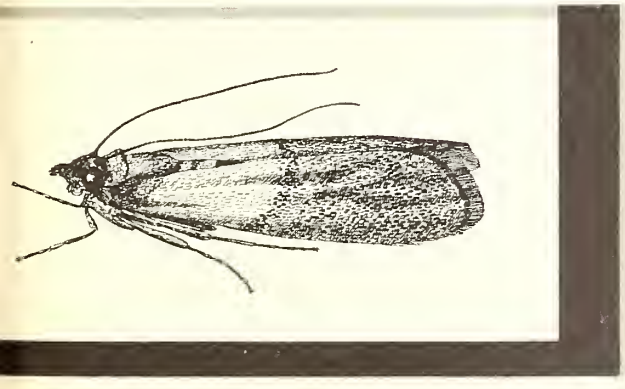
Marketing Research Report No. 364

Insect Infestation as a Factor in Storing Farmers Stock Peanuts Grown in Georgia



Marketing Research Division
Agricultural Marketing Service
U. S. DEPARTMENT OF AGRICULTURE

INSECT SPECIES INVOLVED

Common name	Scientific name
Indian-meal moth	Plodia interpunctella (Hbn.)
Angoumois grain moth	Sitotroga cerealella (Oliv.)
Ephestia moths (probably the almond moth and tobacco moth)	Ephestia spp.
Corn sap beetle	Carpophilus dimidiatus (F.)
Saw-toothed grain beetle	Oryzaephilus surinamensis (L.)
Flour beetles (confused and red flour beetles)	Tribolium confusum Duv. and T. castaneum (Hbst.)
Black larder beetle	Dermestes ater DeG.
Cigarette beetle	Lasioderma serricorne (F.)
Flat grain beetle	Laemophloeus pusillus (Schönh.)
Cadelle	Tenebroides mauritanicus (L.)
Rice weevil	Sitophilus oryza (L.)
Square-necked grain beetle	Cathartus quadricollis (G.-M.)
Broad-horned flour beetle	Gnathocerus cornutus (F.)
Coffee bean weevil	Araecerus fasciculatus (DeG.)
Lesser grain borer	Rhyzopertha dominica (F.)

ACKNOWLEDGMENTS

The authors were assisted in these studies by Aklee Cagle, W. O. Farmer, and Huey S. Hall, of the Stored-Product Insects Laboratory. These biological aides collected, sifted, and weighed samples, counted insects, examined farmers stock peanuts for determination of insect damage, and assisted in the application of insecticidal treatments to peanuts.

Warehouses were made available for study through the courtesy of the Georgia-Florida-Alabama Peanut Association, Camilla, Ga.

The Oils and Peanut Division, Commodity Stabilization Service (CSS), U. S. Department of Agriculture, cooperated in these studies and assisted in arranging for access to warehouses and supplies of peanuts for experimental tests, and in many other ways.

The Federal-State Inspection Service made available the surplus portions of samples taken by them for official grade determination.

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SUMMARY

A comprehensive study was made at Tifton, Ga., between 1952 and 1958 to determine the species of insects infesting stored farmers stock peanuts, their relative abundance, and the amount of damage they cause in typical commercial storages. Supplementary studies were made of peanuts stored in 500-bushel metal bins and in small experimental 5-cubic-foot bins. The studies were extended to cover infestation during harvesting.

Several clear-cut findings relative to insect infestation and damage in farmers stock peanuts resulted from this study. Although the studies were confined for the most part to the area near Tifton, these findings will probably apply generally to all peanut-producing and storage areas in the United States.

1. Insect infestation was centered in, and almost exclusively confined to, the kernels in cracked pods and in the loose shelled kernels during the first season of storage. However, when the storage period was extended to 30 and 33 months, many additional pods became cracked due to drying, many solid pods were attacked by insects, and holes were cut in the shells. This tendency for infestation to spread to solid pods during extended storage was exhibited to a small degree in two instances where peanuts were stored 12 months.

2. Harvesting practices in Georgia during the 1957-58 season resulted in an average of 20 to 25 percent of cracked pods. There appeared to be little difference in the percentage of cracked pods between the picker-harvesting and combining methods or between the types of peanuts.

3. Insect infestation began in the field during harvesting. A small percentage of kernels was already insect damaged when the peanuts were delivered to the storage warehouse, and the same species of insects were associated with damage to kernels during the curing and harvesting period as during storage. The degree of damage progressed as the storage season advanced, and accelerated during the late spring and summer months.

4. Insect species involved were universally present in fields and warehouses. The five most abundant insects, and those which were considered responsible for most of the damage, were the Indian-meal moth, Ephestia moths (two species), the corn sap beetle, the saw-toothed grain beetle, and flour beetles (two species). A second group sometimes present in numbers included the cadelle, cigarette beetle, black larder beetle, Angoumois grain moth, rice weevil, flat grain beetle, square-necked grain beetle, broad-horned flour beetle, coffee bean weevil, and lesser grain borer.

INSECT INFESTATION AS A FACTOR IN STORING FARMERS STOCK PEANUTS GROWN IN GEORGIA

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INTRODUCTION

Under the procedure followed in the 1957-58 season, the majority of Commodity Credit Corporation loans on farmers stock peanuts were made while the peanuts were stored in commercial warehouses operating under CCC's storage contract. In years of small crops many of the peanuts were redeemed and sold, but in other years the peanuts were acquired by CCC in satisfaction of the loan and were maintained in commercial storages until disposed of by CCC. This may require storage through the summer months.

The problem of insect infestation has become more acute because of this situation, and for that reason, studies on the prevention or control of insect infestation in stored peanuts were begun in 1952 at the request of the Oils and Peanut Division of the Commodity Stabilization Service, and the Oilseeds and Peanut Research and Marketing Advisory Committee. As part of this research, extensive studies were made to determine the species of insects infesting stored farmers stock peanuts, their relative abundance, and the amount of damage they cause. A large part of the study was conducted in or near Tifton, Ga., and the observations reported herein are confined principally to Georgia conditions.

This report is part of a broad program of research to reduce the cost of marketing farm products, including the cost of preventing insect infestation in peanuts.

INFESTATION AND DAMAGE DURING STORAGE

Insect infestation and damage to farmers stock peanuts were observed in typical commercial storages between 1952 and 1957. Supplementary studies were made of the infestations in peanuts stored in steel bins (part of a project of on-the-farm storage of farmers stock peanuts), and of infestation and damage in peanuts stored in small experimental bins.

In Commercial Storage Warehouses

Five series of observations were made in commercial peanut warehouses. Series A included observations on peanuts stored for 30 months; series B consisted of samplings in selected warehouses in the 1952-53, 1953-54, 1954-55, and 1955-56 seasons; series C represented a case history of the infestation at a shelling and storing plant; series D represented a case history of a commercial warehouse storing Spanish and Runner peanuts; and series E was a survey of damage in six commercial warehouses after 9 months' storage.

Series A

This study was conducted in two warehouses, one at Bainbridge, Ga., and the other at Tifton, Ga., where newly harvested peanuts from various farms were stored and placed under price-support loans. These peanuts were taken over by CCC and were kept in the same warehouse until sold. Observations were possible over a 30-month period, from the fall of 1952 until the spring of 1955.

As the peanuts were delivered to the Bainbridge warehouse, solid and cracked pods of both Spanish and Runner peanuts were segregated, then recombined into lots containing (a) all solid pods, (b) 75 percent solid, 25 percent cracked, (c) 50 percent solid, 50 percent cracked, and (d) bin-run. Replicates of each of the four types were placed in net bags and buried in bins of peanuts from which the samples had been selected. At Tifton the same procedure was followed with Runner peanuts.

[1] This laboratory is a field station of the Stored-Product Insects Section, Biological Sciences Branch, Marketing Research Division, Agricultural Marketing Service, U. S. Department of Agriculture.

At Bainbridge, four replicates of both Spanish and Runner peanuts were removed after 12 months for examination, and the remaining replicates were left for 30 months. At Tifton only the 30-month observation was made. The samples were screened, and the insects collected and recorded.

The percentages of insect-damaged kernels found after 12 months' storage and after 30 months' storage are given in tables 1 and 2. The kernels in cracked pods had been severely damaged after 12 months, which raised the percentage of damage in all kernels to 18.4 and 20.9 percent in the bin-run samples of Spanish and Runner peanuts. By the end of 30 months the number of cracked pods had increased, undoubtedly due to drying, and a number of pods had been penetrated by insects since the 12-month inspection. A large proportion of the kernels in cracked pods had been damaged by insects, and up to one-third or more of the kernels in pods penetrated by insects had also been damaged, so that the percentage of all kernels showing insect damage was more than double that at 12 months in the Spanish peanuts, and about 50 percent more in the Runner peanuts.

The following insects were screened from the samples when they were removed for examination at the end of the 30-month storage period:

Insect	Bainbridge		Tifton
	Spanish	Runner	Runner
	Number	*Number*	*Number*
Indian-meal moth	244	257	375
Ephestia moths (two species)	74	136	188
Angoumois grain moth	51	89	72
Saw-toothed grain beetle	424	501	616
Flour beetles (two species)	406	416	559
Corn sap beetle	99	65	155
Cadelle	72	112	147
Cigarette beetle	41	60	110
Rice weevil	22	40	50
Black larder beetle	42	40	120
Flat grain beetle	5	0	56

Series B

Nine commercial peanut warehouses were sampled in November, January, March, and June to determine the abundance of insects--two warehouses during the 1952-53 season, two during the 1953-54 season, two during the 1954-55 season, and three during the 1955-56 season. At each sampling enough probe samples were taken to aggregate 5 gallons of peanuts, and five surface samples 1 yard square by 2 inches deep were removed. These samples were screened, and the insects were collected and recorded. No attempt was made to record the percentages of insect-damaged kernels. The peanuts were all Spanish type and classed as Segregation 1. Segregation 1 is an arbitrary classification used in making price support loans, and consists of the top grade of peanuts with less than 2 percent total damage.

Table 3 shows that the moths, flour beetles, saw-toothed grain beetle, black larder beetle, and cigarette beetle tended to increase in numbers as the storage season progressed, but that the corn sap beetle tended to decrease.

Series C

This study represents a survey of a large peanut-shelling plant which exhibited an extremely heavy moth infestation during January 1955. The plant had three upright silo-type bins filled with bulk farmers stock peanuts, which were being shelled at the time the infestation became severe. One bin was more heavily infested than the others, and observations were made in this bin.

Thousands of mature moth larvae were present in the tunnel beneath the more heavily infested upright bin. Migrating larvae on the interior walls of this bin averaged 10 per square yard in the first 6 feet above the surface of the peanuts. A total of 871 moths emerged from fifteen 1-gallon samples of fine screenings from the cleaner, in the flow from above the bin to the sheller. Of greatest concern was the fact that moth larvae were riding through the shelling process and appearing in the sacked, shelled peanuts. The moths were found to be a mixture of the Angoumois grain moth, the Indian-meal moth, and Ephestia moths (two species).

Samples of peanuts were taken from the surface areas of the more heavily infested bins, from the sides of the inverted cone above the unloading port, from the peanuts falling into the cone above the discharge, and from the belt beneath the bin. These samples were screened, the insects collected and recorded, and the samples were

then examined for insect-damaged kernels. The fifteen 1-gallon samples of fine screenings mentioned in the preceding paragraph were also screened for insects.

The insects recovered are listed in table 4 and the percentages of insect-damaged kernels in table 5. Even though the concern of the operator was directed toward the moth infestation, the population of beetles was also heavy. Insect damage to kernels in cracked pods averaged almost 25 percent, and to all kernels 4.6 percent. The injury was more typical of damage done by beetles than by moth larvae.

The bins and the shelling plant were fumigated and the infestation brought under control after the survey was made.

Series D

This study represents a survey of a commercial warehouse where newly harvested 1955-crop Spanish and Runner peanuts from various growers were stored and used as collateral for price-support loans. The insect damage to kernels was recorded at the beginning, during intervals of storage, and again as the peanuts were removed for shelling. The species of insects and their relative abundance were also recorded.

The increase in the percentage of insect-damaged kernels during the period of the study is presented in table 6. The insect damage in Runners was greater than in Spanish peanuts at the time of delivery to the warehouse, and also up to the time they were delivered to the sheller, which correlated with the greater percentage of cracked pods in the Runner peanuts. Damage in the surface layer of peanuts increased progressively during the storage period. The damage was greater in the surface samples than in samples representing the whole bulk of the peanuts, but the increase in damage from the beginning to the end of the storage period was in about the same proportion.

The insects found in 10 replicate surface samples and 10 replicate probe samples at the end of the storage period are shown in the following tabulation.

Insect	Surface sample	Probe sample
Moth larvae	221	37
Flour beetles (two species)	116	99
Saw-toothed grain beetle	91	37
Cigarette beetle	64	28
Corn sap beetle	30	13
Flat grain beetle	17	2
Cadelle	25	0

Series E

A survey of the degree of insect damage to kernels in pods and to loose shelled kernels was made in the summer of 1957 when CCC-owned peanuts in six commercial warehouses in Worth, Lee, Pulaski, and Crisp Counties in Georgia were consolidated by relocation at another site in order to empty the six warehouses before the new harvest began. The peanuts were of the 1956 crop and had been in storage since the fall of 1956. The movement to the consolidated site was begun July 1, 1957.

Samples were obtained from every truckload of peanuts loaded out from each warehouse. These samples of a varied but similar size were the excess portions of the ones taken by the Federal-State Inspection Service for official grade determination. The percentages of insect-damaged kernels in solid and cracked pods, and in loose shelled kernels, were determined for each sample and averaged for each warehouse. These percentages are presented in table 7. The insect damage was high in the loose shelled kernels, but ranged from only 1.24 to 3.43 percent in the kernels in pods. The insects screened from the total excess portions of the Federal-State samples were also recorded. The number of insects collected from the samples was not large either, considering the volume of samples involved (table 8). The species and their relative abundance were typical of those found in other warehouses.

In Experimental 500-Bushel Circular Metal Bins

From 1952 to 1957 the possibilities of storing farmers stock peanuts on the farm under the price-support loan program were

explored through a cooperative agreement whereunder CCC provided peanuts and storage facilities and the work was done by research specialists at the Alabama, Georgia, Virginia, and Texas agricultural experiment stations. A part of this study was conducted at the Coastal Plain Experiment Station at Tifton. Peanuts were stored in five 500-bushel circular metal bins 10 feet high and 9 feet in diameter, during the storage seasons of 1952-53, 1953-54, 1954-55, 1955-56, and 1956-57. The Stored-Product Insects Laboratory participated in this study to the extent of recording the percentages of insect-damaged kernels in pods in each bin throughout each season, and the loose shelled kernels and the insect damage in them at the beginning and end of each season. The species of insects present and their relative abundance were also recorded. Some bins were given insecticidal treatments in each year's series, but only data from those that received no treatment are presented here to supplement the observations made in commercial warehouses. This group includes two bins of 1952-crop peanuts, one of the 1953 crop, four of the 1954 crop, four of the 1955 crop, and four of the 1956 crop.

The percentage of insect-damaged kernels in pod samples taken from the surface and from the bulk mass of each bin at intervals from the beginning to the end of each storage season, and the percentages of insect-damaged kernels in the loose shelled kernels at the time of loading and emptying the bins, are presented in table 9. The damage to kernels in pods ranged from 0 to 0.79 percent at the beginning of the storage periods, and from 2.68 to 7.28 percent at the end of the periods. The number of loose shelled kernels per quart of peanuts did not tend to increase during the storage periods, but the damage to them ranged from 0 to 4.4 percent at the beginning of storage, and from 18.3 to 41.9 percent at the end of storage.

The species of insects collected during each season from the bins under observation are presented in table 10. The relative abundance of the various species in these bins followed the general pattern shown in records from commercial storages.

In Experimental 5-Cubic-Foot Bins

A large number of exploratory or comparative tests were conducted at the laboratory in which lots of approximately 3 bushels of farmers stock peanuts were stored in 5-cubic-foot, open-topped, drum-type bins placed at random on the second floor of an unheated and rather open barn on the experiment station grounds. Each bin was a 2- x 6-foot sheet of masonite rolled into a cylinder and the overlapping edges fastened with roundheaded stove bolts. This cylinder was placed upright on a 24-inch square of masonite. The species of insects attacking peanuts in these bins, their relative abundance, and the degree of damage resulting from various lengths of storage periods, are considered to be comparable to the infestation and damage in commercial storages. Therefore, these data are presented to supplement and augment the observations made in commercial warehouses. Since the tests involved were made for many and varied reasons, the pertinent data are grouped as follows: Group X, where the degree of damage was related to the proportion of cracked pods; group Y, where the degree of damage was recorded for various lengths of storage periods; and group Z, where the insects are recorded for various storage seasons.

Group X

The tests grouped here were made to study the relationship of the proportion of cracked and solid pods to the number of insect-damaged kernels. Lots of peanuts were prepared with known proportions of cracked pods, that is, 50 percent, 25 percent, and none; and one lot was taken from the source supply "as is." Replicate 3-bushel samples were placed in experimental drum-type bins as described above, where they remained undisturbed for the indicated length of storage. At that time the lot was reduced through a peanut divider to a 100- or 1,000-pod sample, and the percentage of insect-damaged kernels was determined.

The percentages of insect-damaged kernels in three experiments of this nature are given in table 11. The percentage of damaged kernels in relation to the proportion

of cracked pods is in logical order. This is one of few instances where kernels in solid pods were found damaged when the storage period was 12 months or less. The 30-month storage test was made in parallel with those in commercial storages as presented in Series A, and the percentages of damaged kernels are very close to those in the commercial storage.

Group Y

The check samples are grouped here from a number of tests where insecticides were applied.

The observations are summarized in table 12. The damage to kernels is of the same degree as observed in other storage tests with comparable lengths of storage.

Group Z

Records of the species of insects found in the drum-type bins, and of their relative abundance were taken at the end of two storage seasons, at the time that the bins were emptied. The observations are tabulated below.

Insect	1954-55 season (60 bins)	1953-54 season (63 bins)
Indian-meal moth	531	1,891
Ephestia moths (two species)	153	597
Angoumois grain moth	109	164
Flour beetles (two species)	15,065	5,608
Saw-toothed grain beetle	24,108	9,452
Cadelle	2,265	641
Corn sap beetle	562	
Flat grain beetle	345	
Rice weevil	274	
Cigarette beetle	235	203
Black larder beetle	156	
Square-necked grain beetle	75	
Coffee bean weevil	5	

These insects were of the same species as those found in commercial warehouses, and were present in about the same relative abundance in each environment.

INFESTATION AND DAMAGE DURING HARVESTING

It became evident as warehouse and bin studies progressed that when the peanuts were delivered to the warehouse they already showed some insect infestation and damage, which must have occurred during harvesting. This finding was contrary to the long-accepted belief that infestation was strictly a storage problem and took place after the peanuts were in the warehouse from sources in or around the warehouse. Therefore studies were conducted between 1955 and 1958 to determine (1) the degree of damage and the insects that infested all three types of peanuts--Runner, Virginia, and Spanish--as they arrived at the warehouse, (2) the steps in the harvesting procedure at which infestation took place, and (3) the sources of such infestation.

Upon Arrival at Warehouse

Three separate studies were made on this subject. In Series F, Runner peanuts harvested by combines and by peanut pickers from two selected groups of fields were sampled upon delivery to the warehouse in the fall of 1955, and the degree of damage for the two groups was compared. In Series G, samples were taken upon delivery of Spanish and Runner peanuts harvested by combines and peanut pickers from the crops of 1955 and 1956, from selected fields. In Series H, samples were collected in 1955, 1956, and 1957 upon delivery to a number of warehouses. The samples were selected so that all three types of peanuts--Spanish, Runner, and Virginia--and both harvesting procedures--combining and picker-harvesting--were represented each year. The identity as to field of origin was not kept in this study.

Series F

This study was made to compare the amount of insect damage and the species present in Runner peanuts harvested by combines and by pickers as delivered to the warehouse. The fields were selected in the vicinity of Tifton early in August, and during the harvest records were made of the intervals between digging and picking and of the weather during these intervals. Ten fields were harvested by combines, and six fields by peanut pickers. In five fields harvested by combines the vines were clipped, and in the other five vines remained unclipped.

Upon delivery at the warehouse following picking, a sample was removed from one truckload of peanuts from each field and examined for insect damage. This sample

was the surplus portion of the one taken for official grade determination by the Federal-State Inspection Service and was considered representative of the whole truckload. In addition, a 3-bushel sample was placed in a 5-cubic-foot drum-type bin covered with cheesecloth, and held for 45 days. The insects emerging from these samples were recorded.

The insect damage in the peanuts upon arrival at the warehouse is presented in table 13. The damage to kernels was nearly equal for each group, and at this stage had not advanced very far. It was enough, however, to serve as an important source of later infestation in the warehouse. The following tabulation gives the number of insects collected from the caged 3-bushel samples after 45 days:

Insect	Combined (10 fields)	Picker-harvested (6 fields)
Angoumois grain moth	55	27
Ephestia moths (two species) ...	122	127
Flour beetles (two species).....	99	45
Saw-toothed grain beetle.....	13	5
Corn sap beetle	61	77
Square-necked grain beetle	25	20
Coffee bean weevil	1	5
Cigarette beetle	14	6
Total.....	390	312

Series G

This study was made to obtain information on the amount of insect damage in Spanish and Runner peanuts upon delivery to warehouses, from a wider area than was represented in Series F. Fields were selected in three counties in Southern Georgia in 1955, and a sample was taken from one truckload from each field as it was delivered to the local warehouse. This sample was the surplus portion of the one taken by the Federal-State Inspection Service for official grade determination. This amount was reduced through a peanut divider to 1 quart, from which 100 pods were selected at random, and the percentage of insect-damaged kernels was determined. Fields were selected in 1956 from one of the three counties represented in 1955, and from two additional counties for similar records. Enough insects were recovered to determine that both moths and beetles were present.

The insect damage in the representative samples taken upon arrival at the local warehouses is presented in table 14. The data demonstrate that infestation took place during harvest in 29 of 31 fields, and that such infestation is probably more or less common in the Georgia peanut-producing area.

Series H

In this study a survey was made of the prevalence and degree of insect damage to peanuts of all types at the time of delivery to a number of local warehouses within a radius of 30 miles from Tifton, in the crop years 1955, 1956, and 1957. The surplus portions of samples taken by the Federal-State Inspection Service for official grade determination were used for this purpose. The type of peanut and the method of harvesting were recorded for each sample. The quantity was reduced through a peanut divider to 1 quart, and 100 pods were selected at random for determination of insect-damaged kernels. In the 1956 and 1957 samples the loose shelled kernels in the quart were counted, and the percentage of insect damage in these samples was also determined. In the 1957 season a second quart sample from each truckload was held for approximately 3 months, and the insects emerging from these samples were recorded.

The records of insect damage in the incoming peanuts at each local warehouse are presented in table 15. These show damage in kernels in the pods ranging from 0.3 to 8.3 percent. Damage was very prevalent in the loose shelled kernels, ranging from 0 to 83 percent, and often more loose shelled kernels were damaged than were the kernels in pods, even though the number of loose shelled kernels was much less than kernels in pods.

Insect damage to kernels was present in about the same degree in each type of peanut, that is, Spanish, Runner, or Virginia, and there also appeared to be little difference whether the peanuts were harvested by pickers or combines. Likewise, insect damage was universally present in peanuts entering each warehouse.

The insects emerging from the extra quart samples retained from each truckload are listed in table 16. The pattern was about the same for each warehouse.

During Harvesting

Other studies were made concurrently with Series F, G, and H to determine the

degree of infestation and damage at each step in the harvesting process and during the combining process. In picker-harvesting, which is the traditional method, the peanuts on the vines are stacked on upright poles as soon as dug, where they cure for periods up to 30 days or more. The peanuts are then removed from the vines by a stationary picker. In combining, which is rapidly becoming the favored method of harvesting, the vines are windrowed when dug and after a short curing period of 8 to 20 days are picked by a combine which moves down each windrow and picks up the peanuts.

Picker Harvesting

During the years 1952 through 1955, 50 fields were examined 3 times each year during the harvesting period. Five counties were involved, and 10 fields were sampled in each county, one-half of the fields Spanish peanuts, and one-half Runner. The first examination was made during September after the peanuts had been dug and stacked, the second about a month later, and the third when the peanuts were picker-harvested. In each field 10 stacks were sampled, 250 pods being removed from each stack and consolidated into a single sample representing the field. The pods were collected from the exterior of each stack, from near the pole, and from the mid-point between the pole and the surface. The 2,500-pod sample was divided once with a peanut divider, one-half was shelled, and the first 1,000 kernels were examined for injury. The excess peanuts from each field were caged, and the insects that emerged were recorded. In addition, any insects noted on peanuts in the stacks were collected and recorded.

The percentage of insect-damaged kernels found at the three inspections made each year are presented in table 17. The percentage increased as the season progressed.

The insects collected from the stacks or emerging from the excess peanuts in the samples are listed in table 18. The number of insects was greater in Spanish peanuts than in Runners, which correlated with the greater percentage of insect-damaged kernels in the Spanish peanuts (table 17). In records not presented here it was demonstrated that the insects were about equally abundant in each of the five counties. The data in table 18 demonstrate the variation in abundance from season to season. The six most abundant species in descending order were the same in both Spanish and Runner peanuts.

In 1956 a miscellaneous lot of field stacks at the Coastal Plain Experiment Station, Tifton, which were to be left undisturbed for several months, were inspected periodically and a record made of insects found on them. These observations are tabulated in table 19. The number of insects increased as the season progressed.

In 1955 a study was made of the relation of the time of harvest and the degree of infestation at picking. Thirty fields were selected near Tifton which represented three conditions: (a) early digging and early picking--about 1 to 2 weeks' curing, (b) early digging and late picking--about 4 to 6 weeks' curing, and (c) late digging and late picking--about 3 to 4 weeks' curing. At picking time, about 3 bushels of peanuts were taken from each lot, and insects removed by screening. Each sample was held for 1 week and all emerging insects collected, then it was screened again.

The insects collected are tabulated in table 20. There appeared to be a correlation between the number of insects recovered and the length of the curing period. The shorter periods had significantly fewer insects associated with them than did the long curing periods of 4 to 6 weeks.

Combine Harvesting

A study was made in 1955 of insect infestation and damage occurring during harvesting when combines were used. The weather was ideal, and the harvest was completed with about the minimum number of curing days and the minimum opportunity for infestation. Observations were made in three fields of Runner peanuts in which the vines were not clipped. The vines were dropped in a row when dug, and windrowed 3 days later after shaking with a peanut shaker. The peanuts were combined on the eighth day.

Ten counts were made in each field before and after shaking, and records were made of cracked pods, loose shelled kernels, and insect damage. During combining, thirty 1-gallon samples of peanuts were taken from the windrows in each field,

10 of peanuts on the exposed surface area, 10 from near the center of the windrow, and 10 from next to the soil. In addition, twelve 1-gallon samples were taken from the combine. Records were made of the cracked pods and insect-damaged kernels in samples from the windrow and from the combine, and of the number of loose shelled kernels in combine samples. The moisture content of the windrow and combine samples was also determined.

The percentages of insect-damaged kernels, cracked pods, and moisture content before and after shaking and before and after combining are summarized in table 21. The data in table 21 indicate that very few pods were cracked by digging, but that combining increased the number of cracked pods considerably. The insect infestation, based on the percentage of insect-damaged kernels was very slight, probably due to the short period, and to the lack of cracked pods. The interval between the records before and after combining covers only a few hours so that no increase in infestation would be expected during that period.

Loose shelled kernels were found after windrowing, after shaking, and after combining. The shaking process increased the number of loose shelled kernels found in samples consisting of 5 lineal feet of windrow. The number of loose shelled kernels per gallon sample from the combine is in addition to the row count, and is indicative of the fact that combining produces additional loose shelled kernels.

	Loose kernels per gallon sample		
Field No.	Before shaking	After shaking	After combining
1	4.0	6.8	10.3
2	1.3	2.4	8.0
3	3.7	4.4	7.9

Insects were found causing injury to kernels in the row counts. These were either the corn sap beetle, the Angoumois grain moth, the Indian-meal moth, or the flour beetles. Loose shelled kernels collected from the windrows were caged and emerging insects (first three of the above-mentioned species) recorded. The cracked pods in samples from the combine were also caged, and the above four species emerged from these samples.

Source of Insects Infesting Peanuts During Harvesting

Since infestation had been noted in peanuts almost immediately after digging, observations were made of the prevalence of stored-product insects in peanut fields before harvest was begun.

Uniform sweepings were made in 50 peanut fields near Tifton on August 2-4 and 25-27, 1956. Twenty-five collections were made in each field, and each collection consisted of 10 sweeps of a standard 12-inch sweeping net. The following insects were collected:

Insect	Aug. 2-4	Aug. 25-27
Corn sap beetle	21	152
Square-necked grain beetle	14	201
Angoumois grain moth	7	28
Saw-toothed grain beetle	3	1
Flour beetles (two species)	2	1
Indian-meal moth	2	1
Coffee bean weevil	0	16

Insects were more plentiful in late August than in early August in these fields.

Uniform sweepings were also made in peanut fields in the Georgia-Florida-Alabama peanut-growing area on September 9-12, 1956. The following insects were collected from 13 fields in Alabama, 3 in Florida, and 11 in Georgia:

Insect	Alabama	Florida	Georgia
Indian-meal moth	1	0	4
Angoumois grain moth	4	1	13
Corn sap beetle	15	12	62
Square-necked grain beetle	16	13	49
Coffee bean weevil	3	0	8
Flour beetles	2	2	0
Saw-toothed grain beetle	0	2	0
Cigarette beetle	0	0	5

In 1957 uniform sweepings were made in four fields on the experiment station at Tifton at periodic intervals. The following tabulation shows the build-up of stored-product insect populations as the season advanced.

Insect	Aug. 20	Aug. 27	Sept. 6	Sept. 17	Sept. 27
Indian-meal moth	0	1	2	0	0
Angoumois grain moth	0	1	2	1	0
Corn sap beetle	0	4	3	6	9
Square-necked grain beetle	0	0	0	0	14
Rice weevil	2	1	0	3	0
Coffee bean weevil	0	0	0	1	0
Flour beetles	0	0	0	0	3

It was suspected that stacks of peanut hay containing the vines from the recent harvest might be the means of carrying stored-product insect populations from harvest until the next year. Four stacks in each of four fields were examined at intervals during the winter of 1953-54, and again in 1954-55, until the hay was baled or spread on the fields in the spring. One hundred stems were examined each time. Emergence cages were maintained on each stack, but collection dates were not recorded. The insects collected were as follows:

	1953-54					1954-55			
Insect	Dec.	Feb.	Mar.	Apr.	In cages	Nov.	Feb.	Apr.	In cages
Indian-meal moth	4	2	2	1	5	2	3	5	5
Ephestia moths (two species)	0	1	0	0	0	0	0	0	0
Angoumois grain moth	7	5	0	2	10	3	1	2	6
Corn sap beetle	29	70	24	4	41	41	37	28	44
Flour beetles (two species)	3	4	2	0	4	8	0	0	5
Coffee bean weevil	7	7	1	0	3	4	0	3	10
Black larder beetle	1	0	2	0	0	0	0	0	3
Rice weevil	0	5	0	0	3	2	0	0	0
Saw-toothed grain beetle	0	1	0	0	0	0	0	0	0
Cigarette beetle	0	0	0	3	0	0	0	0	0
Square-necked grain beetle	0	0	0	0	0	13	7	0	0
Lesser grain borer	0	0	0	0	0	16	0	0	0

Peanut hay from the 1956 crop, both baled and bulk, which had been placed in barns, was also examined periodically. In March 1957 the following insects were recovered:

Insect	Baled hay	Bulk hay
Indian-meal moth	18	1
Ephestia moths (two species)	11	8
Flour beetles (two species)	3	11
Black larder beetle	2	4
Corn sap beetle	0	1
Flat grain beetle	0	2

Another source suspected of aiding stored-product insects to carry over from one season to another was the cleanings from peanut shellers, which are sometimes returned to peanut farms as hog feed. One such lot of cleanings taken back to a farm in April contained 2 Indian-meal moth pupae, 1 Ephestia moth pupa, 4 flour beetles, and 1 black larder beetle.

COMPARISON OF TOTAL INSECT DAMAGE AND INSECT-DAMAGED KERNELS IN GRADE DETERMINATION

The method of determining the percentages of insect damage in loose shelled kernels and in kernels in samples of pods from field- or bin-run farmers stock peanuts, as used in the studies reported herein, gives an estimation of damage different from that obtained by the method used in establishing the loan value of a lot of peanuts.

In establishing the loan value, the loose shelled kernels are first removed, then the kernels from pods are passed over a screen of appropriate size. The percentage of damaged kernels in those riding the screen is then determined, and a penalty is assessed for each percentage point above 1 percent. The remainder riding the screen are classed as "sound mature kernels." All the kernels passing through the screen are classed as "other kernels."

Therefore insect-damaged, loose-shelled kernels did not enter into the grade, and were of economic importance only insofar as they reduced the weight of the total loose shelled kernels. The loose shelled kernels had a price support value of 7 cents a pound in 1958.

Not all insect-damaged kernels in pods entered into the grade determination--only those that rode the screen. The sound kernels that rode the screen had a value of $3.06 to $3.19 per ton per percentage point of the total weight, with a discount for each percent of damaged kernels in excess of 1 percent. Damaged kernels that passed through the screen along with the rest that passed through were classed as "other kernels" and were valued at $1.40. Also the damaged kernels which rode the screen were valued at $1.40 per ton per percentage point. From this, it is apparent that insect damage reduces the value of kernels which ride the screen from $3.06 or more to $1.40 per ton per percentage point, a difference of $1.66 or more per point. And, in addition, a penalty of $3.50 or more was exacted for each percentage of damaged kernels in excess of 1 percent.

A study was made in 1957 to compare the total insect damage count with the count of insect-damaged sound mature kernels in the grade determination. CCC-owned, 1956-crop peanuts in six commercial warehouses were consolidated at one site. The peanuts had been in storage since the fall of 1956 and were graded as they were moved in July 1957. The excess portion of the sample of each truckload of peanuts taken by the Federal-State Inspection Service for grade determination was reduced through a peanut divider to 1 quart. The loose shelled kernels in this quart were counted, and the number of insect-damaged kernels among them was determined. A random sample of 100 pods was then removed from the quart, and segregated into cracked and solid pods. The insect-damaged kernels in the cracked pods were then counted. There were no damaged kernels in the solid pods. The grade determination for the other portion of the same sample was obtained from the Federal-State Inspection Service, and the two records were paired. Paired records were thus obtained from 733 truckloads of peanuts.

In order to demonstrate the comparison on an individual truckload basis, records for the first five and last five truckloads from each of the six warehouses are presented in table 22. The averages of all records for each warehouse are presented in table 23. The data in table 23 show that under the conditions of these observations only one-third to one-fourth of the insect-damaged kernels in pods ride the screen and become a factor in establishing the percentage of total damage in the grade determination.

FINDINGS

Although the results of this study are being reported at this time, additional information on the subjects discussed will be gained in future work. Observations and studies will be continued, as storage practices and methods of handling are ever-changing and consequently the insect populations and the insects involved may change accordingly.

The following points, however, were evident while this work was being summarized.

1. Insect damage was confined to loose shelled kernels and kernels in cracked pods during a normal storage season.

2. Cracked pods are found in peanuts harvested by different methods.

3. Cracked pods are found in all types of peanuts.

4. Insect infestation begins in the field during harvest and damage progresses as the storage season advances.

5. Moth populations (larvae and adults) are most abundant on or above the surface of the peanuts during late fall and spring months. Beetle populations are hidden in the bulk of the peanuts and usually can only be found by sifting the samples.

TABLES

TABLE 1.--Insect-damaged kernels per 100 pods in 1952-crop Spanish and Runner peanuts after 12 months of storage at Bainbridge, Ga.

Type of peanut and composition of sample	Replications	Kernels damaged in solid pods		Kernels damaged in cracked pods		Percentage of kernels damaged in all pods
		Total	Percentage	Total	Percentage	
Spanish peanuts	*Number*	*Number*	*Percent*	*Number*	*Percent*	*Percent*
100 percent solid.....	3	6.7	4.1	--	--	4.1
75-25 solid-cracked....	3	7.0	6.3	12.3	32.2	13.0
50-50 solid-cracked....	3	3.3	4.4	28.7	34.7	20.1
58-42 solid-cracked (bin-run).....	6	2.7	3.1	24.3	39.7	18.4
Runner peanuts						
100 percent solid.....	3	6.3	3.6	--	--	3.6
75-25 solid-cracked....	3	7.3	5.7	17.3	51.0	15.1
50-50 solid-cracked....	3	4.3	4.8	44.6	64.4	30.7
69-31 solid-cracked (bin-run).....	6	1.0	.8	33.2	70.2	20.9

TABLE 2.--Insect-damaged kernels per 1,000 pods in 1952-crop Spanish and Runner peanuts after 30 months of storage at Bainbridge and Tifton Ga.

Location, type of peanut, and composition of sample	Replications	Solid pods			Pods penetrated by insects			Cracked pods			Percentage of kernels damaged in all pods
		Percentage of total	Kernels		Percentage of total	Kernels		Percentage of total	Kernels		
			Total	Damaged		Total	Damaged		Total	Damaged	
Bainbridge											
Spanish peanuts	*Number*	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*
100 percent solid.....	1	60.1	1,100	0	28.4	442	43.4	11.5	192	90.1	21.0
75-25 solid-cracked.....	1	47.2	687	0	26.2	400	32.5	26.6	402	84.8	31.6
50-50 solid-cracked.....	1	31.6	463	0	17.6	267	19.5	50.8	775	81.7	45.5
71-29 solid-cracked (bin-run).....	2	44.4	638	0	20.1	323	37.1	35.5	563	87.4	40.2
Runner peanuts											
100 percent solid.....	1	62.6	1,040	0	31.8	544	31.4	5.6	94	97.9	15.7
75-25 solid-cracked.....	1	52.2	905	0	22.8	404	23.3	25.0	391	97.2	25.5
50-50 solid-cracked.....	1	31.0	540	0	21.0	375	16.8	48.0	699	96.4	45.7
80-20 solid-cracked (bin-run).....	2	52.7	893	0	27.0	457	31.4	20.3	279	96.9	25.6
Tifton											
Runner peanuts											
100 percent solid.....	1	63.4	1,100	0	34.0	582	15.5	2.6	42	90.5	7.4
75-25 solid-cracked.....	1	40.5	738	0	33.5	519	27.0	26.0	441	91.4	32.0
50-50 solid-cracked.....	1	33.1	579	0	17.9	294	11.9	49.0	715	84.3	49.2
74-26 solid-cracked (bin-run).....	2	44.5	739	0	26.3	453	28.9	29.2	450	92.8	41.4

TABLE 3.--Insects collected from Spanish peanuts in commercial peanut warehouses in Georgia in November, January, March, and June during four storage seasons, 1952-55

Season and month sampled	Warehouses sampled	Moth larvae	Angoumois grain moth	Flour beetles	Saw-toothed grain beetle	Corn sap beetle	Dermestes beetle	Cadelle	Flat grain beetle	Cigarette beetle
1952-53 season	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
November	2	13	1	24	14	39	10	3	0	0
January	2	18	3	60	87	90	27	11	1	0
March	2	39	0	145	125	49	44	7	16	0
June	2	145	0	304	141	24	41	7	7	0
1953-54 season										
November	2	93	0	59	15	70	8	0	3	0
January	2	134	0	92	33	47	3	0	11	0
March	2	100	0	121	99	4	16	0	16	13
June	1	30	0	146	54	0	18	0	3	29
1954-55 season										
November	2	52	0	34	7	94	4	0	0	0
January	2	123	0	80	29	52	5	1	0	2
March	2	334	0	185	123	12	26	3	0	33
June	2	503	0	229	279	0	26	10	0	73
1955-56 season										
November	3	162	0	44	5	178	12	0	0	0
January	3	370	0	88	27	116	31	0	6	0
March	3	647	0	131	94	20	49	6	37	59
June	3	678	0	216	103	8	42	7	14	100

TABLE 4.--Insects collected from various sources in a peanut-shelling plant in Georgia, 1955

Insect	Surface of bin	Bulk of bin	Sheller belt	Fine screenings
	Number	*Number*	*Number*	*Number*
Indian-meal moth (adults)	65	0	0	0
Angoumois grain moth (adults)	13	0	0	0
Ephestia moths (adults)	42	0	0	0
Moth larvae	106	21	183	0
Flour beetles	73	205	216	2,167
Corn sap beetle	32	71	56	102
Dermestes beetle	16	57	41	9
Saw-toothed grain beetle	0	79	141	567
Cigarette beetle	0	18	41	71
Flat grain beetle	0	26	31	39
Cadelle	0	24	61	19
Rice weevil	0	0	19	0
Square-necked grain beetle	0	0	0	27
Broad-horned flour beetle	0	0	0	11

TABLE 5.--Insect-damaged kernels per 100 pods in peanuts stored at a shelling plant in Georgia, 1955

Source of sample	Replications	Solid pods			Cracked pods			Percentage of kernels damaged in all pods
		Percentage of total	Kernels		Percentage of total	Kernels		
			Total	Damaged		Total	Damaged	
	Number	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*
Surface areas of bin	5	80	146	0	20	41	20.6	3.8
Side of discharge cone	5	81	149	0	19	32	24.4	4.3
Spill into discharge cone	5	81	148	0	19	34	25.4	4.7
Sheller belt	5	79	140	0	21	37	27.3	5.7

TABLE 6.--Insect-damaged kernels per 100 pods in Spanish and Runner peanuts at various periods during commercial storage in Georgia, 1955-56 season

Date, source of sample, and type of peanut	Replications	Solid pods			Cracked pods			Percentage of kernels damaged in all pods
		Percentage of total	Kernels		Percentage of total	Kernels		
			Total	Damaged		Total	Damaged	
September 27 to October 13								
Delivery to warehouse	*Number*	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*
Spanish peanuts.....	6	82	143	0	18	28	4.7	0.7
Runner peanuts.....	4	72	134	0	28	47	11.2	2.9
October 29								
Surface areas								
Spanish peanuts.....	6	82	151	0	18	29	5.2	.8
Runner peanuts.....	4	77	135	0	23	40	11.9	2.7
November 25								
Surface areas								
Spanish peanuts.....	6	84	153	0	16	26	7.1	1.0
Runner peanuts.....	4	71	124	0	29	47	15.4	4.3
January 9								
Surface areas								
Spanish peanuts.....	6	78	144	0	22	37	10.0	2.0
Runner peanuts.....	4	73	136	0	27	41	24.5	5.7
March 2								
Surface areas								
Spanish peanuts.....	6	79	143	0	21	34	23.5	4.5
Runner peanuts.....	4	73	137	0	27	46	28.1	7.1
March 2 to 9								
Delivery to sheller								
Spanish peanuts.....	6	78	142	0	22	35	21.0	4.0
Runner peanuts.....	4	71	136	0	29	46	15.3	3.9

TABLE 7.--Insect-damaged kernels in 1956-crop peanuts removed from storage in 6 commercial warehouses in Georgia, July 1957

County and warehouse	Truck loads sampled	Loose shelled kernels per quart of peanuts		Per 100 pods						
				Solid pods			Cracked pods			Percentage of kernels damaged in all pods
		Total	Percentage damaged	Percentage of total	Kernels		Percentage of total	Kernels		
					Total	Damaged		Total	Damaged	
Crisp County	*Number*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*
Warehouse A.....	329	47	26	70	127	0	30	46	4	2
Lee County										
Warehouse B.....	70	30	28	75	134	0	25	39	2	1
Warehouse C.....	62	28	30	78	138	0	22	34	2	1
Pulaski County										
Warehouse D.....	24	37	21	62	117	0	35	57	5	3
Worth County										
Warehouse E.....	102	24	50	67	124	0	33	54	6	3
Warehouse F.....	146	25	41	75	136	0	25	42	13	3

TABLE 8.--Insects collected from samples of 1956-crop peanuts removed from storage in 6 commercial warehouses in Georgia, July 1957

County and warehouse	Samples examined	Moth larvae	Saw-toothed grain beetle	Flour beetles	Cadelle	Der-mestes beetle	Corn sap beetle	Flat grain beetle	Cigar-ette beetle	Rice weevil
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Crisp County										
Warehouse A	329	40	1,928	355	219	37	70	29	25	3
Lee County										
Warehouse B	70	90	606	126	52	3	41	13	1	1
Warehouse C	62	3	423	41	13	0	9	2	1	1
Pulaski County										
Warehouse D	24	7	126	34	26	0	4	12	0	0
Worth County										
Warehouse E	102	7	431	69	89	47	24	6	6	1
Warehouse F	146	14	765	62	86	30	7	4	19	0
Total	733	161	4,279	687	485	117	155	66	52	6

TABLE 9.--Insect-damaged kernels in the surface and in the load mass of peanuts stored in experimental circular metal bins at Tifton, Ga., during 5 storage seasons

Storage season and date of sampling	Bins observed	Samples from surface					Samples from load mass				
		Percentage of kernels damaged in--			Loose shelled kernels per quart of peanuts		Percentage of kernels damaged in--			Loose shelled kernels per quart of peanuts	
		Solid pods	Cracked pods	All pods	Total kernels	Percentage damaged	Solid pods	Cracked pods	All pods	Total kernels	Percentage damaged
1952-53 season	*Number*	*Percent*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Number*	*Percent*
November 24 (load-in)	2	0	0.46	0.19	25	0	0	0.43	0.18	32	0
February 3	2	0	1.84	.59			0	2.24	.89		
March 6	2	0	.72	.21			0	1.59	.44		
April 6	2	0	6.22	1.75			0	2.72	.97		
May 6	2	0	10.60	3.52			0	3.48	1.24		
June 2	2	0	13.31	4.82			0	3.73	1.36		
July 7	2	0	21.29	7.95			0	9.77	3.97		
August 14 (load-out)	2	0	17.89	7.28	27	18.4	0	15.07	6.35	28	40.0
1953-54 season											
December 16 (load-in)	1	0	2.08	.79	23	4.4	0	1.00	.42	18	0
December 28	1	0	4.00	1.61			0	1.53	.76		
February 9	1	0	3.69	1.48			0	3.10	1.54		
April 16	1	0	9.38	3.66			0	8.09	4.42		
June 9	1	0	15.89	6.54			0	11.45	6.10		
August 17 (load-out)	1	0	12.80	6.30	27	26.0	0	17.82	6.92	31	41.9
1954-55 season											
October 1 (load-in)	4	0	3.10	.77	25	0	0	1.40	.70	20	2.5
November 29	4	0	6.24	1.71			0	3.16	1.07		
January 3	4	0	11.33	3.09			0	8.79	2.77		
March 29	4	0	17.06	5.01			0	11.86	3.88		
May 27	4	0	18.74	7.39			0	14.58	5.75		
July 25 (load-out)	4	0	16.50	5.80	24	28.7	0	14.59	5.80	23	40.0
1955-56 season											
November 9 (load-in)	4	0	2.72	.74	17	3.0	0	1.60	.53	30	1.6
November 30	4	0	7.96	2.06			0	3.50	1.52		
January 17	4	0	6.60	1.90			0	6.60	2.80		
February 16	4	0	15.80	4.70			0	18.20	5.80		
April 17	4	0	23.90	2.50			0	15.10	2.50		
May 14	4	0	9.30	3.00			0	5.60	1.80		
July 21 (load-out)	4	0	7.95	2.68	22	20.7	0	12.54	3.47	31	18.3

TABLE 9.--Insect-damaged kernels in the surface and in the load mass of peanuts stored in experimental circular metal bins at Tifton, Ga., during 5 storage seasons--Continued

Storage season and date of sampling	Bins observed	Samples from surface					Samples from load mass				
		Percentage of kernels damaged in--			Loose shelled kernels per quart of peanuts		Percentage of kernels damaged in--			Loose shelled kernels per quart of peanuts	
		Solid pods	Cracked pods	All pods	Total kernels	Percentage damaged	Solid pods	Cracked pods	All pods	Total kernels	Percentage damaged
1956-57 season	*Number*	*Percent*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Number*	*Percent*
October 5 (load-in)	4	0	0	0	16	0	0	0	0	35	0
November 15	4	0	3.7	.8			0	2.3	.5		
January 4	4	0	8.8	2.7			0	3.7	1.6		
February 18	4	0	4.4	2.3			0	5.3	2.6		
March 19	4	0	17.9	5.5			0	10.9	3.6		
April 16	4	0	11.1	3.1			0	6.3	2.2		
May 17	4	0	21.1	5.7			0	7.3	2.4		
May 22 (load-out)	4	--	--	--	15	40.0	0	8.7	3.4	23	30.2

TABLE 10.--Insects collected from peanuts stored in experimental circular metal bins at Tifton, Ga., 5 storage seasons 1952-56

Storage season	Bins sampled	Indian-meal moth	Ephestia moths	Angoumois grain moth	Flour beetles	Saw-toothed grain beetle	Cigarette beetle	Corn sap beetle	Cadelle	Dermestes beetle	Flat grain beetle
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
1952-53 season	2	230	190	16	176	126	26	4	12	0	0
1953-54 season	1	111	72	6	64	34	8	0	5	0	0
1954-55 season	4	494	292	67	251	78	3	33	29	0	0
1955-56 season	4	559	504	41	399	123	88	17	35	0	4
1956-57 season	4	1,509	834	65	873	573	390	508	127	106	17

TABLE 11.--Insect-damaged kernels per 100 pods in Spanish, Runner, and Virginia peanuts after 12 and 30 months storage in experimental drum-type bins in Georgia, 1952-57

Length of storage season, type of peanut, and composition of sample	Replications	Solid pods			Pods penetrated by insects			Cracked pods			Percentage of kernels damaged in all pods
		Percentage of total	Kernels		Percentage of total	Kernels		Percentage of total	Kernels		
			Total	Damaged		Total	Damaged		Total	Damaged	
	Number	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*
12 months' storage, 1952-53											
Spanish peanuts											
100 percent solid.....	3	100	178	3.37				--	--	--	3.37
75-25 solid-cracked.....	3	75	133	1.75				25	19	48.28	12.21
50-50 solid-cracked.....	3	50	85	.39				50	37	55.91	20.63
74-26 solid-cracked (bin-run).....	6	74	126	.66				26	42	59.69	15.43
12 months' storage, 1956-57											
Spanish peanuts											
100 percent solid.....	4	100	--	.6				--	--	--	.6
75-25 solid-cracked.....	4	75	--	0				25	--	--	4.7
50-50 solid-cracked.....	4	50	--	0				50	--	--	7.5
76-24 solid-cracked (bin-run).....	4	76	--	0				24	--	--	4.6
Runner peanuts											
100 percent solid.....	4	100	--	.6				--	--	--	.6
75-25 solid-cracked.....	4	75	--	0				25	--	--	5.4
50-50 solid-cracked.....	4	50	--	0				50	--	--	10.3
77-23 solid-cracked (bin-run).....	4	77	--	0				23	--	--	5.0
Virginia peanuts											
100 percent solid.....	4	100	--	.7				--	--	--	.7
75-25 solid-cracked.....	4	75	--	0				25	--	--	5.2
50-50 solid-cracked.....	4	50	--	0				50	--	--	9.1
73-27 solid-cracked (bin-run).....	4	73	--	0				27	--	--	4.9
30 months' storage, 1952-55											
Spanish peanuts											
100 percent solid.....	1	71.9	125.5	0	20.4	32.0	48.2	7.7	12.6	87.3	15.5
75-25 solid-cracked.....	1	49.1	73.0	0	22.0	34.4	27.9	28.9	45.8	84.3	31.5
50-50 solid-cracked.....	1	37.6	51.3	0	13.4	19.6	23.5	49.0	72.6	84.7	46.0
73-27 solid-cracked (bin-run).....	2	47.0	71.5	0	18.2	27.5	53.5	34.8	49.8	87.1	39.0

TABLE 12.--Insect-damaged kernels per 100 pods in Spanish and Runner peanuts after varying lengths of storage in experimental drum-type bins in Georgia, 1952-54

Type of peanut and length and season of storage	Replications	Solid pods			Cracked pods			Percentage of kernels damaged in all pods
		Percentage of total	Kernels		Percentage of total	Kernels		
			Total	Damaged		Total	Damaged	
	Number	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*
Spanish peanuts								
11 months storage, 1952-53.....	8	80	111	0	20	30	61.5	13.1
11 months storage, 1954-55.....	2	--	--	--	--	--	--	8.2
12 months storage, 1952-53.....	4	78	109	0	22	28	54.7	11.2
21 months storage, 1952-53.....	3	75	120	0	25	35	75.1	17.0
33 months storage, 1952-53.....	3	82	154	13.7	18	32	77.2	24.6
Runner peanuts								
21 months storage, 1953-54.....	4	--	--	--	--	--	--	13.6

TABLE 13.--Insect-damaged kernels per 100 pods in Runner peanuts harvested by combines and by pickers near Tifton, Ga., at time of delivery to warehouse, 1955

Method of harvest and vine condition	Fields sampled	Interval between digging and picking	Solid pods	Cracked pods	Damaged kernels
Combined					
	Number	*Days*	*Percent*	*Percent*	*Percent*
Vines unclipped.....	5	8-27	87	13	0.6
Vines clipped.....	5	6-26	89	11	.8
Picker harvested.....	6	29-56	81	19	.9

TABLE 14.--Insect-damaged kernels per 100 pods in Georgia-grown Spanish and Runner peanuts at time of delivery to local warehouses, 1955-56

Year, county, and peanut type	Fields sampled	Solid pods		Cracked pods		Percentage of kernels damaged in all pods
		Percentage of total pods	Kernels damaged	Percentage of total pods	Kernels damaged	
1955						
Early County	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Spanish peanuts.....	6	78	0	22	4.0	0.8
Runner peanuts.....	2	82	0	18	1.7	.3
Ben Hill County						
Spanish peanuts.....	2	83	0	17	0	0
Crisp County						
Runner peanuts.....	2	74	0	26	1.5	.3
1956						
Tift County						
Spanish peanuts.....	7	76	0	24	3.1	.7
Turner County						
Spanish peanuts.....	3	76	0	24	1.4	.4
Runner peanuts.....	4	73	0	27	1.2	.3
Crisp County						
Spanish peanuts.....	2	80	0	20	4.9	.9
Runner peanuts.....	3	79	0	21	2.0	.4

TABLE 15.--Insect-damaged kernels in Spanish, Runner, and Virginia peanuts at time of delivery to local warehouses near Tifton, Ga., during the 1955, 1956, and 1957 harvests

Year, source of peanuts, peanut type, and method of harvest	Truck loads sampled	Loose shelled kernels per quart		Per 100 pods						
				Solid pods			Cracked pods			Percentage of kernels damaged in all pods
		Total	Percentage damaged	Percentage of total	Kernels		Percentage of total	Kernels		
					Total	Damaged		Total	Damaged	
1955										
Colquitt County										
Spanish peanuts	*Number*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*
Combined	2	--	--	93	148	0	7	12	4.2	0.3
Runner peanuts										
Picker-harvested	4	--	--	83	148	0	17	23	5.4	.7
Combined	2	--	--	86	154	0	14	23	4.4	.6
Virginia peanuts										
Picker-harvested	5	--	--	75	131	0	25	42	6.2	1.5
Cook County										
Spanish peanuts										
Picker-harvested	4	--	--	76	132	0	24	39	10.3	2.3
Combined	1	--	--	79	130	0	21	30	6.7	1.3
Runner peanuts										
Picker-harvested	9	--	--	86	148	0	14	19	5.9	.6
Combined	3	--	--	88	155	0	12	19	7.0	.8
Virginia peanuts										
Picker-harvested	1	--	--	73	130	0	27	37	8.1	1.8
Tift County										
Spanish peanuts										
Picker-harvested	15	--	--	77	131	0	23	36	4.6	1.0
Combined	7	--	--	83	143	0	17	27	6.3	1.0
Runner peanuts										
Picker-harvested	21	--	--	87	149	0	13	21	10.5	1.3
Combined	10	--	--	86	151	0	14	22	6.4	.8
Virginia peanuts										
Picker-harvested	9	--	--	70	119	0	30	47	7.4	2.1
Turner County										
Spanish peanuts										
Picker-harvested	45	--	--	77	134	0	23	36	9.5	2.0
Combined	12	--	--	76	133	0	24	39	8.6	1.9
Runner peanuts										
Picker-harvested	6	--	--	87	160	0	13	19	5.2	.6
Combined	5	--	--	88	160	0	12	17	7.2	.7

TABLE 15.--Insect-damaged kernels in Spanish, Runner, and Virginia peanuts at time of delivery to local warehouses near Tifton, Ga., during the 1955, 1956, and 1957 harvests--Continued

Year, source of peanuts, peanut type, and method of harvest	Truck loads sampled	Loose shelled kernels per quart		Per 100 pods						
				Solid pods			Cracked pods			Percentage of kernels damaged in all pods
		Total	Percentage damaged	Percentage of total	Kernels		Percentage of total	Kernels		
					Total	Damaged		Total	Damaged	
1955--continued										
Webster County										
Spanish peanuts										
Picker-harvested	*Number* 1	*Number* --	*Percent* --	*Percent* 62	*Number* 106	*Percent* 0	*Percent* 38	*Number* 51	*Percent* 25.5	*Percent* 8.3
Wilcox County										
Spanish peanuts										
Picker-harvested	3	--	--	76	139	0	24	43	11.7	2.8
1956										
Ashburn, Ga.										
Spanish peanuts										
Combined	31	15	12.1	71	125	0	29	45	3.8	1.0
Runner peanuts										
Combined	15	11	14.0	79	146	0	21	31	9.8	1.7
Fitzgerald, Ga.										
Spanish peanuts										
Combined	21	7.1	14.4	62	114	0	38	60	5.1	1.8
Runner peanuts										
Combined	22	1.8	5.1	76	146	0	24	40	8.0	1.7
Virginia peanuts										
Combined	20	.3	0	73	141	0	27	47	2.1	.6
Sylvester, Ga.										
Spanish peanuts										
Combined	21	8.6	20.0	69	124	0	31	49	9.2	2.6
Runner peanuts										
Picker-harvested	1	21.0	24.0	87	169	0	13	23	21.7	2.6
Combined	31	7.4	11.0	80	153	0	20	31	8.4	1.4
Virginia peanuts										
Combined	12	3.4	0	80	154	0	20	31	2.2	.4
Tifton, Ga.										
Spanish peanuts										
Combined	26	5.2	20.0	67	122	0	33	52	4.6	1.4

Runner peanuts										
Picker-harvested	34	18.0	28.4	68	130	0	32	56	5.7	1.7
Combined	43	9.0	10.0	73	138	0	27	46	8.0	2.0
Virginia peanuts										
Combined	31	7.0	.9	73	138	0	27	44	2.5	.6
1957										
Ashburn, Ga.										
Spanish peanuts										
Picker-harvested	2	39.0	13.0	79	151	0	21	37	11.0	2.1
Combined	2	57.0	21.9	53	97	0	47	63	9.5	3.8
Runner peanuts										
Picker-harvested	1	78.0	19.2	69	133	0	31	52	6.0	3.2
Combined	15	19.6	23.1	72	135	0	28	42	4.1	1.0
Cordele, Ga.										
Spanish peanuts										
Combined	2	25.0	43.0	82	160	0	18	33	18.2	3.1
Fitzgerald, Ga.										
Spanish peanuts										
Picker-harvested	3	32.0	27.4	83	161	0	17	30	11.0	1.7
Combined	5	20.0	27.3	77	138	0	23	56	4.2	.8
Runner peanuts										
Combined	19	14.0	25.2	84	157	0	16	19	7.1	.8
Virginia peanuts										
Combined	9	8.0	14.1	78	139	0	22	31	5.4	1.0
Hawkinsville, Ga.										
Spanish peanuts										
Combined	3	57.0	20.6	73	128	0	27	46	2.2	.6
Leesburg, Ga.										
Spanish peanuts										
Combined	2	31.0	32.8	72	122	0	28	41	3.7	.9
Runner peanuts										
Combined	6	16.0	30.0	83	156	0	17	27	11.3	1.6
Marianna, Fla.										
Spanish peanuts										
Picker-harvested	1	93.0	16.1	74	151	0	26	46	30.0	6.6
Runner peanuts										
Picker-harvested	3	20.0	31.6	83	157	0	17	31	10.0	1.6
Combined	7	13.0	25.0	74	137	0	26	43	4.0	1.0
Moultrie, Ga.										
Runner peanuts										
Combined	1	80.0	83.7	76	148	0	24	44	22.8	5.2

TABLE 15.--Insect-damaged kernels in Spanish, Runner, and Virginia peanuts at time of delivery to local warehouses near Tifton, Ga., during the 1955, 1956, and 1957 harvests--Continued

Year, source of peanuts, peanut type, and method of harvest	Truck loads sampled	Loose shelled kernels per quart		Per 100 pods						
				Solid pods			Cracked pods			Percentage of kernels damaged in all pods
		Total	Percentage damaged	Percentage of total	Kernels		Percentage of total	Kernels		
					Total	Damaged		Total	Damaged	
1957--Continued										
Ocilla, Ga.										
Runner peanuts	*Number*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*	*Number*	*Percent*	*Percent*
Picker-harvested	2	4.0	28.5	89	167	0	11	19	23.7	2.4
Combined	13	7.0	26.1	89	169	0	11	16	7.9	.7
Virginia peanuts										
Combined	11	8.0	32.0	84	154	0	16	26	8.5	1.2
Sylvester, Ga.										
Spanish peanuts										
Picker-harvested	1	25.0	32.0	81	153	0	19	30	26.7	4.3
Combined	6	30.0	32.5	78	144	0	22	31	9.0	1.6
Runner peanuts										
Combined	24	16.0	28.4	79	149	0	21	35	5.1	1.0
Tifton, Ga.										
Spanish peanuts										
Picker-harvested	1	8.0	13.0	82	151	0	18	28	10.7	1.6
Combined	5	74.0	22.8	71	123	0	29	47	5.6	1.5
Runner peanuts										
Picker-harvested	1	14.0	42.8	87	170	0	13	24	8.3	1.0
Combined	78	29.0	18.0	76	143	0	24	38	5.0	1.0
Virginia peanuts										
Combined	8	5.0	25.0	86	162	0	14	21	2.9	.3

TABLE 16.--Insects emerging from quart samples of peanuts held approximately 3 months after source lots were received at local warehouses near Tifton, Ga., in 1957

Source of peanuts	Truck loads sampled	Moths[1]	Saw-toothed grain beetle	Flour beetles	Corn sap beetle	Flat grain beetle	Cadelle	Dermestes beetle	Miscella-neous
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Ashburn, Ga.....	69	162	271	28	2	3	0	0	2
Cordele, Ga.....	2	26	1	0	0	0	0	0	0
Fitzgerald, Ga.....	35	68	140	2	0	1	1	0	0
Hawkinsville, Ga.....	3	0	15	0	1	0	0	0	0
Leesburg, Ga.....	8	89	52	0	0	0	0	0	0
Marianna, Fla.....	7	2	18	0	1	0	0	1	1
Moultrie, Ga.....	1	21	20	0	0	0	0	0	0
Ocilla, Ga.....	24	127	68	1	1	0	0	2	0
Sylvester, Ga.....	33	87	135	13	1	0	0	0	1
Tifton, Ga.....	91	282	430	23	7	2	1	1	4
Total.....		864	1,150	67	13	6	2	4	8

[1] Composed of Angoumois grain moths, Indian-meal moths, and Ephestia spp.

TABLE 17.--Insect-damaged kernels in peanuts collected from field stacks and from the picker in 5 Georgia counties, 1952-55

County, type of peanut, and year	Peanuts from field stacks		Peanuts from pickers
	September	October	
	Percent	*Percent*	*Percent*
Colquitt County			
Spanish peanuts			
1952	0.10	0.20	0.30
1953	.06	.27	.28
1954	.26	.53	.64
1955	.16	.62	1.56
Runner peanuts			
1952	.12	.22	.58
1953	.10	.18	.34
1954	.10	.12	.34
1955	.16	.12	.40
Cook County			
Spanish peanuts			
1952	.10	.17	.42
1953	.06	.25	.38
1954	.22	.33	.70
1955	.16	.62	1.48
Runner peanuts			
1952	.06	.10	.38
1953	.04	.10	.32
1954	.12	.36	.44
1955	.12	.20	.36
Tift County			
Spanish peanuts			
1952	.08	.28	.54
1953	.04	.24	.50
1954	.18	.43	.76
1955	.10	.64	1.72
Runner peanuts			
1952	.02	.16	.40
1953	.10	.18	.46
1954	.06	.32	.42
1955	.08	.18	.70
Turner County			
Spanish peanuts			
1952	.12	.27	.28
1953	.10	.12	.26
1954	.20	.27	.40
1955	.16	.78	1.80
Runner peanuts			
1952	.08	.26	.36
1953	.08	.20	.42
1954	.10	.44	.42
1955	.12	.08	.58
Worth County			
Spanish peanuts			
1952	.06	.23	.28
1953	.12	.10	.20
1954	.14	.15	.34
1955	.16	.32	1.02

TABLE 18.--Insects found on field stacks or emerging from samples from field stacks of Spanish and Runner peanuts from 50 fields in 5 Georgia counties, 1952-55

Type of peanut, and species of insect	1952	1953	1954	1955	Total
Spanish peanuts	*Number*	*Number*	*Number*	*Number*	*Number*
Indian-meal moth	57	69	40	168	334
Ephestia moths	43	57	48	114	262
Corn sap beetle	16	39	51	149	255
Angoumois grain moth	69	17	11	14	111
Flour beetles	33	20	7	17	77
Rice weevil	7	14	2	26	49
Flat grain beetle	2	6	0	21	29
Square-necked grain beetle	0	0	0	24	24
Cadelle	2	0	0	9	11
Cigarette beetle	2	7	0	0	9
Saw-toothed grain beetle	3	0	2	0	5
Total	234	229	161	542	1,166
Runner peanuts					
Indian-meal moth	14	27	20	127	188
Corn sap beetle	31	43	29	72	175
Ephestia moths	21	24	13	92	150
Angoumois grain moth	47	33	9	11	100
Flour beetles	13	23	4	23	63
Rice weevil	2	16	7	11	36
Square-necked grain beetle	7	3	0	19	29
Flat grain beetle	0	0	0	14	14
Saw-toothed grain beetle	2	0	2	3	7
Cigarette beetle	0	0	0	3	3
Cadelle	1	0	0	0	1
Total	138	169	84	375	766

TABLE 19.--Insects found on miscellaneous field stacks at Tifton, Ga., on specified dates, fall 1956

Date of examination	Stacks examined	Indian-meal moth	Ephestia moths	Angoumois grain moth	Corn sap beetle	Flour beetles	Square-necked grain beetle	Flat grain beetle	Coffee bean weevil	Rice weevil	Saw-toothed grain beetle
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
August 10.....	25	0	0	0	3	0	0	0	0	0	0
15.....	28	0	0	3	4	0	0	0	0	0	0
25.....	30	0	0	4	0	0	0	0	0	0	0
31.....	30	1	0	6	4	0	0	0	0	0	0
September 8.....	45	0	0	3	2	0	1	0	4	0	0
22.....	60	0	0	6	4	2	5	0	0	0	0
29.....	75	1	0	1	13	0	7	0	0	0	0
October 6.....	100	2	0	17	10	1	6	0	1	0	1
20.....	55	2	0	2	20	0	6	0	0	0	0
November 12.....	22	3	2	0	19	6	1	0	0	0	0
24.....	19	2	1	1	17	2	7	0	0	1	0
December 4.....	10	2	0	0	17	2	0	37	0	0	0
6.....	12	1	2	0	6	5	0	6	0	0	0
7.....	25	0	0	0	3	10	1	1	0	0	0
21.....	10	2	1	1	11	3	2	0	0	1	0

TABLE 20.--Insects collected at picking from lots of Spanish and Runner peanuts field cured for various periods, Tifton, Ga., 1955

Type of peanuts; insects collected	Early digging and early picking	Late digging and late picking	Early digging and late picking
Spanish peanuts	*Number*	*Number*	*Number*
Indian-meal moth	10	11	57
Corn sap beetle	28	10	38
Ephestia moths	7	8	40
Square-necked grain beetle	2	2	11
Rice weevil	6	4	2
Angoumois grain moth	2	1	8
Flour beetles	1	2	7
Cigarette beetle	0	3	4
Coffee bean weevil	0	0	4
Saw-toothed grain beetle	0	0	3
Cadelle	0	1	0
Total	56	42	174
Runner peanuts			
Corn sap beetle	32	18	43
Ephestia moths	10	4	42
Indian-meal moth	13	1	27
Square-necked grain beetle	2	9	7
Flour beetles	3	6	7
Angoumois grain moth	5	2	5
Rice weevil	1	4	4
Cigarette beetle	0	1	4
Coffee bean weevil	0	1	4
Saw-toothed grain beetle	0	0	3
Cadelle	0	0	2
Total	66	46	148

TABLE 21.--Insect-damaged kernels, cracked pods, and moisture content in Runner peanuts at various stages during harvesting by combines, Georgia, 1955

Harvesting stage and location of sample	Field No. 1			Field No. 2			Field No. 3		
	Moisture content	Pods cracked	Kernels damaged	Moisture content	Pods cracked	Kernels damaged	Moisture content	Pods cracked	Kernels damaged
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Before shaking.....	--	1.0	0.4	--	0.5	0.03	--	1.0	0.1
After shaking.....	--	1.8	.03	--	1.4	.01	--	1.3	.1
Before combining									
Surface of windrow.....	7.33	1.5	.1	7.86	1.3	.1	7.13	.6	.1
Center of windrow.....	10.11	.7	.01	12.45	.5	.02	9.42	.5	.02
Beneath windrow.....	18.49	.7	.1	18.44	.4	.04	18.02	.6	.03
After combining.....	12.85	10.0	.03	14.60	6.3	.04	12.43	8.0	.8

TABLE 22.--Insect damage found by research workers, compared with defects scored by Federal-State inspectors, in individual paired samples of peanuts, 6 commercial warehouses in Georgia, July 1957

Warehouse and sample number	Total insect damage (by count of kernels)		Defects scored in determining grade (by weight)		
	Kernels in pods	Loose shelled kernels	Damaged kernels that ride the screen		Loose shelled kernels[2]
			Total damaged	Insect damaged[1]	
Warehouse A	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1	3.2	100.0	1.0	0.75	1
2	1.7	33.3	1.0	0	2
3	3.1	53.3	3.0	.40	1
4	3.1	37.5	1.0	.20	8
5	4.6	61.1	2.0	.75	4
325	2.2	38.1	2.0	.85	5
326	3.0	32.4	1.0	.75	4
327	2.2	38.9	1.0	0	6
328	1.1	23.8	1.0	.65	5
329	3.5	25.5	1.0	.50	4
Warehouse B					
1	0	35.7	1.0	.75	3
2	1.2	26.3	1.0	.50	3
3	0	22.9	2.0	.30	3
4	1.1	33.3	1.0	.50	4
5	1.7	37.5	1.0	.25	3
70	3.9	18.2	3.0	.75	4
71	1.8	30.6	2.0	.45	6
72	1.2	10.0	1.0	.25	4
73	2.8	37.5	2.0	.75	3
74	2.3	22.2	2.0	.30	6
Warehouse C					
1	1.2	23.1	1.0	0	4
2	.6	26.9	1.0	.30	4
3	1.7	26.9	2.0	.85	3
4	2.4	23.7	1.0	.20	5
5	0	12.1	2.0	.50	6
56	1.2	33.3	1.0	.30	4
57	1.1	27.3	2.0	0	4
58	1.1	12.5	1.0	0	4
59	.6	33.3	1.0	.40	6
60	.6	25.0	1.0	.20	3
Warehouse D					
1	5.3	35.3	2.0	1.00	11
2	4.7	37.1	2.0	1.00	7
3	6.2	7.1	2.0	1.15	8
4	6.6	36.4	2.0	.20	4
5	2.9	28.6	1.0	.10	7
20	3.4	22.9	0	0	11
21	.6	20.5	.2	.20	10
22	.6	7.5	0	.10	8
23	0	5.4	1.0	.20	9
24	3.3	8.5	1.0	0	8

TABLE 22.--Insect damage found by research workers, compared with defects scored by Federal-State inspectors, in individual paired samples of peanuts, 6 commercial warehouses in Georgia, July 1957--Continued

Warehouse and sample number	Total insect damage (by count of kernels)		Defects scored in determining grade (by weight)		
	Kernels in pods	Loose shelled kernels	Damaged kernels that ride the screen		Loose shelled kernels[2]
			Total damaged	Insect damaged[1]	
Warehouse E	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1	5.0	55.3	2.0	1.00	8
2	7.0	53.5	3.0	2.55	8
3	5.3	61.1	1.0	.45	5
4	5.8	57.5	1.0	.20	5
5	5.6	56.8	2.0	1.20	5
99	2.9	26.3	1.0	.30	2
100	3.5	29.4	2.2	2.20	6
101	3.9	33.3	2.0	1.10	3
102	3.0	61.5	2.0	1.30	2
103	8.3	54.2	3.0	1.00	2
Warehouse F					
1	1.1	38.0	2.0	0	2
2	9.7	59.1	2.0	0	4
3	1.7	46.2	2.0	1.50	4
4	8.8	61.9	2.0	1.00	4
5	3.4	35.7	3.0	1.30	4
142	2.3	27.8	1.0	1.00	2
143	1.1	25.0	1.0	.50	2
144	.6	33.3	1.0	.25	2
145	4.3	35.7	2.0	1.25	3
146	2.3	11.1	5.0	0	7

[1] Included in total defects.
[2] Includes insect-damaged loose shelled kernels.

TABLE 23.--Insect damage found by research workers, compared with defects scored by Federal-State inspectors, averages for paired samples of peanuts, 6 commercial warehouses in Georgia, July 1957

Warehouse and sample number	Truckloads sampled	Total insect damage (by count of kernels)		Defects scored in determining grade (by weight)		
		Kernels in pods	Loose shelled kernels	Damaged kernels that ride the screen		Loose shelled kernels[2]
				Total damaged	Insect damaged[1]	
	Number	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Warehouse A.....	329	2.06	26.2	1.36	0.47	5.8
Warehouse B.....	70	1.24	27.6	1.47	.34	4.3
Warehouse C.....	62	1.38	30.1	1.06	.39	4.6
Warehouse D.....	24	2.70	21.1	.83	.37	6.6
Warehouse E.....	102	3.43	49.5	1.39	.81	3.6
Warehouse F.....	146	2.99	27.6	1.54	.87	3.3

[1] Included in total defects.
[2] Includes insect-damaged loose shelled kernels.