3-1999

# Proceedings of the 26th Annual Meeting, Southern Soybean Disease Workers (March 20-22, 1999, Robinson, Mississippi)

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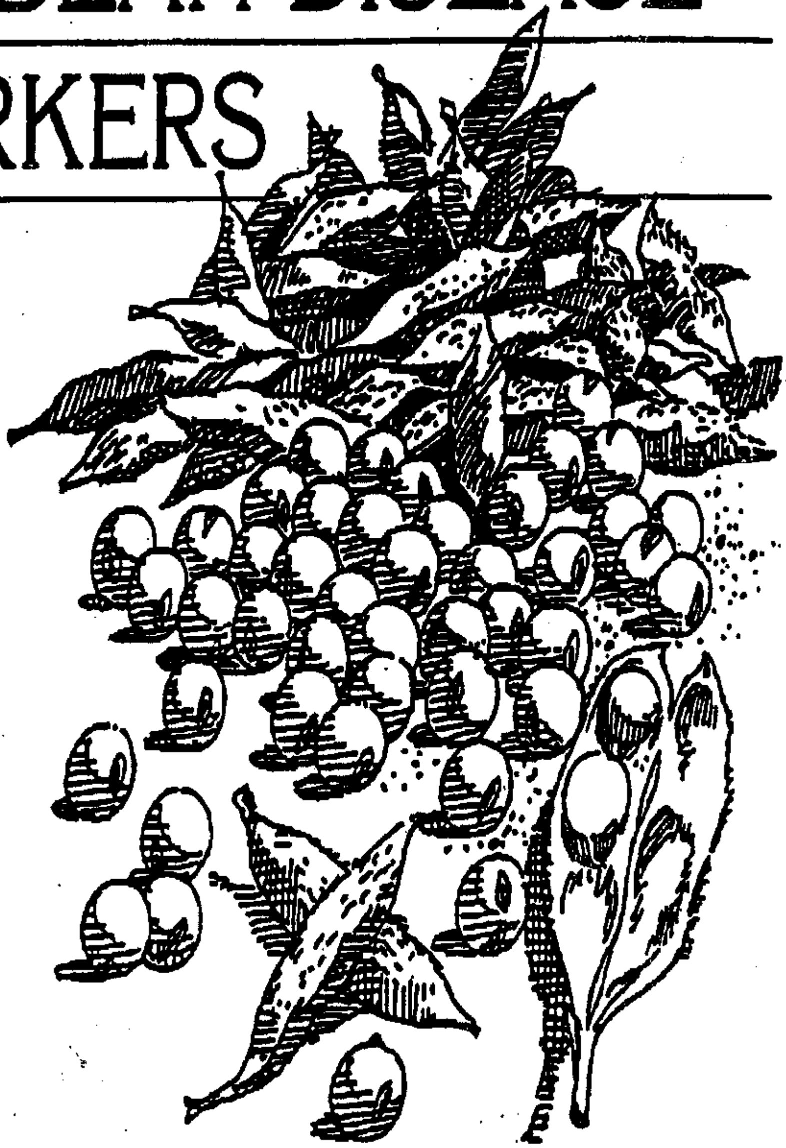
# PROCEEDINGS OF THE SOUTHERN SOYBEAN DISEASE WORKERS



**TWENTY-SIXTH ANNUAL MEETING**
**MARCH 20-22, 1999**
**ROBINSON, MS**

# PROGRAM
# AGENDA

**Southern Soybean Disease Workers**
**Twenty-Sixth Annual Meeting**

## March 20-22, 1999

**Sam's Town Hotel & Gambling Hall**
**Robison, MS**

**Saturday, March 20**
**8:00 p.m. - SSDW Steering Committee Meeting**
**Sunday, March 21**
**7:30 a.m. - 8.00 a.m. - Registration**

**8:00 a.m. Opening Session and Announcements**

**8:15 a.m. Presidential Address**

**<u>Contributed Paper Session</u>**

| | | |
|---|---|---|
| **8:15-8:30** | » | **Resistance Ratings for 288 soybean Cultivars to the Reniform nematode, *Rotylenchulus reniformis*. R.T. Robbins, L. Rakes, and L. Jackson, University of Arkansas.** |
| **8:30-8:45** | » | **Evaluation of Azoxystrobin on two Foliar Soybean Diseases in Arkansas. C.M. Coker, University of Arkansas.** |
| **8:45-9:00** | » | **Early Soybean Production System in Missouri: Progress and Potential. J.A. Wrather, and D.A. Sleper, University of Missouri, Columbia.** |
| **9:00-9:15** | » | **A New Phomopsis Disease of Soybeans in Mississippi. G.L. Sciumbato and B.L. Keeling, Mississippi State University.** |
| **9:15-9:30** | » | **Reaction of Soybean Genotypes to Sudden Death Syndrome. J.H. Klein, M.E. Schmidt, R.E. Whelan, J.S. Russin, R.J. Suttner, M.A. Shenaut, and P.T. Gibson, Southern Illinois University.** |
| **9:30-9:45** | » | **Additional Studies on the Use of Soybean as a Rotation Crop for the Management of Root-knot Nematodes in Peanut. C.F. Weaver, R.Rodriguez-Kabana and C.R. Taylor. Auburn University.** |
| **9:45-10:00** | » | **Comparison of Soybean Meal with Other Legume Meals as Amendments to Soil for Control of Plant-Parasitic Nematodes. P.S. King, R. Rodriguez-Kabana, and C.R. Taylor, Auburn University.** |
| **10:00-10:15** | » | **Tolerance of Selected Roundup Ready Soybean Cultivars to Columbia Lance Nematode. S.R. Koenning, North Carolina State University.** |
| **10:15-10:30** | » | **Break.** |

| | | |
|---|---|---|
| **10:15-11:15** | ➻ | **State Reports - Diseases**<br>**John Russin, Southern Illinois University.** |
| **11:15-12:00** | ➻ | **Panel Discussion , Where has all the resistance gone? S.R. Koenning and J.S. Russin.** |
| **12:15-12.30** | ➻ | **SSDW Business Meeting** |
| **1:00-2.00** | ➻ | **Steering Committee Exit Meeting** |

**PROCEEDINGS OF THE**

**SOUTHERN SOYBEAN DISEASE WORKERS**

**TWENTY-SIXTH ANNUAL MEETING**

**MARCH 20-22, 1999**

**ROBINSON, MS**

Saturday - March 20

Steering Committee Meeting

Sunday - March 21

Contributed Paper Session
State Reports
Panel Discussion
Business Session
Steering Committee Exit Meeting

Proceedings of the Southern Disease Workers are published annually by the Southern Soybean Disease Workers.





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**1998-1999 Officers**

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### BUSINESS SECTION

# SOUTHERN UNITED STATES SOYBEAN DISEASE LOSS ESTIMATE FOR 1998

Compiled by Phillip W. Pratt, Area Extension Plant Pathology Specialist, Oklahoma Cooperative Extension Service, Oklahoma State University, Muskogee, OK 74401

Since 1974, soybean disease loss estimates for the Southern United States have been published in the Southern Soybean Disease Workers Proceedings. Summaries of the results from 1977 (7), 1985 and 1986 (1), 1987 (2), 1988 to 1991 (6), 1992 to 1993 (9), 1994 (12), 1994 to 1996 (4) have been published. A summary of the results from 1974 to 1994 has also been published (8).

The loss estimates for 1998 published here were solicited from: Bill Gazaway in Alabama, Clifford Coker in Arkansas, Robert Mulrooney in Delaware, Tom Kucharek in Florida, Richard Davis in Georgia, Don Hershman in Kentucky, Ken Whitam in Louisiana, Gabe Sciumbato in Mississippi, Allen Wrather in Missouri, Steve Koenning in North Carolina, Phil Pratt in Oklahoma, Charles Drye in South Carolina, Melvin Newman in Tennessee, Joseph Krausz in Texas, and Patrick Phipps in Virginia. As recommended by Dr. Arvydas Grybauskas, University of Maryland, the Maryland soybean disease loss estimate was provided by Robert Mulrooney of Delaware. Various methods were used to obtain the disease losses, and most individuals used more than one. The methods used were: field surveys, plant disease diagnostic clinic samples, variety trials, questionnaires to Cooperative Extension staff, research plots, grower demonstrations, private crop consultant reports, and foliar fungicide trials. The actual production figures for each state were supplied by the state crop reporting services. Production losses were based on estimates of yield in the absence of disease.

In the southern states, the 1998 average soybean yield and acreage decreased from what was reported in 1997 (5). In 1998, 508.330 million bushels were harvested from 18.475 million acres in 16 southern states. The overall average for the 16 reporting states was 27.5 bushels/a. The overall average reported in 1997 was 31.8 bushels/a. The 1998 total acres harvested, average yield in bushels per acre, and total production in each state are presented in Table 1.

Percentage loss estimates from each state are specific as to causal organism or the common name of the disease (Table 2). The total average percent disease loss for 1998 was 11.53%. This is an increase over the 1997 percent soybean disease reported to have been 9.46% (5). In 1998, Mississippi reported the greatest loss at 29.70%, followed by Tennessee at 14.45%. Maryland reported the least at 3.66% (Table 2).

The estimated reduction of soybean yields is specific as to the causal organism or the common name of the disease (Table 3). The estimated reduction in soybean yield due to diseases during 1998 was greatest in Mississippi with 20.461 million bushels and least in Florida with 0.055 million bushels. The total reduction in soybean yield due to diseases in the 16 southern states was 78.282 million bushels in 1998. The estimated value of this loss was $508,830,000 (based on $6.50/bu).

In 1998, the highest estimated percent loss was caused by soybean cyst nematode at 2.50% (16.394 million bushels) (Table 2 & 3). However the disease causing the largest yield loss was charcoal rot at 18.424 million bushels (Table 3). This was due to significant infections of charcoal rot in Kentucky, Louisiana, Mississippi, Oklahoma and Texas. In these five states charcoal rot was estimated to be the most destructive soybean disease in 1998. The least reported disease was brown stem rot. Brown stem rot was not reported as occurring in any of the 16 southern states.

In 1998, diseases continued to cause significant loss in soybean production throughout the 16 southern states that participated in this disease loss estimate. It is essential that Extension and University research continue their efforts to discover methods to control these diseases and to educate soybean producers concerning the best methods to prevent yield loss due to soybean diseases.

Table 1. Soybean production for 16 southern states in 1998.

| State | Acres harvested | Yield/acre (bu) | Total production (bu) |
|---|---|---|---|
| Alabama | 320,000 | 25 | 8,000,000 |
| Arkansas | 3,350,000 | 25 | 83,750,000 |
| Delaware | 215,000 | 28 | 6,020,000 |
| Florida | 35,000 | 23 | 805,000 |
| Georgia | 250,000 | 20 | 5,000,000 |
| Kentucky | 1,230,000 | 29 | 35,670,000 |
| Louisiana | 1,100,000 | 21 | 23,100,000 |
| Maryland | 460,000 | 26 | 11,960,000 |
| Mississippi | 1,950,000 | 25 | 48,750,000 |
| Missouri | 5,100,000 | 34 | 173,400,000 |
| North Carolina | 1,425,000 | 25 | 35,625,000 |
| Oklahoma | 380,000 | 23 | 8,740,000 |
| South Carolina | 610,000 | 21 | 12,810,000 |
| Tennessee | 1,270,000 | 36 | 45,720,000 |
| Texas | 400,000 | 25 | 10,000,000 |
| Virginia | 490,000 | 24 | 11,760,000 |
| Total | 18,475,000 | Avg. = 27.5 | 508,330,000 |

Table 2. Estimated percentage loss of soybean yields for 16 southern states during 1998[a]

| Disease | AL | AR | DE | FL | GA | KY | LA | MD | MS | MO | NC | OK | SC | TN | TX | VA | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anthracnose | 2.00 | 0.56 | TR[b] | 1.00 | 0.10 | 1.00 | 1.00 | 0.01 | 0.80 | .... | 0.05 | 0.50 | 1.00 | 0.50 | 2.50 | TR | **0.69** |
| Bacterial diseases | .... | 0.01 | .... | .... | .... | 0.01 | TR | .... | TR | .... | 0.01 | TR | 0.05 | .... | .... | .... | **0.005** |
| Brown leaf spot | .... | 0.02 | .... | .... | 0.10 | 0.20 | 0.10 | .... | 0.20 | .... | 0.06 | TR | 0.10 | 0.50 | 0.10 | .... | **0.09** |
| Brown stem rot | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | **0.000** |
| Charcoal rot | TR | 0.50 | 0.50 | .... | 0.10 | 4.00 | 4.00 | 0.50 | 14.00 | 2.00 | 0.20 | 3.00 | 0.10 | 2.00 | 3.50 | TR | **2.21** |
| Diaporthe/Phomopsis | 1.00 | 3.50 | .... | 1.00 | 0.50 | 1.00 | 0.10 | TR | 4.00 | TR | 0.10 | 0.50 | 0.005 | 0.01 | 1.00 | TR. | **0.86** |
| Downy mildew | 0.50 | 0.01 | .... | .... | 0.10 | 0.01 | TR | .... | TR | .... | 0.01 | TR | 0.05 | 0.01 | .... | .... | **0.04** |
| Frogeye | 0.50 | 0.10 | | | 0.50 | 0.50 | 0.20 | .... | TR | 1.00 | .... | .... | 0.10 | 4.00 | 1.00 | .... | **0.47** |
| Fusarium wilt & rot | .... | 0.01 | .... | .... | .... | 0.01 | TR | .... | 0.05 | .... | .... | .... | 0.01 | .... | 0.20 | .... | **0.02** |
| Other diseases[c] | .... | .... | .... | .... | 0.30 | .... | .... | .... | .... | .... | 5.05 | .... | 0.60 | .... | .... | .... | **0.37** |
| Phytophthora rot | .... | 0.04 | .... | .... | .... | 0.02 | 0.10 | .... | 1.50 | 1.50 | 0.30 | 0.05 | 0.01 | 0.10 | 0.10 | .... | **0.23** |
| Pod & stem blight | 2.00 | 0.60 | 0.25 | .... | 0.10 | 0.50 | 3.00 | 0.10 | 1.00 | .... | 0.01 | 1.00 | 0.95 | 0.01 | 2.00 | TR | **0.72** |
| Purple seed stain | 0.20 | 0.49 | .... | 0.10 | 0.10 | 0.10 | 3.00 | TR | 2.00 | .... | 0.01 | 0.40 | 0.25 | 0.01 | 2.00 | .... | **0.54** |
| Aerial blight | TR | 0.50 | .... | .... | .... | .... | 0.50 | .... | 5.00 | .... | .... | .... | .... | .... | 0.20 | .... | **0.39** |
| Sclerotinia stem rot | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0.10 | .... | **0.006** |
| Seedling diseases | 0.50 | 1.65 | TR | 1.00 | 2.50 | 0.10 | TR | TR | 0.40 | 0.50 | 0.02 | 0.75 | 0.10 | 2.50 | 0.50 | TR | **0.66** |
| Southern blight | .... | 0.01 | .... | 0.10 | 0.20 | 0.01 | TR | .... | 0.10 | .... | 0.06 | 0.10 | 1.00 | 0.10 | 0.20 | .... | **0.12** |
| Soybean cyst nematode | 2.50 | 1.25 | 4.00 | 1.00 | 3.0 | 3.50 | 1.00 | 3.00 | 0.20 | 4.00 | 5.50 | 1.50 | 3.00 | 3.50 | .... | 3.00 | **2.50** |
| Root-knot nematode | 1.50 | 1.40 | 0.50 | 0.10 | 3.0 | .... | 1.00 | 0.05 | 0.05 | TR | 0.80 | 0.10 | 3.00 | .... | 0.20 | 0.50 | **0.76** |
| Other nematodes[d] | .... | 0.10 | TR | .... | 0.50 | .... | 1.00 | .... | 0.10 | .... | 0.50 | .... | 2.00 | 0.10 | .... | 0.50 | **0.30** |
| Stem Canker | TR | 0.20 | TR | .... | 0.50 | 0.80 | TR | .... | 0.10 | .... | .... | .... | .... | 0.10 | 0.10 | .... | **0.11** |
| Sudden death syndrome | 0.50 | 0.18 | .... | .... | .... | 0.50 | .... | .... | TR | 1.00 | .... | .... | .... | 1.00 | 0.10 | .... | **0.20** |
| Virus[e] | .... | 0.07 | TR | .... | .... | 0.50 | 1.00 | .... | 0.20 | .... | 0.20 | TR | 1.50 | 0.01 | 0.30 | TR | **0.24** |
| **Total** | **11.20** | **11.20** | **5.26** | **6.40** | **11.60** | **12.31** | **16.01** | **3.66** | **29.70** | **10.00** | **12.88** | **7.90** | **13.83** | **14.45** | **14.10** | **4.01** | **11.53** |

[a] Rounding errors present. [b] TR = trace

[c] Other diseases include: ozone and black root rot (*Cylindrocladium parasticum*) in NC and SC, red crown rot (*Cylindrocladium crotalariae*).in GA.

[d] Other nematodes include: Dagger in TN; Lance in NC, SC, TN and TX; Reniform in AR, LA, and MS; Ring in SC, Root lesion in DL, NC and TN; Spiral in TN; Sting in NC and SC; Stubby root in TN and VA.

[e] Viruses were identified as: Bean pod mottle in AR, KY, MS, NC, OK, and TX; Bean yellow mosaic in TX; Peanut mottle in VA; Soybean mosaic in AR, KY, MS, NC, OK, SC, TN, TX and VA; Soybean severe stunt in DL; Tobacco ringspot in AR..

Table 3. Estimated reduction of soybean yield (bushels x$10^6$) for 16 southern states during 1998[a]

| Disease | AL | AR | DE | FL | GA | KY | LA | MD | MS | MO | NC | OK | SC | TN | TX | VA | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anthracnose | 0.180 | 0.528 | 0.001 | 0.009 | 0.006 | 0.407 | 0.275 | 0.002 | 0.555 | .... | 0.020 | 0.047 | 0.149. | 0.210 | 0.237 | 0.001 | **2.624** |
| Bacterial diseases | .... | 0.009 | .... | .... | .... | 0.004 | 0.001 | .... | 0.001 | .... | 0.004 | 0.001 | 0.007 | .... | .... | .... | **0.026** |
| Brown leaf spot | .... | 0.019 | .... | .... | 0.006 | 0.081 | 0.028 | .... | 0.139 | .... | 0.024 | 0.001 | 0.015 | 0.210 | 0.009 | .... | **0.531** |
| Brown stem rot | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | **0.0** |
| Charcoal rot | 0.001 | 0.472 | 0.032 | 0.009 | 0.006 | 1.627 | 1.100 | 0.062 | 9.709 | 3.853 | 0.082 | 0.285 | 0.015 | 0.842 | 0.332 | 0.001 | **18.424** |
| Diaporthe/Phomopsis | .0.090 | 3.301 | .... | 0.017 | 0.028 | 0.407 | 0.028 | 0.001 | 2.774 | 0.002 | 0.041 | 0.047 | 0.001 | 0.004 | 0.095 | 0.001 | **6.835** |
| Downy mildew | 0.045 | 0.009 | .... | .... | 0.006 | 0.004 | 0.001 | .... | 0.001 | .... | 0.004 | 0.001 | 0.007 | 0.004 | .... | .... | **0.081** |
| Frogeye | 0.045 | 0.094 | .... | 0.001 | 0.028 | 0.020 | 0.055 | .... | 0.001 | 1.927 | .... | .... | 0015 | 1.683 | 0.095 | .... | **3.964** |
| Fusarium wilt & rot | .... | 0.009 | .... | .... | .... | 0.004 | 0.001 | .... | 0.035 | .... | .... | .... | 0.001 | .... | 0.019 | .... | **0.069** |
| Other diseases | .... | .... | .... | .... | 0.017 | .... | .... | .... | .... | .... | 2.065 | .... | 0.089 | .... | .... | .... | **2.171** |
| Phytophthora rot | .... | 0.038 | .... | .... | .... | 0.008 | 0.028 | .... | 1.040 | 2.890 | 0.123 | 0.005 | 0.001 | 0.042 | 0.009 | .... | **4.184** |
| Pod & stem blight | 0.180 | 0.566 | .0.016 | .... | 0.006 | 0.203 | 0.825 | 0.012 | 0.693 | .... | 0.004 | 0.095 | 0.141 | 0.004 | 0.190 | 0.001 | **2.936** |
| Purple seed stain | 0.018 | 0.462 | .... | 0.001 | 0.006 | 0.041 | 0.825 | 0.001 | 1.387 | .... | 0.004 | 0.038 | 0.037. | 0.004 | 0.190 | .... | **3.012** |
| Aerial blight | 0.001 | 0.472 | .... | .... | .... | .... | 0.138 | .... | 3.467 | .... | .... | .... | .... | .... | 0.019 | .... | **4.096** |
| Sclerotinia stem rot | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0.009 | .... | **0.009** |
| Seedling diseases | 0.045 | 1.556 | 0.001 | 0.009 | 0.141 | 0.041 | 0.001 | 0.001 | 0.277 | 0.963 | 0.008 | 0.071 | 0.015 | 1.052 | 0.047 | 0.001 | **4.227** |
| Southern blight | .... | 0.009 | .... | 0.001 | 0.011 | 0.004 | 0.001 | .... | 0.069 | .... | 0.024 | 0.010 | 0.149 | 0.042 | 0.019 | .... | **0.339** |
| Soybean cyst nematode | 0.225 | 1.179 | 0.254 | 0.009 | 0.170 | 1.424 | 0.275 | 0.372 | 0.139 | 7.707 | 2.249 | 0.142 | 0.446 | 1.473 | .... | 0..330 | **16.393** |
| Root-knot nematode | 0.135 | 1.320 | 0.032 | 0.001 | 0.170 | .... | 0.275 | 0.006 | 0.035 | 0.002 | 0.327 | 0.010 | 0.446 | .... | 0.019 | 0.055 | **2.832** |
| Other nematodes | .... | 0.094 | 0.001 | | 0.028 | .... | 0.275 | .... | 0.069 | .... | 0.204 | .... | 0.297 | 0.042 | .... | 0.055 | **1.066** |
| Stem canker | 0.001 | 0.189 | 0.001 | | 0.028 | 0.325 | 0.001 | .... | 0.069 | .... | .... | .... | .... | 0.042 | 0.009 | .... | **0.664** |
| Sudden death syndrome | 0.045 | 0.170 | .... | | .... | 0.203 | .... | .... | 0.001 | 1.927 | .... | .... | .... | 0.421 | 0.009 | .... | **2.776** |
| Virus | .... | 0.066 | 0.001 | .... | .... | 0.203 | 0.275 | .... | 0.139 | .... | 0.082 | 0.001 | 0.223 | 0.004 | 0.028 | 0.001 | **1.021** |
| **Total** | **1.009** | **10.563** | **0.334** | **0.055** | **0.656** | **5.007** | **4.402** | **0.455** | **20.600** | **19.271** | **5.267** | **0.750** | **2.005** | **6.081** | **1.336** | **0.441** | **78.282** |

[a]Rounding errors present.[b] = < 1,000 bu/acre loss in yield. [C] Other diseases include: ozone and black root rot (*Cylindrocladium parasticum*) in NC and SC, red crown rot (*Cylindrocladium crotalariae*) in GA.
[d] Other nematodes include: Dagger in TN; Lance in NC, SC, TN and TX; Reniform in AR, LA, and MS; Ring in SC, Root lesion in DL, NC and TN; Spiral in TN; Sting in NC and SC; Stubby root in TN and VA.
[e] Viruses were identified as: Bean pod mottle in AR, KY, MS, NC, OK, and TX; Bean yellow mosaic in TX; Peanut mottle in VA; Soybean mosaic in AR, KY, MS, NC, OK, SC, TN, TX and VA; Soybean severe stunt in DL; Tobacco ringspot in AR.

Literature Cited


1. Mulrooney, R. P. 1988. Soybean disease loss estimate for Southern United States in 1985 and 1986. Plant Disease 72:364-365.

2. Mulrooney, R. P. 1988. Soybean disease loss estimate for Southern United States in 1987. Plant Disease 72:915.

3. Pratt, Phillip W. 1997. Proceedings of the Southern Soybean Disease Workers. pp 1-7.

4. Pratt, Phillip W. and Wrather, J. Allen. 1998. Soybean disease loss estimates for the Southern United States during 1994-1996. Plant Disease 82:114-116.

5. Pratt, Phillip W. 1998. Proceedings of the Southern Soybean Disease Workers. pp 1-7.

6. Sciumbato, G. L. 1993. Soybean disease loss estimate for the Southern United States during 1988-1991. Plant Disease 77:954-956.

7. Whitney, G. 1978. Southern states soybean disease loss estimates-1977. Plant Disease Reporter 62:1078-1079.

8. Wrather, J. Allen, A. Y. Chambers, J. A. Fox, W. F. Moore, and G. L. Sciumbato. 1995. Soybean disease loss estimates for the southern United States, 1974 to 1994. Plant Disease 79:1076-1079.

9. Wrather, J. Allen and G. L. Sciumbato. 1995. Soybean disease loss estimates for the Southern Untied States during 1992-1993. Plant Disease 79:84-85.

10. Wrather, J. Allen. 1995. Proceedings of the Southern Soybean Disease Workers. pp 1-6.

11. Wrather, J. Allen. 1996. Proceedings of the Southern Soybean Disease Workers. pp 1-7.

12. Wrather, J. Allen, T.R. Anderson, D.M. Arsyad, J. Gai, L.D. Ploper, A. Porta-Puglia, H.H. Ram, J.T. Yorinori. 1997. Soybean Disease Loss Estimates for the Top 10 Soybean Producing Countries in 1994. Plant Disease 81:107-110.

# SOUTHERN SOYBEAN DISEASE WORKERS
# 1998 TREASURY REPORT

Operational [redacted] Planters Bank, Hawkinsville, GA

| Receipt Summary | |
|---|---|
| Interest on Operational Account | $ 123.75 |
| 1998 Meeting Registration Receipts | $ 1550.00 |
| 1998 Soybean Disease Atlas Sales | $ 270.00 |
| **Total Receipts** | **$ 1943.75** |

| Disbursement Summary | |
|---|---|
| Printing Fees | $ 726.36 |
| Postage Fees | $ 190.62 |
| 1998 Annual Meeting Costs | $ 2161.35 |
| SSDW Association Awards | $ 95.27 |
| Bank Account Fees(12/31/97 - 12/31/98) | $ 60.00 |
| **Total Disbursements** | **$ 3233.60** |

| SSDW Assets - December 31, 1998 | |
|---|---|
| **Beginning Balance - 12/31/97** | **$ 6068.79** |
| **Receipts** | **$ 1943.75 +** |
| **Disbursements** | **$ 3233.60 -** |
| **Net Assets - 12/31/98** | **$ 4778.94** |
| **Balance of Operational Account** | **$ 4778.94** |

Peggy S. King [redacted] 12/31/98
SSDW TREASURER

# RESISTANCE RATINGS FOR 288 SOYBEAN CULTIVARS TO THE RENIFORM NEMATODE, *ROTYLENCHULUS RENIFORMIS*

R. T. Robbins, L. Rakes and L. Jackson,

Department of Plant Pathology, University of Arkansas, Fayetteville, AR

Currently, in Arkansas, the reniform nematode causes less yield reduction to soybean than soybean cyst nematode and several fungal diseases and is not as prevalent in soybean fields as it is in cotton fields. The objective of this study was to find if the soybean cultivars included in the Arkansas and Mississippi soybean variety testing programs exhibited resistance to the reniform nematode, *Rotylenchulus reniformis.* All cultivar and breeding lines included in the 1998 soybean variety testing programs in these two states were tested in the greenhouse for resistance to reniform nematode.

Resistance was the reproduction of reniform nematode on each test line as a percentage of the standard reniform nematode-resistant cultivar "Forrest". Included as checks were the resistant varieties Forrest and Hartwig, the susceptible variety Braxton, and inoculated fallow soil. Single soybean plants in the dicotyledon stage were planted in 10-cm-diam clay pots in fine loamy sand soil and 1166 vermiform reniform nematodes were added per pot, including the fallow infested soil checks. All entries were replicated at least 5 times. Plants were inoculated on 17 June 1998 and harvested one replication per week starting 1 September 1998. Reniform nematodes were extracted from the soil (sieving, sucrose centrifugation) and roots (sodium hypochlorite) and the numbers per pot determined by adding the soil and roots totals.

Thirteen of the 288 lines tested proved to have a percentage reproduction less than Forrest. They are: Delsoy 5710 (26%), S94-1956 (U of Missouri (43%)), Terral TV4770 (49%), NK S53-Q7 (52%), SC91-2007 (Clemson (54%), Riverside Robin-5 (62%), Deltapine DP 5806RR (68%), Accomac (73%), AgriPro AP 588RR (80%), Terral TV 5797 (80%), Hartz H5181RR (92%), HBK R5411 (95%), and Eagle seed ES 48N (96%). An additional 16 lines supported less than 150% of the reproduction on Forrest. They are Asgrow A5843 (113%), DT 95-15091 (114%), HBK R5404 (117%), AG 4702 RR(125%), TN 4-86 (130%), Asgrow A 6711 (131%), Deltapine DP 3519s (131%), Willcross 2517RR (133%), DeKalb CX570c (133%), Md 92-5769 (133%), Hartz H 6200 (135%), HBK 5990 (136%), Deltapine DP 4969 RR (139%), Deltapine DP 5644RR (139%), AG 4501 RR (140%), and Hartz H 5545RR (145%). Forty-one of the remaining lines supported between 150 and 200% of the reproduction on Forrest. Reproduction on the remaining 218 lines exceeded 200% of the reproduction on Forrest and ranged from 202 to 820% with Braxton at 484%.

This data shows that several soybean varieties may be useful in reducing reniform nematode numbers when used in various rotation schemes. Earlier reports showed Hartwig, Cordell, Sharkey, Stonewall, and Cenntenial to be resistant to this nematode. Soybean lines derived from PI 90763, PI 437654 and Peking have been shown to have reniform nematode resistance whereas those derived from PI 88788 do not exhibit this resistance.

# EVALUATION OF AZOXYSTROBIN ON TWO FOLIAR SOYBEAN DISEASES IN ARKANSAS

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Cultivar resistance is the mainstay of soybean disease control in Arkansas. Frogeye leaf spot (*Cercospora sojinia*)(FLS) and aerial blight (*Rhizoctonia solani*)(AB) are important foliar diseases of soybeans grown in Arkansas. They are most severe when warm moist conditions occur during the period from early flowering (R1) to beginning pod fill (R5). AB has increased recently in incidence and severity in Arkansas, especially on farms with fields undergoing strictly a soybean-rice rotation. Few of the soybean cultivars grown in Arkansas have adequate AB resistance, and no other cultural practices offer adequate control measures for either disease. Based upon field experience and past research trials, current soybean fungicides are ineffective against AB. Research recently conducted at LSU has demonstrated exceptional efficacy of azoxystrobin on AB of soybean. A study was conducted to evaluate the fungicide azoxystrobin (Quadris) for the effects of activity on FLS and AB severity and yield under field conditions of high disease pressure.

Two soybean fields were located during August, 1998with severe disease pressure. Field A planted to NK S59-60 near Watson, in Desha county with severe AB and FLS pressure and field B planted to Terral TV 5797 near Wilson, in Mississippi county with severe FLS pressure. On August 19 Quadris 3.06F at 8.5 oz (0.2 lb ai)/A under Section 18 was aerial applied with a 10-GPA application rate to field A. No surfactant was used. Four replications for the product were established along with untreated checks. Each treated and untreated test area was 100 feet wide x 1250 feet long. The soybeans were in seed fill growth stage (R5) and showing approximately 75% infection of the plants with AB and 15% infection of the leaves with FLS. The plots were harvested on September 25 and yields measured using a weigh wagon. On August 28 Quadris 3.06F at 6.4 oz (0.15 lb ai)/A under Section 18 and Benlate at 12.0 oz (0.75 lb ai)/A were aerial applied with a 10-GPA application rate to field B. No surfactant was used. Four replications for the product were established along with untreated checks. Each treated and untreated test area was 120 feet wide x 1320 feet long. The soybeans were in full pod elongation growth stage (R4) and showing approximately 25% infection of the leaves with FLS. The plots were harvested on October 17and yields measured using a weigh wagon.

The azoxystrobin treatment yields were statistically different at the .05 level from the unsprayed check at both locations, whereas Benlate was not significantly different from the unsprayed check or azoxystrobin. The LSD (.05) in field A was 5.3 bushels and in field B 2.5 bushels. The small yield increases for both fungicides over the unsprayed checks were expected due to hot, dry weather experienced after the plots were sprayed. These studies support research findings of many other plant pathologists stressing that the response of foliar fungicides depends upon the susceptibility of a variety, the presence of the disease pathogen, and the type of weather seen after treatment. Foliar disease development is slowed and often stopped under hot, dry conditions as seen in these studies. Although there was a significant yield increase (3-5 bu.) where azoxystrobin was applied compared to unsprayed check plots, economically this was not a break-even response. The cost of a fungicide plus the application runs around $20 per acre.

Prospects for the use of azoxystrobin as a fungicidal control of FLS and AB are good. Azoxystrobin in these studies appeared to be effective in controlling AB and FLS and protecting against yield loss even though the fungicide was applied when the timing was not optimal for reducing infection. More information is needed to further assess the effectiveness of azoxystrobin as a means to control these important foliar diseases of soybean.

# The Early Soybean Production System In Missouri: Progress and Potential

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The Early Soybean Production System has become popular in some areas of the south. It was designed to help farmers avoid soybean yield loss due to the late-summer drought that typically develops in the south, but moldy harvested seed was a major problem. The mold was due to infection of seed by *Phomopsis* and other fungi. Our research in 1992-1994 indicated that the major advantage to this system in Southeast Missouri was early harvest. For example, maturity group III varieties planted in mid-April were harvested around September 1 compared to a mid-October harvest date for MG V varieties planted in mid-May. For farmers that need to do field work after harvest, such as precision grading, this early harvest is a distinct advantage. Unfortunately, seed harvested from plots of maturity group III varieties planted in mid-April were moldy due to infection by *Phomopsis*. We reevaluated the system in 1998 and compared soybean yields and *Phomopsis* infection of harvested seeds between Asgrow 3834 and two *Phomopsis* resistant soybean lines developed by Dr. D. Sleper, University of Missouri soybean breeder. The lines were SN93-6012 (maturity group 3.9) and SN93-6181 (maturity group 4.4). Yields of all three were the same, but seed mold was significantly less for Dr. Sleper's lines, 2-3% of seed infected with *Phomopsis*, than for Asgrow 3834, 35% of seed infected with *Phomopsis*, for mid-April plantings. Further experiments are planned for 1999 and 2000.

## A New *Phomopsis* Disease of Soybeans in Mississippi

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A disease was observed in several soybean varieties which caused severe lesions on the stems and pods. Lesions began to appear on the green stems at the R1 stage of maturity and were observed on green pods later in the growing season. *Phomopsis* type pynicidia and spores were observed in the mature lesions. Several soybean fields had severe losses due to this disease.

*Phomopsis* was isolated from the lesions and maintained on Potato Dextrose Agar. Toothpick inoculum was produced by placing toothpicks in vials. Potato dextrose broth was added to the lower one-fourth of the vial, and the vial was plugged and autoclaved. After autoclaving an agar plug containing the fungus was added to the top of the toothpicks. The fungus was allowed to grow throughout the toothpicks. The toothpick + fungus was inserted into the second internode from the top of the seedling. Symptoms began to appear about four to five weeks after inoculation. Susceptible plants died and pynicidia were formed in the stem lesions. The fungus was reisolated from the lesions.

We have screened several soybean varieties for susceptibility to this disease and there are differences in susceptibility. We are in the process of screening the entries in the Mississippi Variety Trials for resistance to this disease.

# Reaction of Soybean Genotypes to Sudden Death Syndrome

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Soybean sudden death syndrome (SDS) caused by the fungus *Fusarium solani* f. sp. *glycines* has become an increasing problem in recent years. Unfortunately host resistance is the only effective control measure currently available. In 1987 we began to evaluate genotypes (i.e., cultivars, experimental lines, and plant introductions) for reaction to SDS leaf scorch. We have tested approximately 500 genotypes per year.

Soybeans from maturity groups III, IV, and V were screened in the field. Each maturity group was divided into early and late entries to allow comparison of material with similar maturity. Tests were planted at two locations per year in southern Illinois in fields with a history of severe and uniform SDS. Tests were arranged in a randomized complete block design with three replications. Small plots (two rows by 4.3 m) enabled many genotypes to be tested and minimize environmental variation within a test. Plots were scored twice (before and after R6.2) for reproductive stage, disease incidence (DI), and disease severity (DS). This allowed us to interpolate and express disease data at R6.2. Disease incidence was scored based on the percentage of the plants in a plot showing leaf symptoms. Symptomatic plants were scored for disease severity on a 1 to 9 scale, with 1 being mild leaf symptoms and 9 being premature plant death. Disease index (DX) on a scale of 0 to 100 was calculated for each plot DI*DS/9.

Genotypes included in this data set were scored in at least three environments. A susceptible check was tested in all environments for each test. A DX score of greater than 20 for the susceptible check in each test was required for an environment to be included in the data set. A relative DX was calculated to allow a standard comparison across years because all cultivars and lines were not tested in each year and disease pressure differed among tests. The relative DX for each entry was calculated as (DXentry/DXsusceptible check)*100.

Data are presented in Table 1. A total of 152 genotypes were included in this data set. For each test the minimum and maximum relative DX scores are presented. There was a wide range in relative DX scores (0 to 140). Entries were grouped into four categories based on their relative DX score. The relative DX group with the largest number of entries across tests was 0 to 25. One explanation for this is that a large number of genotypes has resistance to SDS leaf scorch. The likely reason for this is that resistant lines were retested while susceptible lines were dropped.

Table 2 lists genotypes from the six tests with the lowest relative DX scores, the susceptible check, and other lines of interest.

Table 1 Summary of Genotype Distribution by Relative DX

| Test | Relative DX | | # Genotypes | | | | |
|---|---|---|---|---|---|---|---|
| | Min | Max | 0-25 | 26-50 | 51-75 | >75 | Tota |
| III Early | 2 | 100 | 15 | 8 | 0 | 2 | 25 |
| III Late | 3 | 140 | 7 | 11 | 1 | 3 | 22 |
| IV Early | 0 | 114 | 8 | 5 | 2 | 4 | 19 |
| IV Late | 0 | 117 | 17 | 7 | 3 | 8 | 35 |
| V Early | 0 | 100 | 21 | 4 | 1 | 2 | 28 |

Table 2 Relative DX Means for Selected Genotypes

Test III Early

| Entry | Relative DX |
|---|---|
| Kisaya | 2 |
| HS 3411 | 3 |
| DeKalb CX340c | 7 |
| NK S29-11 | 7 |
| CM 331 | 8 |
| Pioneer 3981 | 100 |

Test III Late

| Entry | Relative DX |
|---|---|
| CG 3388 | 3 |
| Ripley | 4 |
| NK S39-11 | 5 |
| P3981 | 100 |
| PI 437.654 | 140 |

Test IV Early

| Entry | Relative DX |
|---|---|
| Pioneer 9451 | 0 |
| Ripley | 5 |
| Calhoun | 8 |
| Hamilton | 11 |
| Spencer | 100 |
| PI 88.788 | 106 |
| PI 90.763 | 114 |

Test IV Late

| Entry | Relative DX |
|---|---|
| LS90-1920 | 0 |
| LS94-3207 | 1 |
| DeKalb CX499c | 2 |
| Manokin | 5 |
| TN4-86 | 5 |
| Pharaoh | 7 |
| CM 497 | 100 |

Test V Early

| Entry | Relative DX |
|---|---|
| Asgrow 5560 | 0 |
| Wicomico | 0 |
| Pharaoh | 2 |
| Manokin | 2 |
| Hartwig | 4 |
| NK S52-25 | 4 |
| TN5-95 | 6 |
| Forrest | 6 |
| Asgrow 5112 | 7 |
| Jader E5007 | 7 |
| Pioneer 9551 | 8 |
| NK 6955 | 8 |
| V82-2191 | 100 |

Test V Late

| Entry | Relative DX |
|---|---|
| NK 6955 | 7 |
| Cordell | 11 |
| Hartwig | 11 |
| DP 105 | 100 |

# ADDITIONAL STUDIES ON THE USE OF SOYBEAN AS A ROTATION CROP FOR THE MANAGEMENT OF ROOT-KNOT NEMATODES IN PEANUT

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This paper is an update of a 14- year (1985-1998) field study rotating 'Florunner' peanut (*Arachis hypogaea*) with 'Kirby' soybean (*Glycine max*) to evaluate the long-term effects on management of *Meloidogyne arenaria* and *Sclerotium rolfsii* in peanut production. The last report issued on this study included the the first 6 years (1985-1990) of the study and this paper will update the subsequent 4 year period (1991-1994). The final 4 years (1995-1998) will not be included due to highly abnormal weather conditions that adversely affected the crops.

Planting schemes for this study included peanut monoculture, peanut and soybean in alternate years, and peanut preceeded by 2 years of soybean; for each, aldicarb was applied at-plant every year or was never applied. Densities of second-stage juveniles ($J^2$) of *M. arenaria* were very low (<10 $J^2/100cm^3$ soil) in soybean plots, however, populations usually resumed high levels (>150 $J^2/100cm^3$ soil) after a subsequent peanut crop. At-plant applications of aldicarb had no significant effect on *M. arenaria* $J^2$ population densities in soil either in peanut monoculture or rotation plots.

Aldicarb applied to peanut monoculture did not significantly increase yield which was in contrast to earlier years (1985, 1986, 1988, and 1990) of the study when we did observe significant increases. In 1992 and 1994, peanut preceeded by 1 year of soybean with no aldicarb resulted in a 14 and 30 percent increase in yield respectively over untreated monoculture. When aldicarb was applied in this same system it further enhanced yields to 20 and 40 percent respectively over untreated monoculture. In 1993, peanut preceeded by 2 years of soybean with no aldicarb did not significantly increase yield over untreated monoculture, but when aldicarb was applied in this system it resulted in a 20 percent increase in yield over untreated monoculture.

The incidence of southern blight caused by *S. rolfsii* was not significantly impacted by applications of aldicarb either in monoculture or rotation plots. Peanut preceeded by 1 year of soybean resulted in some suppression of southern blight, however 2 years of soybean afforded more suppression. Long-term rotation of peanut with 'Kirby' soybean reduced yield decline but did not reduce population densities of *M. arenaria* below economically damaging levels.

# COMPARISON OF SOYBEAN MEAL WITH OTHER LEGUME MEALS AS AMENDMENTS TO SOIL FOR CONTROL OF PLANT-PARASITIC NEMATODES

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Soil infested with root-knot (*Meloidogyne arenaria* and *M. incognita*) [RKN] and soybean cyst (*Heterodera glycines*) [SCN] nematodes was amended with velvetbean (*Mucuna deeringiana)*, canavalia (*Canavalia ensiformis*), or soybean (*Glycine max* ) meals at the rates of 2.5, 5.0, 7.5, and 10.0 g/kg soil to determine their effects on nematode populations.

Pre-plant nematode sampling taken three weeks after soil was amended showed that all meals virtually eliminated RKN when applied at rates ≥ 5.0 g/kg soil. Soybean meal was highly effective at the lowest rate reducing RKN by 80 percent. Populations of SCN were low throughout in the pre-plant sampling and were not considered important.

'Young' soybean was planted and grown for 8 weeks after which the following variables were assessed - nematode populations from soil and roots, shoot weight, root weight, and gall index. Suppression of RKN in soil was observed only in response to rates of soybean meal ≥ 7.5 g/kg soil. No suppression of SCN in soil was noted in response to any of the meals. Suppression of RKN in roots was observed only at the highest rate of soybean meal. All rates of velvetbean meal eliminated SCN in roots, whereas some increases in SCN were observed in response to the highest rates of canavalia meal and the 5.0 g rate of soybean meal. Shoot weight and root weight responded positively to all meals. Applications of the amendments to soil resulted in reduced root-knot indices; the velvetbean meal was less effective than the other two meals.

## TOLERANCE OF SELECTED ROUNDUP READY® SOYBEAN CULTIVARS TO COLUMBIA LANCE NEMATODE

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The objective of this research was to evaluate the tolerance of selected group V and VI Roundup Ready® soybean cultivars to the Columbia lance nematode *Hoplolaimus columbus*. A test sight in Scotland County,NC was selected with moderate levels of Columbia lance nematode (CLN) and low levels of the sting nematode *Belonolaimus longicaudatus*. Cultivars were arranged in a split-plot design with fumigated vs. non-fumigated plots side by side and six replications. Selected plots were fumigated with 4.5 gallons of Telone II® per acre in late April. All plots were planted on 16 May 1998. Soybean yield and harvest population densities of Columbia lance nematode were determined in early November. A tolerance index (TI) was calculated where TI=(yield of non-fumigated plots $\div$ yield of fumigated plots) $\times$100.

Two of the three group VI cultivars tested, Asgrow 6101 and Deltapine 6880, had tolerance indices greater than 90. Of 7 group V cultivars tested only Deltapine 5644 had a tolerance index greater than 90. Reproduction of H. columbus did not differ among cultivars.