in July was along the western slopes of the range, some 20 miles north of Tucson.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Dichlorethyl ether toxic to wireworm larvae.--In recent experiments by M. W. Stone, of the Alhambra, Calif., laboratory, against the sugar beet wireworm (Limonius californicus Mann.), it was shown that a dilute solution of dichlorethyl ether, ranging from 5 to 10 cc per gallon, was highly toxic to the larvae of L. californicus when drilled into infested bean rows planted as a trap crop. The cost of this treatment is estimated to range from \$1.70 to \$3.70 per acre. When applied at a dilution of 5 cc of dichlorethyl ether per gallon, 96.6 percent of the wireworms were killed.

Relation between cropping system and infestation by bean pod borer in Puerto Rico.--Field observations in the northeastern shore districts of Puerto Rico by L. B. Scott, of the Mayaguez, P. R., laboratory, indicate that the bean pod borer (Maruca testulalis Geyer) is more numerous in beans when this crop is interplanted with corn than when grown in pure stands. It appears that the shade afforded by the corn exerts some influence in inducing a concentration of M. testulalis adults. Other fields of the same variety of beans grown under directly comparable conditions, but not interplanted with corn or other companion crops, were found to be practically free from infestation.

Soil-surface applications of sulphur failed to prevent oviposition of wireworm adults.--Reporting on experiments directed against the adults of the sugar beet wireworm (Limonius californicus Mann.) and the Pacific coast wireworm (Limonius canus Lec.), R. S. Lehman, of the Walla Walla, Wash., laboratory, states that soil surface application of sulphur at rates of 400 and 800 pounds per acre did not have any appreciable effectiveness in preventing oviposition by the adults of these two species.

Effect of gladiolus thrips feeding on corms in storage.--To determine further data on whether the gladiolus thrips (Taeniothrips simplex Morrison) causes a shrinkage in the weight of corms and affects the future growth of the plants, size No. 2 corms of four varieties--Brilliant, Crimson Glow, Alice Tiplady, and Joe Coleman--were used in tests performed by R. H. Nelson, of the Beltsville, Md., laboratory. A total of 480 corms of each variety were selected and divided into 16 lots of 30 corms each; 8 lots were treated with naphthalene, and thrips were added to the other 8 lots. One-half of the collection (4 naphthalene-treated and 4 thrips-infested lots of each variety) were stored in a cool place at from 55° to 65° F., and the other half were placed in warm storage at from 75° to 80°. The naphthalene was removed at the end of 1 month. The average unit weight, that is, the average weight per corm, was taken at the beginning of the test and the same weights after 4 months. Taking the percentage unit loss per corm as a criterion, it is evident that in every case the thrips-infested corms lost more weight than those treated with naphthalene. This was true of the lots stored under either of the given temperatures. The greatest difference in weight was in the variety Alice Tiplady, where the thrips-infested corms lost 10.3 percent more weight in warm storage than did the naphthalene-treated lots.

Calcium arsenate proves toxic to sweetpotato leaf beetle.--L. W. Brannon, of the Norfolk, Va., laboratory, reports that field-cage toxicity tests performed against Typophorus viridicyaneus Crotch showed that undiluted calcium arsenate was highly toxic to the adults. This confirmed results of tests performed in 1923. Cryolite-talc dust (60-40) was more toxic to T. viridicyaneus adults than were derris or cube root mixtures containing 0.5 percent rotenone or derris root sprays containing 0.02 percent rotenone.

Erabu lilies tolerant to thermal treatments against bulb mite.--Reporting on tests with various thermal treatments directed against Rhizoglyphus hyacinthi Boisd. on the bulbs of Erabu lilies (Lilium giganteum Wallich), Randall Latta, of the Sumner, Wash., laboratory, says that the mites were controlled and that none of the treatments had an adverse effect on the crop of flowers. Northern and southern-grown bulbs were used in these tests. Treatments were as follows: Hot water, for 30 and 60 minutes, respectively, at 110° F., and for 10 minutes at 120°; hot water and formalin (1-200) for 30 minutes at 110°; and vapor heat for 60 minutes at 110°. In addition, the southern-grown bulbs were subjected to vapor heat for 20 minutes at 120°. A retardation of from 2 to 3 days was evident in the blooming of the plants included in the two vapor-heat treatments of the southern bulbs and a retardation of from 3 to 4 days in the blooming of the southern bulbs treated with hot water and formalin.

Rotenone and organic thiocyanate sprays control thrips on greenhouse-grown cucumbers.--C. A. Weigel and R. H. Nelson, of the Beltsville, Md., laboratory, report that sprays containing 0.0056 percent rotenone and pyrethrum extract (1-10,000) with sulphonated castor oil added (1-300) as a spreader, and organic thiocyanate sprays diluted 1-300 were effective in killing adults and nymphs of Thrips tabaci Lind., without injury to the treated cucumber plants in the greenhouse. These sprays were applied at 300 pounds pressure by a specially devised greenhouse power sprayer. The addition of pyrethrum extract to either the derris or cube powder sprays was found to enhance their efficiency against the thrips. An immediate effect was evident against both the adults and the nymphs. The cube powder, plus the sulphonated castor oil, was not as effective as a derris powder spray, even though the rotenone content (0.0056 percent) of both was the same. One of the commercial organic thiocyanate sprays included in these tests was more effective when diluted at 1-300 without the addition of sulphonated castor oil, than when diluted 1-600, but with the sulphonated castor oil added. The other organic thiocyanate diluted 1-600 with sulphonated castor oil added at the rate of 1-400 gave a good control of 85.7 percent, but caused severe spotting of the foliage. It was also observed that the average population of the thrips per leaf showed a steady increase in the case of the checks, as compared to the population on the untreated plants. Incidentally, it was observed that no mildew appeared in any of the sprayed plots, whereas in the check plots it was consistently present. This may indicate some fungicidal action on the part of the sprays containing rotenone or organic thiocyanates under the conditions of the experiment.

Dust mixtures containing rotenone control turnip aphid.--In a continuation of field tests with insecticides against Rhopalosiphum pseudobrassicae Davis on purple-top globe turnips and Florida broadleaf mustard, P. K.

Harrison, of the Baton Rouge, La., laboratory, reports that a dust mixture containing 1 percent rotenone, with equal parts of tobacco dust and sulphur as diluents, was superior to derris sprays and dust mixtures containing nicotine sulphate. The dust mixture containing rotenone not only gave a satisfactory reduction in the aphid population immediately after treatment but continued to inhibit the increase of aphids for a period of at least 6 days. Derris sprays ranked second in effectiveness against the aphids. A nicotine sulphate dust mixture, containing 3 percent nicotine, was quite effective against the aphids for a short period after application but did not afford adequate protection for as long a period as did the derris dusts or sprays.

Dust mixtures containing rotenone effective against western striped cucumber beetle.--K. B. McKinney, of the Phoenix, Ariz., laboratory, reports that the application of dust mixtures containing 1 percent rotenone, derived from derris or cube, with talc as a diluent, proved effective in controlling *Diabrotica trivittata* Mann. on cantaloups in the Salt River Valley. Treated plots yielded approximately 1.6 times more fruit than did untreated plots grown under comparable conditions, and the protected plants also produced more fruits earlier in the season, when prices were high.

INSECTS AFFECTING MAN AND ANIMALS

Removal of vegetation reduces effect of materials used as outdoor repellents against mosquitoes.--The following results were obtained by W. V. King, G. H. Bradley, and T. E. McNeel, Orlando, Fla., in preliminary tests to determine the relative efficacy of various materials in repelling mosquitoes under outdoor conditions. All materials were applied as emulsions. Collections were made by hand.

Test area	Reduction in mosquitoes after using--		
	Pyrethrum extract	Pine-tar oil	Citronella
	Percent	Percent	Percent
Uncleared (1/5 acre)--	75 to 94	89	85
Cleared (1/5 acre)---	52	--	39
Cleared (2/5 acre)---	49	17	44

Diking of mangrove swamps for control of mosquito and sand fly breeding.--With the cooperation of J. B. Hull, of the Savannah, Ga., laboratory, the St. Lucie County Anti-Mosquito District of Florida has begun the construction of a dike along the Indian River opposite Fort Pierce. The dike prevents the flooding of the swamp by tides, and rain water is to be removed from the breeding area by means of pumps. On July 31, a total of 3,500 lineal feet of dike had been built and one pump capable of pumping 10,000 gallons of water per minute was being installed. Approximately 100 feet of dike with a base of 22 feet, a top 10 feet wide, and $3\frac{1}{2}$ feet above mean low tide level is being built per day. This is believed to be the first dike built in this country to control mosquito and sand fly breeding in mangrove swamps.

Three hundred-mesh wetttable sulphur effective in controlling goat lice.--O. G. Babcock, Sonora, Tex., has found that 300-mesh wetttable sulphur used as a dip at the rate of 10 pounds to 100 gallons of water is effective in controlling two species of sucking and three species of biting lice that infest Angora goats. The method of using this material in round dipping vats was recently demonstrated to a large number of west Texas ranchmen in 10 counties. Over 6,000 goats were treated in these demonstrations with very effective results.

Larvicides and repellents for screwworm flies.--A mixture of soluble pine oil and nicotine has been found to be very effective in killing larvae of screw worm and other blowflies infesting the wounds of animals. In preliminary laboratory and field tests on the comparative efficiency of pine-tar oil and bone oil carried out at various field stations of the Division of Insects Affecting Man and Animals for protecting wounds from blowfly attack, it has been shown that the former is as effective in this respect as the latter. Marked interest has been developed in recent months in the use of bone oil for repelling flies and killing larvae. It is higher in cost than pine-tar oil and the available supply is limited; tests show it to possess little larvicidal value; and it cannot be scoured out of wool or mohair by the usual cleaning processes.

FOREIGN PARASITE INTRODUCTION

Parasite importations into Puerto Rico.--In January S. M. Dohanian forwarded colonies of four species of Coccinellidae from Trinidad to Puerto Rico for liberation against the coconut scale. Of these Cryptognatha nodiceps Mshll., Pentillia castanea Muls., and Azya trinitatensis Mshll. have become well established and have spread considerable distances from the points of liberation. K. A. Bartlett reports having collected more than one thousand Pentillia in 2 hours at a point 2 miles from the original liberation site. Late in April and in May Mr. Dohanian collected in Peru and forwarded to Puerto Rico a total of 11,705 adults of Ipobracon rimac Wolc. and 1,713 of Theresia claripalpis v. d. W. These were for colonization against the sugarcane moth borer. They were forwarded by air express and were in transit from 6 to 14 days. The survival was 64.4 and 32.5 percent, respectively. One consignment of each species was also sent to Florida. Several species of bean pod borers are serious pests in Puerto Rico and parasites have recently been forwarded for colonization. Through H. W. Allen, of the Division of Fruit Insect Investigations, a total of 8,729 adults of Macrocentrus ancylivorus Rohw., a very effective parasite of the oriental fruit moth, were shipped during July. These were sent by air express and 95.8 percent reached their destination alive. Laboratory experiments have shown that this parasite reproduces readily upon Maruca testulalis Geyer, Fundella cistipennis Dyar, and Elasmopalpus lignosellus Zell. C. A. Clark, of the corn borer parasite laboratory at Moorestown, N. J., forwarded 3,000 adult flies of Lydella grisescens Rond., of oriental origin, for colonization against the same pests. Of these, 69.1 percent survived the 2-day air journey.

Pea weevil parasites from France.--Several shipments of infested broad beans have been made from France by H. L. Parker. The weevils in these shipments were heavily parasitized by Triaspis thoracicus Curt., which attacks a

wide range of seed weevils under field conditions. This material is being reared out under quarantine conditions by C. A. Clark, of the Moorestown, N. J., laboratory, and the parasites will be colonized upon the pea weevil in the Pacific Northwest.

Fruit fly parasites to Hawaii.--On July 24 F. C. Hadden returned to Hawaii after completing his investigations in Malaya and India. Infested fruits were collected in those countries shortly before sailing and the parasites reared out en route. A total of 392, representing five species, were alive upon arrival at Honolulu. A portion of these were immediately colonized and the remainder were utilized for rearing in the insectary.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Eighty-two living larvae of the Mediterranean fruit fly (Ceratitis capitata Wied.) were intercepted at Baltimore on April 20 in eight oranges in stores from South Africa. Six larvae of the bean pod borer (Maruca testulalis Geyer) were taken at San Pedro, Calif., on May 14 in string beans in stores from Hawaii. Three adults of the coffee berry borer (Stephanoderes hampei Ferr.) arrived at New York on June 12 in coffee in the mail from Java. A living specimen of the cercopid Clastoptera funesta Stal was intercepted at Brownsville, Tex., on March 12 on a gardenia in cargo from Mexico. An adult of the chrysomelid Leptinotarsa undecimlineata (Stal) was found at New Orleans on March 27 with banana debris in cargo from Nicaragua. Larvae of the weevil Phacocorynes zamiae Gyll. arrived at Washington, D. C., on May 21 in the stem of Eucephalartos lehmanni in the express from South Africa. An adult of this weevil was also taken at the same time in E. caffra from South Africa. Specimens of Anaphothrips orchidii (Moult.) were intercepted at San Francisco on May 22 on orchids in the mail from the Dominican Republic. A larva of the elaterid Athous haemorrhoidalis Fab. arrived at Seattle, Wash., on May 29 in soil around the roots of Hepatica sp. in the mail from Sweden. One living and five dead larvae of the pink bollworm (Pectinophora gossypiella Saund.) were taken at Philadelphia on May 1 in cottonseed in cargo from Siam. The cotton containing the seed was used as packing about lacquer ware. Larvae of the pyralid Noctuella rufofascialis (Stephens) were found at Roma, Tex., on May 27 in a capsule of Hibiscus cardiophyllus in baggage from the vicinity of San Pedro, Mexico. Specimens of the thrips Frankliniella cephalica (Crawford) were intercepted at Miami, Fla., on May 4 on a rose in passengers' quarters aboard an airplane from the Bahamas. An adult of the wireworm Heteroderes rufangulus var. meticulosus Cand. was taken at New York on April 17 on a grape in cargo from Argentina. W. S. Fisher states that this species is closely allied to laurentii, which has become established in the Southern States. The habits of this species are probably similar to those of laurentii and it might become a pest if established in the United States.

Pathological interceptions of interest.--Camarosporium sp., no species reported on orchids, was intercepted at San Francisco February 5 on Oncidium sp. from Honduras; Cephalosporium pammelii var. purpurascens Buchanan was intercepted at Baltimore July 24 on apples from Japan; a jasmine leaf intercepted July 16 at Brownsville was infected with a Cercospora producing

definite spots similar to those of C. rosicola Pass. on rose leaves; Colletotrichum erumpens Sacc. (first interception) was fruiting abundantly on cankers on rhubarb from Sweden intercepted July 31 at Norfolk; C. macrosporum Sacc., first interception, was found on Phalaenopsis schilleriana from the Philippines intercepted November 14, 1935, at San Francisco; a fungus nearer C. lujae Verpl. and Claess. than any other named species but with smaller spores was found on Lycaste sp. leaves from Dominican Republic on February 24 at San Francisco; C. nigrum was intercepted from Panama on peppers for the first time on July 27 at New Orleans; C. phomoides, first interception on tomato from Brazil, was taken July 13 at New Orleans; Colletotrichum sp., does not agree with species reported on Oncidium, was intercepted on O. unguiculatum from Mexico on February 11 at San Francisco; Coniothyrium sp., not either of species described on orchids, was intercepted on Oncidium sp. from Honduras on February 5 at San Francisco; Diplodina salicis West. was intercepted from Germany for the first time on June 12 at New York; a trace of what appeared to be Discella strobilina (Desm.) Died. was found on Picea rubra cones from Nova Scotia intercepted at New York July 20, only previous interception from Poland; Gloeosporium affini Sacc. was intercepted at San Francisco on January 20 on Cattleya mossiae from Venezuela and on March 5 on C. dowiana and C. skinneri from Costa Rica, the only previous interception was from Tobago Island; G. intermedium var. epidendri Sacc., first interception, was taken on February 24 at San Francisco on Epidendrum sp. from Dominican Republic; G. oncidii Oud., first interception since 1923, was found at San Francisco on March 5 on Oncidium stenotes from Costa Rica; our first interceptions of Heterosporium allii Ellis and Mart. on onion were made at New York on July 8 on onions from France and on July 28 on onions from Chile; Macrophoma oncidii Henn., first interception, was found on December 27, 1935, at San Francisco on Cattleya dowiana from Costa Rica; Melampsora pini-torqua Rostr., first interception, was taken at New York on July 6 on Pinus montana mughus from Germany; Mollisia sp., no species described on orchids, was found on 25 percent of the dead flower stalks of a group of orchids from Guatemala reaching San Francisco in baggage; Nectria binotiana Sacc., first interception, was found on January 21 at San Francisco in Cattleya mossiae from Venezuela and Ophiobolus sp., no species reported on orchids, was found on a similar shipment of the host on the same boat on January 20; Pestalozzia sp., not agreeing with any species reported on orchids, was found on November 13, 1935, at San Francisco on orchids from Guatemala, and on December 9 another one on Cymbidium sp. from Japan and Phomopsis sp., unlike only species reported on orchids and Phyllosticta stanhoepae All., first interception, were found on orchids from Guatemala; Physalospora orchidearum P. Henn., first interception, was found on Lycaste sp. from Dominican Republic on February 24 at San Francisco; Pleospora neottiae Hollos., first interceptions, was found on orchids from Guatemala on November 14, 1935, and Mexico on February 11; Sphaceloma perseae has been found to be more or less prevalent on many shipments of Cuban avocados at New York beginning the middle of July; Uredo rochiaae Putt., first interception, was taken at Washington on May 4 on Myrciaria cauliflora from Brazil; Uredo sp., apparently undescribed, was found at San Francisco on July 16 on Oncidium bicallosum from Mexico.

Linguistic ability helps inspector.--A New York inspector heard the steward accompanying him asked, "Hae el encontrarse los mangoes?" He finally found the mangoes, 18 of them from Cuba, hidden among some apples in an

an American apple box. Inspectors who know foreign languages are likely to get such tips if their linguistic ability isn't known to the would-be smugglers.

No need for Sherlock Holmes.--Glimpsing a safety pin about half way up the sleeve of a light-weight coat slung over the arm of a passenger a New York inspector found that four iris roots, with soil, from Japan had been pinned up the sleeve in a small oiled-paper package.

Fruit fly in personal effects.--On May 21 a living fruit fly larva (Ceratitis sp.) was intercepted at New York in the bottom of a suitcase, among personal effects, in which a passenger had four grapefruit from Palestine. Two out of the four grapefruit were found infested with Ceratitis sp., one with one larva and one with four larvae.

Fruit fly pupating in box with uninfested fruit.--On May 25 a half box of blood oranges arrived at New York in stores from Spain. All the oranges were examined for fruit fly larvae, many being cut up, with negative results. Although no larvae were found in the fruit, three living puparia of the Mediterranean fruit fly (Ceratitis capitata Wied.) were located on the boards at the bottom of the box. No signs of old infestation were found in the fruit.

Interesting pest in orchid.--A living larva of the castniid Castnia sp. was intercepted at Washington, D. C., on May 9, 1936, in a pseudo-bulb of a wild orchid (Cattleya sp.) in express from Venezuela. Another living specimen of this lepidopterous larva was taken at Washington, D. C., on July 17, 1935, in a pseudo-bulb of an orchid in express from Brazil. A living specimen of the giant sugarcane borer (Castnia licus Drury) arrived at Honolulu, Hawaii, on April 12, 1935, in a corm of Heliconia angustifolia from the Canal Zone. The adult moth was reared. The giant sugarcane borer is recorded as a major pest of sugarcane in Trinidad, British Guiana, and other parts of South America. C. licus Drury was recorded in 1905 in the roots of an orchid in the upper Orinoco. Other hosts include another species of Heliconia (H. bihai), banana, plantain, young coconut palms, another palm, Oreodoxa oleracea, and one species of grass. The wing spread of the adult moth is about 4 inches. Fully grown larvae (and also adult moths) vary considerably in size. When fed on large succulent cane, the larvae may measure as much as 4 inches in length and one-half inch in diameter in front, but specimens half this size are encountered. It was not possible to determine the species of Castnia taken recently with orchids from Brazil and Venezuela, as the larvae of this group are not sufficiently known.

DOMESTIC PLANT QUARANTINES

Citrus canker found in marshland of Louisiana.--The recent finding of citrus canker in the marsh section of Louisiana is a true indication of the value of the autogiro in locating isolated citrus growth. The canker was discovered on an island 5 miles farther than the inspector was able to navigate with a boat. Had not the autogiro been available for survey purposes in the almost inaccessible swamp areas, the infection would no doubt have existed indefinitely. The autogiro was loaned by the leader of the Dutch elm disease

project. W. E. Anderson, in charge of citrus canker eradication in Louisiana, writes: "The survey work of the marshlands of Louisiana to locate isolated citrus plantings by the use of the United States Department of Agriculture gyroplane is directly responsible for the finding of this infection."

Date palm scale quarantines revoked.--Federal domestic plant quarantine No. 6, pertaining to the date palm scale, was revoked effective July 1, 1936, and the State of California has announced the revocation of their intrastate quarantine covering this pest. The Federal quarantine had been issued to prevent the interstate spread of the scale insects attacking dates and it prohibited the movement of date palms and date palm offshoots from certain parts of California, Arizona, and Texas. The revocations are based on the fact that the date palm scale has apparently been eradicated from the United States.

Freight cars inspected for Japanese beetle.--During this season of the year when the Japanese beetle is in flight, transit inspectors have inspected freight cars destined to or reconsigned from Chicago, Cincinnati, Kansas City, Milwaukee, and St. Paul, which contained fruits and vegetables consigned from the area regulated by the Japanese beetle quarantine. Fifty-five live and 278 dead beetles were found during the period from June 27 to August 1.

Nurseries receive permits for shipping five-leafed pine interstate.--Fifty-seven applications for permits to ship five-leafed pines interstate under the regulations of the white pine blister rust quarantine were received during the fiscal year 1936. This is an increase of 16 percent over last year, probably owing to the fact that the demand for five-leafed pines has been greatly stimulated, primarily because of recognition by the public of the value of this tree in reclaiming denuded areas, in protecting water sheds, and in preventing soil erosion. Of the 57 applications received, 20 commercial nurseries and 8 Federal and State nurseries received permits for the shipping of approximately 27,000,000 five-leafed pines, tentative permits were issued to 12 nurseries in which the pines had not reached a salable size, action is pending in 14 cases, 2 applications were withdrawn, and 1 was denied.

CONTROL INVESTIGATIONS

Fumigation of seed kills vetch bruchid.--In a series of experiments completed last month at Salisbury, W. C., A. C. Johnson, in cooperation with J. S. Pinckney, of the Division of Cereal and Forage Crop Insect Investigations, worked out a treatment for the fumigation of vetch seed to kill the vetch weevil (*Bruchus brachialis* Fahr.). In this work it was found that the weevils could be killed by fumigation of vetch seed under reduced pressures with a dosage of 7 ounces of hydrocyanic acid per 100 cubic feet of space, including the space occupied by the vetch seed. The atmospheric fumigation of hydrocyanic acid was also effective. With a dosage of 3 pounds of hydrocyanic acid per 1,000 cubic feet of space and a 24-hour exposure a complete kill was obtained. A complete kill was also obtained when the seed was fumigated with carbon disulphide at a dosage of 20 pounds per 1,000 cubic feet.

Effects of nicotine on hearts of cockroach and armyworm.--J. F. Yeager and J. E. Gahan recently submitted a paper for publication on "Effects of rhythmicities of isolated heart preparations from cockroach (Periplaneta americana L.) and southern armyworm (Xylomyges oridania Crn.)", in which they compare the effect of nicotine on the hearts of adult roaches with the effect on the hearts of larvae of the southern armyworm. They find the roach heart much more susceptible to nicotine than that of the southern armyworm and suggest that this might be due to the presence of ganglionic cells in the roach heart which apparently did not occur in the heart of the southern armyworm larva. Nicotine preparations containing 10 percent nicotine were employed. The work was a careful piece of physiological work and adds to our knowledge of the effect of nicotine on insects.

Enzymes secreted by southern armyworm.--In recent work on the digestion in the southern armyworm, Babers and Wolfe have found that nine enzymes were secreted in the digestion, all of which were found in the tissues of the midgut. It is of interest to note that only two were found in the tissue of the foregut and two in the tissue of the reargut. The midgut apparently is the most important digestive organ of the larva of this insect.

INSECTICIDE INVESTIGATIONS

Cryolite spray residues removed by new washing solutions.--In the search for substitutes for lead arsenate, much attention has been given to certain compounds of fluorine, especially barium fluosilicate and cryolite. These compounds have been found to be effective for controlling several species of insects. Their use as insecticides is greatly restricted, however, because when sprayed or dusted on fruits or vegetables a fluorine-containing residue is left, which is deleterious to health. The Department of Agriculture has established a tolerance for fluorine residues on fruits of 0.01 grain F per pound. This is the same tolerance as that for arsenic. This means that apples, for example, that have been sprayed with cryolite for the control of the codling moth must be washed before they enter interstate commerce. Cryolite is not as easily removed from apples by the ordinary washing solutions as is lead arsenate. For this reason, it has been difficult for orchardists spraying with cryolite to meet the tolerance for fluorine on the fruit. An investigation of the solubility of cryolite in various reagents was undertaken to aid in developing more efficient washing solvents. It was found that three common materials, boric acid, aluminum salts, such as the sulphate and chloride, and ferric salts, such as the sulphate and chloride, when added to dilute hydrochloric or sulphuric acid, markedly increase the solvent action of these acids on cryolite. Public-service patents covering the use of these materials for the removal of fluorine insecticide residues from fruits and vegetables have been granted recently to members of the Division of Insecticide Investigations. United States patents 2046546 and 2046547 were issued to R. H. Carter and 2046548 to R. H. Carter and J. E. Fahey. It is hoped that the use of these solvents will enable the orchardist to remove fluorine spray residues from apples more effectively and may therefore lead to the greater use of the valuable fluorine-containing insecticides.

No pyrethrins in daisy flowers.--Because of their close resemblance to pyrethrum flowers, common field daisies (Chrysanthemum leucanthemum) have been

used to adulterate pyrethrum. Moreover, the oleoresin of the field daisy when analyzed by the method of Seil for pyrethrin I and the method of Haller and Acree for pyrethrin II apparently contains about 5 percent of each of these pyrethrins. Although inert insecticidally, field-daisy extract thus appears to contain the active principles of pyrethrum flowers when analyzed by the methods commonly used by the industry. A chemical examination of daisy flowers to see if they contain pyrethrins or chemically related constituents has been made by F. Acree, Jr., and F. B. LaForge, of the Division of Insecticide Investigations. They report (Soap, vol. 12, no. 8, p. 109, 111. Aug. 1936) that the oleoresin of C. leucanthemum contains no pyrethrins or any other material closely related to the pyrethrins.

BEE CULTURE

Upon invitation of the Bureau, a conference was held at Ames, Iowa, on July 20, to discuss methods and policies for conducting an investigation of the resistance of honeybees to American foulbrood. Such an investigation was authorized by the last session of Congress through an appropriation of \$7,500 to the Division of Bee Culture. Through the courtesy of the Iowa Agricultural Experiment Station a conference room and other facilities were provided. Officials of the Bureau and representatives of the Agricultural Experiment Stations of Iowa, Wisconsin, and Wyoming were in attendance. The Agricultural Experiment Station of Texas, which has signified its willingness to cooperate, was not represented. The Iowa Agricultural Experiment Station was represented by W. H. Stevenson, vice director, C. J. Drake, in charge of the Department of Zoology and Entomology, F. B. Paddock, and O. W. Park. The American Bee Journal, already cooperating with the Iowa Experiment Station on a similar project, was represented by H. C. Dadant, Roy A. Grout, and Frank C. Pellett. W. J. Maytham was present as a delegate from the Iowa State Beekeepers' Association. The Wisconsin Agricultural Experiment Station was represented by L. J. Cole, chairman of the Department of Genetics, and H. F. Wilson, chairman of the Department of Economic Entomology. The Wyoming Agricultural Experiment Station's representative was C. H. Gilbert, associate research apiculturist. There were present from the Bureau, Jas. I. Hambleton and W. J. Nolan, Beltsville, Md., C. L. Farrar and A. P. Sturtevant, Laramie, Wyo., Otto Mackensen, Baton Rouge, La., and Harry Laidlaw, Madison, Wis. M. P. Jones, extension specialist, Washington, D. C., also attended. The tentative plans include a search in this country and abroad for bee stock having a history of resistance to American foulbrood, the testing of such stock under experimental conditions to determine whether it does possess resistance, then breeding to perpetuate the resistance and to incorporate other desirable characteristics. General supervision of the entire project will be centered in the Division of Bee Culture and specialized phases of the work will be taken care of by the cooperating agencies. Thus Iowa and Wyoming will assume the task of subjecting stock undergoing tests to standardized doses of infection to determine definitely whether it has resistance. Those in charge for Iowa will be O. W. Park and F. B. Paddock. C. H. Gilbert will be in charge for Wyoming, where studies will also be made of the tendency of various strains and races to become infected naturally, as opposed to artificial inoculation. Texas, under the leadership of H. B. Parks, will rear in quantity for further testing queens from stock that appears to possess favorable characteristics. Records of all queens will clear through the Wisconsin Agricultural

Experiment Station and Messrs. Cole and Wilson will serve as consultants on breeding activities. Harry Laidlaw, working at the University of Wisconsin, will devote his time primarily to the perfection of methods for controlling matings. A. P. Sturtevant, of the Laramie, Wyo., laboratory, will have charge of the various bacteriological phases, including a study of differences in the virility of possible strains of Bacillus larvae White. The facilities of the Division's laboratories at Beltsville, Md., Baton Rouge, La., and Davis, Calif., will also be employed in various phases of the work. It is hoped that the services of State apiary inspectors will be available in locating colonies showing disease-resistance characteristics. It is also hoped that individuals owning colonies believed to possess disease resistance will communicate with their State apiary inspector or with any of the cooperating agencies. The fact that investigations of this type will have to be carried on over a period of years was repeatedly emphasized during the conference. All in attendance fully recognized that immediate results could not be expected and that it will not be possible soon to distribute stock for breeding purposes. Those in attendance recognized the importance of not arousing undue hopes that the development of resistant strains would eliminate the necessity of continuing present methods for combating American foul-brood. To insure that the results of the studies would not convey an erroneous impression, they reached an agreement on a method of making public the results obtained as the investigations progress.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Weevil, new to North America, attacks peanuts.--Two specimens of a weevil identified by L. L. Buchanan as Naupactus leucoloma Boh. were recently received from A. N. Tissot, Agricultural Experiment Station, Gainesville, Fla. The weevils were reported to be injuring peanuts at Crestview, Fla. This species, which has not heretofore been known from North America, was described from Tucuman, Argentina, and has been reported also from Chile, Uruguay, and New South Wales. At the last-named locality the larvae were found attacking roots of lucerne (Marshall, R. A. E., v. 21, p. 303, 1933).

Host record for a species of Nertus.--Two specimens determined by Mr. Buchanan as an apparently undescribed species of Nertus were found in cells in a bamboo joint from Mexico by W. R. Sudduth at Naco, Ariz., interception No. 221. This tropical curculionid genus includes only a few species, all of them rare in collections. As far as is known, nothing has been reported heretofore on the host relations.

Another record for Cuterebra baeri Shannon and Greene.--A pupa of this species of botfly was intercepted at New Orleans, La., by the Division of Foreign Plant Quarantines, in banana trash from Mexico on July 15, 1936, under New Orleans No. 19868. The finding of this specimen is interesting because it is only the third record for this species. The first specimens were collected from the throat portion of the howling monkey (Alouatta palliata inconsonans Goldman) at Darien, Panama, in 1924 by the late J. L. Baer. The second record related to material taken at Kartabo, British Guiana, on July 22, 1924, by Alfred Emerson, then of Pittsburgh University, also from a species of howling monkey. When the parasite larva is full grown it leaves the host and falls to the ground to pupate. Although it has the characteristic

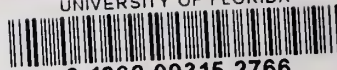
appearance of Cuterebra, the larva is very distinct from those of all other known species of the genus.

New parasite of hessian fly.--Recently there were submitted for determination four specimens of a chalcidoid parasite recorded by H. D. Smith, of the Bureau's laboratory at Hyeres, France, as having been reared at that laboratory from a puparium of the hessian fly. According to A. B. Gahan, the parasite appears to represent a new genus of Tetrastichinae. We have no record of the previous rearing of any such form from the hessian fly.

Two egg parasites of the cotton flea hopper recorded.--Two species of Mymaridae reared from eggs of the cotton flea hopper (Psallus seriatus Reut.) at Port Lavaca, Tex., by H. J. Crawford, have recently been identified by A. B. Gahan as Erythmelus n. sp. near gracilis (How.) and Anaphes anomocerus Girault. So far as known, no parasites have previously been recorded from this important cotton insect. The new species of Erythmelus appears to be the more abundant parasite of the two, 54 specimens of that species having been sent in for identification while only 3 specimens of Anaphes anomocerus were submitted. Anaphes anomocerus was originally described by Girault from specimens reared at Salt Lake City from eggs of Halticus citri Ashm. on alfalfa, and was treated as a variety of A. iole Girault. Mr. Gahan doubts whether the slight differences which distinguish it from A. iole are even of varietal importance. The typical A. iole is said to be parasitic in eggs of Hypera nigrirostris Fab., and is recorded from Illinois and Virginia. Nothing is known of the distribution of the supposed new species of Erythmelus.

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