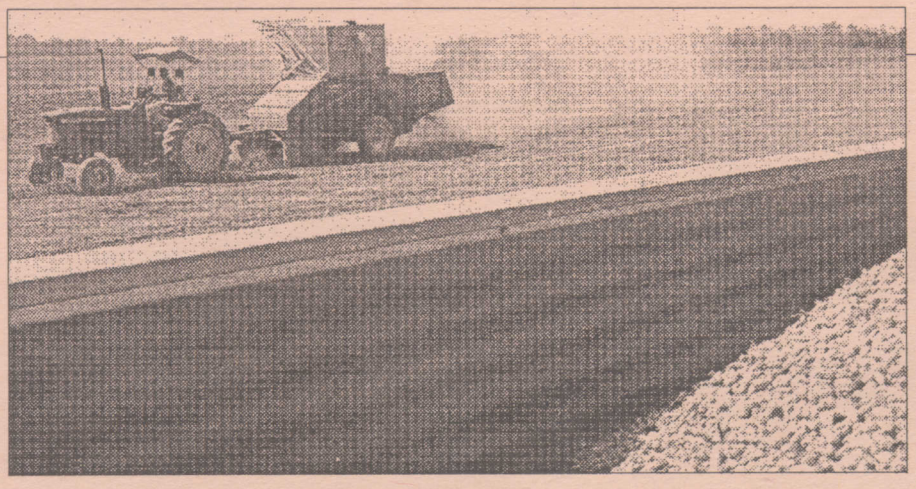


Research Update 1990 PEANUTS

FIRST IN RESEARCH UPDATE SERIES ON PEANUTS

This is the first peanut research report published in a new publication series entitled, "Research Update," which was inaugurated in 1989 by the Alabama Agricultural Experiment Station (AAES). The new series is meant to promote timely reporting of research results dealing with a specific crop or commodity, with distribution to all producers of that particular commodity. In this case, the target audience is all Alabama farmers who grow peanuts as a commercial crop.

Today's highly competitive conditions make it doubly important that farmers have available the latest scientific information. Publication of this new series is meant to help meet that need. Efforts will be made to maintain up-to-date mailing lists of each producer group so all Alabama producers will receive the appropriate report annually.

Other information about peanut production and latest recommendations are available from each county Extension Service office in Alabama.

New Fungicides Affect Varieties Differently

Both yield and grade of Florunner peanuts were improved by Spotless®, Folicur®, or Flutolanil®, when substituted for two of seven Bravo treatments on a standard 14-day leafspot spray program. Yield also was improved on Southern Runner peanuts, but quality factors were largely unaffected by using the new sterol-inhibiting fungicides.

In the Auburn tests, Spotless at 0.225[1] pound per acre and Folicur at 0.25 pound per acre were substituted for the third and fifth Bravo applications. Flutolanil at 1.0 pound per acre was tankmixed with the recommended rate of 1.5 pints per acre of Bravo and substituted for Bravo alone, also on the third and fifth fungicide applications.

All three substitute treatments reduced the incidence of both Southern stem rot and limb rot on both Florunner and Southern Runner peanuts. And, yields were increased 44-49 percent for Florunner and 24-39 percent for Southern Runner, compared to using Bravo on all seven applications.

No differences were found in sound mature kernels (SMK) amongments and varieties. However, Florunner averaged 24 percent extra large 24 percent extra large kernels (ELK), compared to 18 percent ELK for Southern Runner. In Florunners, kernel damage (DK) was 6.1 percent, compared to 1.8 percent of Southern Runner. In Florunner peanuts, the addition of Folicur to the Bravo spray program increased ELK 5 percent and decreased DK by 4 percent, while Southern Runner's values were unaffected.

J.C. Jacobi and P.A. Backman

[1]All treatment in active ingredients.

Peanut Seed Size Has Little Effect on Yield

Several sizes of peanut seed are available to growers. Planting smaller seed, often referred to as high count seed, may save growers up to $30 per acre. However, questions remain as to how smaller seed will tolerate production stresses, such as burn, from herbicides.

Studies conducted in 1989 revealed that upon germination, smaller seed resulted in smaller plants—which was expected. However, these smaller plants grew at the same rate

ALABAMA AGRICULTURAL EXPERIMENT STATION AUBURN UNIVERSITY
LOWELL T. FROBISH, DIRECTOR AUBURN UNIVERSITY, ALABAMA

as the larger plants from larger seed. The yield differential between small, high count seed and large seed was less than 100 pounds per acre.

Plants were treated with normal and excessive rates of Gramoxone®. As expected, peanut plant growth was temporarily interrupted as the damaged leaves were replaced. However, the growth delay was no different between the smaller plants and the larger plants. Seed size had only a slight effect on yield among the small, medium, and large seed used in the test.

Based on this 1-year test, which was conducted under nearly ideal weather conditions, it can be concluded that planting the larger seed simply represents a means to enter the growing season with somewhat larger plants. Consequently, the canopy did close quicker over the row middles. Whether there are additional benefits remain to be determined.

G.R. Wehtje

Lorsban for Control of Lesser Cornstalk Borer

The lesser cornstalk borer is an economic pest of several crops in the Southeast, including peanuts, corn, sorghum, and small grains. It is the most economically damaging insect pest of peanuts in the Southeast. Damaging population outbreaks occur during periods of hot, dry weather, and are more likely on peanuts grown in sandy soils.

Lorsban® is the most commonly used insecticide to manage lesser cornstalk borers. Recent AAES studies measured the residual effectiveness of Lorsban over time against lesser cornstalk borers in peanuts, and compared the performance of different application times.

Lorsban applied at planting significantly reduced survival of lesser cornstalk borer larvae at 0, 16, 22, 29, and 42 days after application. Larval survival was not significantly different from survival in untreated plots from 56 to 91 days after application. Both treatments containing planting and pegging applications reduced larval survival until 36 days after application. All of the pegging and flowering treatments significantly reduced survival of larvae immediately after application; however, the activity of each treatment varied with time. The flowering time application reduced larval survival on all days, except one day after application. The pegging application reduced survival at 10, 14, and 43 days after application.

The application of Lorsban for lesser cornstalk borer control was effective in Alabama for 42 and 102 days in 1986 and 1987, respectively. The decreased effectiveness in 1986 was probably caused by accelerated Lorsban degradation in the hot and dry weather during the growing season. The month of July in 1986 had 268 hours in which the hourly soil temperature 1 inch below the soil surface was above 95°F, compared to zero hours of such conditions in 1987.

Lesser cornstalk borer damage occurs primarily during flowering, pegging, and pod production. An insecticide applied for lesser cornstalk borer management must protect the plant from flowering to late pod-fill to reduce yield losses. The planting time application was not effective during this period in 1986. The effectiveness of this application declined when the plants were growing pods, indicating that significant pod damage could have occurred. The planting time application provided season-long control during normal moisture and temperature conditions (e.g., 1987), but not when hot, dry climatic conditions were present (e.g., 1986). A planting and a pegging application reduced lesser cornstalk borer survival from flowering to late pegging, but none of the granular insecticides that are registered for use in peanuts are labeled for two applications.

The flowering time application of Lorsban was more effective for a longer period of time than the pegging treatment in 1987, and was equivalent to a pegging time application in the other test.

T.P. Mack and M.G. Miller

Alternative Crop Rotations Improve Peanut Yields

Root-knot nematodes are primary yield-reducing pathogens of peanuts in Alabama. The banning of effective and economic soil sterilants by the EPA has left growers with limited chemical nematicide options and no new resistant varieties are expected in the near future.

One option for reducing nematode populations being tested by the AAES is the use of alternate crops that are poor hosts, or in some cases toxic to nematodes. Cotton, sesame, castor beans, American jointvetch, partridge peas, and hairy indigo are among the crops being tested in rotation with peanuts. Comparison studies included peanuts following peanuts with no chemical treatment and peanuts following peanuts in which Temik® at the rate of 3 pounds per acre active ingredient (a.i.) was applied on a 10-inch wide band.

Temik improved yields in both years of the test, but reduced juvenile root-knot nematode counts in only one year. Sesame improved peanut yields by about 100 pounds per acre more than Temik, and castor beans improved yields by about 200 pounds per acre more than the Temik-treated peanuts. In the same test, cotton, partridge peas, and American jointvetch all produced about 100 pounds per acre less than the Temik-treated plots.

In a separate test, hairy indigo,

used as a rotation crop, improved peanut yields by about 300 pounds per acre over peanuts following peanuts. The same percentage yield difference held true when both the indigo-peanut and peanut-peanut plots were treated with 3 pounds per acre a.i. of Temik.

Cotton has become an increasingly popular crop in the Wiregrass in recent years. It is doubly popular because it is not a host crop for root-knot nematodes. In tests by the AAES, cotton-peanut plots produced 3,000 pounds per acre, when neither crop was treated with Temik. When both crops, both years, were treated with Temik, yields improved to 3,200 pounds per acre. In the same test, peanuts following peanuts and not treated with Temik produced 2,600 pounds per acre and peanut-peanut plots treated with Temik produced 2,800 pounds per acre.

R. Rodriguez-Kabana

Reduced Terrachlor Rates Control White Mold

Terraclor 10G® has been used by Alabama farmers for a number of years to protect peanuts from white mold, though its use has declined in recent years. However, recent AAES research indicates reduced rates of the popular fungicide may provide better control and allow growers to reduce cost.

Disease Control and Yield Response with Reduced Rate of Terraclor 10 G on Peanuts

Fungicide	White mold hits/100 ft. of row		Yield	
	1988	1989	1988	1989
	No.	*No.*	*Lb.*	*Lb.*
Terraclor 10G, 100 lb. .	6.7	11.2	3,611	3,667
Terraclor 10G, 50 lb. ...	5.8	8.8	3,986	4,004
Spotless 25W, 1 lb.	3.4	1.3	4,044	4,331
Nontreated control	12.4	17.2	3,243	3,477

Tests were conducted in 1988 and 1989 in two farm fields with a history of high peanut yield losses from white mold. Florunner peanuts were planted in all fields in early May and maintained according to current recommendations. Terraclor 10G was applied at early peg at the reduced rate of 50 pounds per acre and full rate of 100 pounds per acre of formulated product. The reduced rate was applied on a 4-inch band by centering the drop tube directly over the row, while a 5-inch bander was used to apply the full rate on a 12-inch band width.

Over the 2-year period, the reduced rate of Terraclor 10G gave equal to slightly better disease control than the same fungicide at the full label rate. Plots treated with the reduced rate yielded an average of 356 pounds per acre higher than those treated with the full rate. The experimental fungicide Spotless gave superior white mold control and higher yields both years than the full rate of Terraclor. However, similar yields were obtained in the plots treated with the reduced rate of Terraclor 10G and Spotless in 1988.

Austin Hagan

New Fungicides May Reduce Peanut Aflatoxins

Three new fungicides, which soon may be marketed, showed some promising effects on decreasing concentration of aflatoxin contamination found in irrigated peanuts grown in 1988. When these fungicides, Spotless®, Folicur®, and Flutolonil®, were applied to peanut plants at pegging for control of soilborne diseases, seed harvested from treated plants were shown to contain 11-33 percent less aflatoxin than kernels from plants treated with recommended fungicides.

However, in 1989, in peanuts from unirrigated plots, fungicidal applications did not reduce aflatoxin concentration. It is assumed the lack of impact of these experimental fungicides on aflatoxin concentration in the second year of testing was primarily weather related.

Exterior tissue of whole, intact peanut seed (5-10 percent by weight, including testa and outer layers of cotelydonary tissue) have been shown to contain the majority of aflatoxin contamination in peanuts sampled. This may prove to be a method by which aflatoxins can be removed.

K.L. Bowen

Integrated Pest Management Program Being Developed for Peanuts Pests

AU-Pnut, Auburn University Peanut pest management program, is being developed to help farmers manage nematodes, fungal diseases, and insect pests of peanuts. The program is using an "expert system" approach which allows incorporation of qualitative reasoning as well as quantitative analysis. The expert system also has the advantage that the reasoning behind recommendations can be displayed to inform users about integrated pest management concepts.

To arrive at a recommendation, information on growing conditions, level of pest occurrence, or weather conditions are input and the program interprets the input to determine if a conclusion can be reached or if more information is needed. At the end of the conclusion, the farmer can request "how" a conclusion was reached and the logic flow and calculations leading to the recommen-

dation are then displayed.

Currently, AAES researchers are validating AU-Pnut at the Wiregrass Substation in Headland. Also, effects of rotations, fungicide use patterns for leafspot and white mold, and variety susceptibility to fungal diseases are being investigated to refine knowledge on how these inputs affect peanut yield, quality, and pest management practices.

D.P. Davis, T.P. Mack, P.A. Backman, and R. Rodriguez-Kabana

Disease Cost May Be Cut for Southern Runners

Leafspot control alone may cost peanut growers over $50 per acre. Recent AAES tests indicate that fungicide cost may be reduced by alternative management practices on Southern Runner peanuts.

Tests at the Wiregrass Substation in Headland compared reduced rates of Bravo®, longer intervals between Bravo applications, and the use of less expensive fungicides on Florunner versus Southern Runner peanuts.

By reducing the rate of Bravo from 1.5 pints (active ingredient) to 3/4 pint and delaying harvest 14 days, Florunner yields dropped from 3,157 to 2,666 pounds per acre, compared to 3,344 pounds per acre for Southern Runner. By using Manzate® instead of Bravo for leafspot control and delaying harvest 14 days, Florunner yields declined from 2,649 to 2,114 pounds per acre, compared to 2,837, a decline from 3,143 pounds per acre for Southern Runner, see table.

Effective Full season Spray Program On Yield and Leafspot Severity of Southern Runner and Florunner Peanuts, Three-year Average

Treatment[1]	Yield per acre: Optimum harvest date	Yield per acre: Harvest delayed 14 days	Leafspot defoliation[2]
	Lb.	*Lb.*	*Pct.*
Florunner			
Bravo 0.55 lb.	2,757	2,666	44.7
Bravo 1.1 lb.	2,868	2,672	36.0
Manzate 1.5 lb.[3]	2,649	2,114	53.0
Southern Runner			
Bravo 0.55 lb.	3,124	3,344	46.1
Bravo 1.1 lb.	3,179	3,106	31.8
Manzate 1.5 lb.	3,143	2,837	51.2

[1] All rates are in pounds active ingredient per acre.
[2] Defoliation rated prior to harvest.
[3] Equals 2.0 pounds Manzate 200 BF.

Over the past 3 years, Southern Runner has averaged 65 percent less white mold damage than Florunner in tests at the AAES. Observations of the two varieties indicate Southern Runner is less susceptible to tomato spotted wilt virus, but no differences were detected in limb and pod rot, two soilborne diseases that appear to be increasing in frequency in the Southeast.

Based on the AAES tests, it appears that Southern Runner can be managed for peanut leafspot less intensively and without significant yield loss, and it is less susceptible to white mold. It can be a good variety to grow in fields with a history of high white mold and leafspot pressure.

J. C. Jacobi and P. A. Backman

Classic Tank Mixes Can Cause Leaf Burn

Last season Classic® herbicide was labeled for Florida beggarweed control in peanuts. Since the label restricts its use to 60-100 days after emergence, numerous questions arose about tank mixing it with other commonly used peanut pesticides.

Results from a test conducted during 1989 at the Wiregrass Substation demonstrated that several of the tank mix combinations did cause temporary peanut foliar burn, but no significant yield reduction. The Asana XL® formulation, Bravo 720®, and Classic tank mixture did show a significant increase in foliar burn symptoms, while it was slight in all other tank mix combinations. Generally, Bravo 720 did not increase the level of damage in the combination mixtures.

Lannate®, Orthene®, and Asana are labeled insecticides for various foliar insect pests of peanuts. Based on these results, Bravo, a leafspot fungicide, could be safely mixed with Classic at their recommended rates. Lannate or Orthene also could be added to the tank mixture if needed for foliar insect control. Research indicates, however, that foliage burn can be expected when mixing Classic and Bravo with Asana XL. Adding any additional materials, such as crop oils, sulfur, or foliage fertilizers, to Classic-Bravo-insecticide spray mixtures may increase the absorption of these pesticides and enhance crop injury.

J.R. Weeks

Peanut Foliage Damage and Effect on Yield from Pesticide Tank Mixes with Classic Herbicide

Pesticide mixture	Leaf burn	Yield/acre
	Rating[1]	*Lb.*
Classic + Larvin	0.2	3,280
Classic + Asana XL	0.8	3,385
Classic + Orthene	0.6	3,381
Classic + Lannate	0.6	3,505
Classic + Larvin + Bravo	0.3	3,482
Classic + Asana XL + Bravo	1.3	3,428
Classic + Orthene + Bravo	0.6	3,469
Classic + Lannate + Bravo	0.4	3,182
Untreated	0.0	3,312

[1] 0 = no damage; 5 = total defoliation.

Lime May Provide Peanut Calcium Needs

Calcium is still the most important fertility input for peanut production and seed quality in Alabama. Many growers apply gypsum to supply supplemental calcium, but recent AAES research indicates that lime may provide the calcium needs of peanuts, if it is applied and managed properly.

Yields decreased when lime was placed below the pegging zone (top 3 inches of soil) with a moldboard plow. When lime was placed and remained in the pegging zone, yields were equal to treatments in which supplemental gypsum was applied to peanuts. These tests also showed that previously plowed down lime can supply adequate calcium the following year, if the field is plowed again to bring the calcium back up to the pegging zone.

Effect of calcium on seed quality is also important since producers of certified and foundation seed are concerned with germination percentage of peanuts they produce. On-farm tests have shown that germination is associated with seed calcium content. These experiments have also shown that the level of seed calcium concentration for runner type peanuts must be above 309 parts per million (p.p.m.), whereas Virginia types require over 420 p.p.m. to produce seed of maximum germination. These data also suggest that maximum germination quality requires higher soil test calcium than is required for maximum yield.

J.F. Adams and D.L. Hartzog

Computer Program Accurately Predicts Leafspot Fungicide Needs

Peanut farmers who apply fungicides on a 14-day programmed schedule probably over-treat when conditions are hot and dry, and probably under-treat when conditions are wet. Further, the new leafspot tolerant variety Southern Runner probably needs fewer fungicide applications to achieve maximum yields than does the Florunner variety. A commercial company, Neogen, is presently developing a computerized leafspot predicting weather station, which by monitoring weather and timing of previous sprays can provide a recommendation for the next fungicide treatment.

In 1989 AAES research, the Neogen Envirocaster was compared to a set of expert rules for peanut leafspot treatment called "AU-Pnuts." Both of these predictive systems were compared to the standard 14-day program.

The standard 14-day program made seven applications of Bravo 720 during the 1989 peanut growing season, while the Neogen and AU-Pnuts systems each recommended six applications. Disease control on Florunner peanuts was best with the AU-Pnuts program, with the 14-day standard schedule second, and the Neogen system last; however, all of the schedules did a good job of disease control. The weakness of the Neogen equipment was that it did not utilize weather forecasts that predicted long periods of rainfall that occurred when tropical depressions were in the vicinity.

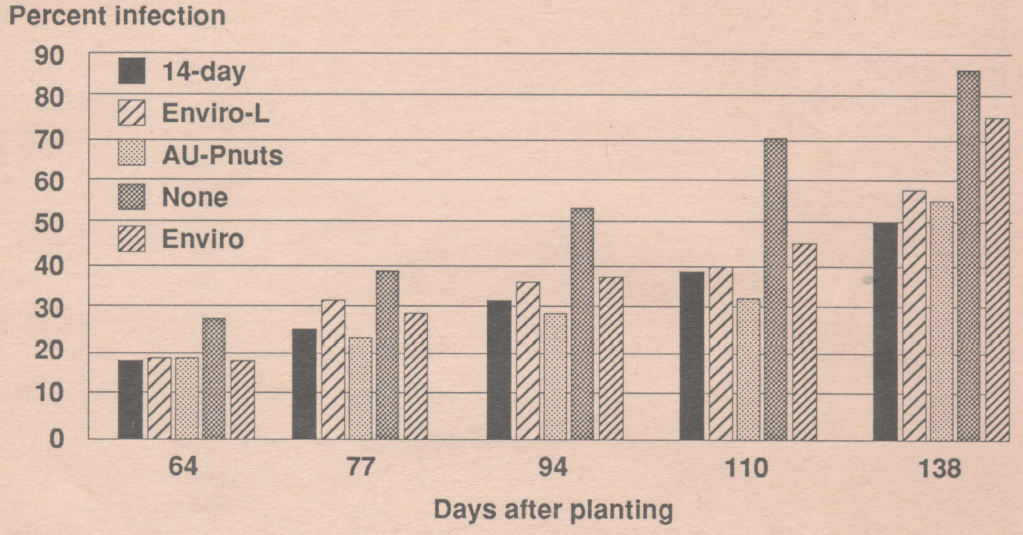
In Southern Runner variety, AU-Pnuts also was the top performing program; Neogen's model again was worse than the 14-day program.

Southern Runner yields showed little response to these changes in peanut leafspot control.

The data indicated that predictive programs can be developed for Southeastern peanuts that will allow for reductions in frequency of pesticide applications. The applications made are more timely since they are coordinated with infection periods for the peanut leafspot fungi.

P. A. Backman, J. C. Jacobi, and D. P. Davis

Comparison of leafspot predictive systems-Florunner 14-day program vs. Neogen and AU-Pnuts, 1989
% infection = leaves lost + leaves infected/total leaves



Nitrogen Fixation Provides Most of Peanut N Requirement

Peanut plants are nitrogen-fixing legumes that are able to obtain required nitrogen (N_2) from the air. The bacteria that carry out the N_2 fixation process live in nodules on the peanut root. They also live independently in the soil and may nodulate other legumes, such as beggarweed, cowpea, and kudzu. AAES research shows no shortage of peanut rhizobia in soils of the Wiregrass area, even after long periods in pastures or woods.

Further research shows the effectiveness of N_2 fixation in providing high yields of protein by peanuts. From early pod development to maturity, peanuts fix from 1.3 to 2.1 pounds of atmospheric nitrogen per acre per day. Nearly all this nitrogen goes into kernel development. By harvest time, the crop has obtained 67 to 82 percent of its total nitrogen content from the atmosphere. Much of the soil-derived portion of crop nitrogen is absorbed in the pre-bloom stage before N_2 fixation becomes rapid.

The AAES studies indicate the N_2 fixation system can provide the nitrogen needed for maximum yield of peanuts. Applying nitrogen fertilizer simply replaces a corresponding amount that would be obtained from the air and does not increase yield.

A.E. Hiltbold

EDITOR'S NOTE

Mention of company or trade names does not indicate endorsement by the Alabama Agricultural Experiment Station or Auburn University of one brand over another. Any mention of non-label uses or applications in excess of labeled rates of pesticides or other chemicals does not constitute a recommendation. Such use in research is simply part of the scientific investigation necessary to fully evaluate materials and treatments.

Information contained herein is available to all persons without regard to race, color, sex, or national origin.

April 1990 4M

Support Peanut Research

Funds appropriated by the Alabama Legislature provide the major financial support for Alabama Agricultural Experiment Station research. Hatch funds from the U.S. Government also represent an important funding source. Since these funds are limited, many areas of research would go unsupported, except for financial support from various granting agencies, commodity groups, and other friends of the Experiment Station. Contributions of these supporters to the AAES program of research are acknowledged with gratitude. Among these supporters of AAES research, the following are recognized for their contributions to research on peanuts:

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