



Current Report

Cooperative Extension Service • Division of Agriculture • Oklahoma State University

SOYBEAN DISEASE CONTROL GUIDE - 1982

OSU
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R. V. Sturgeon
Extension Plant Pathologist

Phil Pratt
Area Specialized Agent
Plant Pathology

Soybeans were once considered a "Disease free" crop, however, they have been grown long enough in Oklahoma that diseases have become established and under favorable weather conditions reach damaging levels. Soybeans are an important crop for Oklahoma growers and optimum yields are needed to offset the inflated product costs. Thus, the soybean producer must through proper management achieve near maximum yields while holding production costs to a minimum. The Soybean Disease Control Guide is provided to aid growers in selecting effective and economical control practices.

weather; (3) harvest damage; (4) and improper storage. Poor quality seed is usually low in germination, and often decays in the soil. Fungicide seed treatment protects the seed from rot and seedling disease and improves stands. This is especially true when low quality seed is used. Fungicide

FUNGICIDES SUGGESTED FOR CONTROL OF SOYBEAN SEED DECAY AND SEEDLING DISEASES IN OKLAHOMA - 1982^{1/}

Seed Treatment

<u>Fungicide</u>	<u>Rate Formulation</u>
Arasan 50-Red	2 oz/100 lbs
Captan 30 DD	240 cc/100 lbs
Terra-Coat L-205	2 - 4 oz/bu
Terra-Coat SD-205	2 - 4 oz/bu

Planter-Box

<u>Fungicide</u>	<u>Rate Formulation</u>
Arasan 50-Red	2 oz/bu
Arasan 75-S	1 1/3 oz/100 lb
Captan 25 (Seed protectant)	4 oz/bu
Ortho Seed Protectant	4 oz/bu
Terraclor Super X 2.0-5 Dust	2 - 4 oz/bu
Terra-Coat SD-205	2 - 4 oz/bu

^{1/} CHECK LABEL for restrictions and manufacturer's instructions.

SOYBEAN DISEASE CONTROL: Cultural practices in combination with fungicides and nematicides provide more effective disease control and profitable returns. Suggested cultural practices: (1) Plant only top quality disease free (certified) seed; (2) Plant only recommended varieties, tolerant to locally known diseases; (3) Use a balanced fertility program and plant in a well prepared seed bed; (4) Rotate soybeans with sorghum, small grains or forage crops. Rotation with other legume crops will encourage disease; (5) Do not cultivate when foliage is wet. (6) Practice full-season weed control.

SEED AND SEEDLING DISEASE CONTROL: Low quality seed can result from several factors: (1) diseases occurring during the growing season; (2) delayed harvest due to

seed treatment is recommended for seed with 85% or lower germination. The value of fungicide seed treatment has been proven and provides a low-cost insurance against planting over or poor stands. Fungicide seed treatment does not improve

quality of the seed but protects the seed and aids in maintaining germination. When a bacterial inoculant is used apply the fungicide seed treatment last. This should be done just before planting or mixed with the seed in the planter box.

DISEASE TOLERANT VARIETIES: Plant only top quality disease-free seed of recommended varieties that are adapted to Oklahoma and tolerant to locally known diseases.

<u>VARIETY</u>	<u>BACT. PUSTULE</u>	<u>PHYTOPHTHORA</u>	<u>PURPLE SEED STAIN</u>	<u>SCN</u>	<u>RK</u>
Maturing group IV					
CLARK 63	S	R	S	S	S
COLUMBUS	S	S	S	S	S
DOUGLAS	N*	N*	N*	S	S
OKSOY	MR	MR	MR	S	S
Maturing group V					
BEDFORD	S	MR	N	R ^{3&4}	MR
DARE	R	S	R	S	MR
ESSEX	R	MR	R	S ³	S
FORREST	S	MR	S	R ³	R
HILL	R	MR	R	S ³	R
MACK	S	R	S	R ³	S
RA 501A	R	R	R	R ^{3&4}	S
NATHAN	N	N	N	R ^{3&4}	N
Maturing group VI					
CENTENNIAL	R	R	N	R ³	R
DAVIS	R	R	N	S ^{3&4}	S
JEFF	N	N	N	R ^{3&4}	N
LEE 74	S	R	S	S ³	R
PICKETT 71	R	R	N	R ³	S
SOHOMA	S	R	S	S	S
Maturing group VII					
BRAGG	R	R	S	S	R
RANSOM	R	MS	R	S	MS

R = resistant MR = moderate resistant
 S = susceptible MS = moderate susceptible
 N = no information
 SCN = Soybean Cyst Nematode and 4 races
 RK = Root knot nematode

POD AND STEM DISEASES considered of major importance to Oklahoma soybean growers are Anthracnose caused by Glomerella glycines and Diaporthe pod and stem blight caused by the fungus Diaporthe phaseolorum. When present, Diaporthe pod and stem blight seems to be the most destructive, however, Anthracnose is more common and is found every season in most of Oklahoma's soybean growing areas. Due to level of occurrence, Anthracnose is believed to be the greater problem in Oklahoma.

Soybean seed producers should consider a foliar fungicide spray program. Studies have shown that foliar fungicides protect the beans from fungal infections late in the season and this preserves the quality (germination) of the developing bean. In addition, there is potential of increasing yields 20 to 30 percent, based on fields averaging 30 bushels per acre. There should be a greater demand for seed produced in fields receiving the foliar fungicide sprays.

For farmers not growing seed beans, the decision to apply foliar fungicides is more difficult. Foliar fungicides may not always be needed or profitable. Growers must evaluate conditions and base the decision to spray on certain factors. The amount of disease present directly effects the yield response obtained from the use of foliar fungicides. During years when the disease incidence is heavy, a grower can usually expect a substantial yield increase from application of foliar fungicide. However, during the dry years or under adverse growing conditions, foliar fungicides may not provide a yield increase. Soybeans grown on upland fields will usually not have as much disease pressure as low river bottom fields and the foliar fungicides spray will not be as profitable.

Foliar fungicides are profitable when needed. The following point system is provided as a tool to help growers determine need for foliar fungicide sprays.

CONTROL: Anthracnose and Diaporthe Pod and Stem Blight can be controlled when certain fungicides are properly applied. Two fungicide-sprays have effectively controlled these pod and stem diseases and shown economic returns.

Proper timing and good fungicide coverage is very important in obtaining disease control. The fungicides selected should be applied in sufficient water carrier to obtain thorough coverage of the soybean plants, for aircraft this should be at least 5 to 7 gals per acre.

(1) The first fungicide application at early pod set, when a majority of the pod are 1/8 to 1/4 inch long.

(2) The second fungicide application should be made approximately 14 days following first application.

Time of fungicide application is very important for effective disease control. It is critical that the first treatment be applied when a majority of the pods are 1/8 to 1/4 inch in length. The pods are growing rapidly at this stage of the growing season and there is a relatively short period of time to cover the pods with a fungicide before they become infected. A delay of a few days may allow a majority of the pods to grow to 1 inch in length which is past the prime stage of growth for best fungicide applications. Fungicides applied late many times do not provide the protection needed for profitable yield increases.

Growers should keep a close watch on the developing beans and anticipate the proper time for the first fungicide application. The second fungicide application should be applied in approximately 14 to 21 days.

FUNGICIDES SUGGESTED FOR CONTROL OF ANTHRACNOSE AND DIAPORTHE POD AND STEM BLIGHT ON SOYBEANS IN OKLAHOMA - 1982 ^{1/}

Fungicide	Rate Formulation/Acre
Benlate 50W	0.5 - 1.0 lb
Bravo	1.5 - 2.75 pt
Mertect 340F	8 - 10 oz
Topsin M	0.5 lb

^{1/} CHECK LABEL for restrictions and manufacturer's instructions.

Point System Guide for Use of
Foliar Fungicides on Oklahoma Soybeans

- | | (Point value if answer is yes) | |
|---|--------------------------------|-------|
| 1. Yield potential
25 bushels/acre or more | <u>3</u> | _____ |
| 2. Soybeans continuously grown in
field for 3 or more years.
Weather conditions favorable
for disease development. | <u>3</u> | _____ |
| 3. Rain fall, dew, humidity up to
early pod set. | | |
| Below normal | <u>0</u> | _____ |
| (Select One) Normal | <u>2</u> | _____ |
| Above normal | <u>4</u> | _____ |
| 4. Early maturing variety being grown
Group IV or V with maturity expected
between Sep. 15 and Oct. 15 | <u>3</u> | _____ |
| Maturity after Oct. 15 | <u>0</u> | _____ |
| 5. Field relatively free of weed,
insect and nematode problems. | <u>3</u> | _____ |
| 6. Beans to be used or sold for seed. | <u>3</u> | _____ |
| 7. Long range weather forecast
(Next 30 to 60 days) rainfall. | | |
| Above average | <u>2</u> | _____ |
| (Select One) Average | <u>1</u> | _____ |
| Below average | <u>0</u> | _____ |

A point total of 12 or more indicates that foliar fungicide applications are likely to return a net profit.

If a total is obtained that is less than 12 points, foliar fungicides should not be used.

Soybeans planted in upland fields have less potential for disease and yield increase from foliar fungicides during dry or years of normal rainfall.

Purple seed stain caused by Cercospora kikuchii has been found in many Eastern Oklahoma soybean fields. The fungus over-winters in the seed, stems and leaves. Purple seed stain can be prevented with the foliar fungicide applications recommended for controlling Anthracnose and Diaporthe Pod and Stem blight. Also some varieties grown in Oklahoma are resistant to purple seed stain (See Table).

Southern blight caused by Sclerotium rolfsii has been found in several soybean fields. The Southern blight fungus rots the stems at the base or soil-line of the soybean plant causing it to wilt and die. The fungus forms a web-like mat of white mycelium on the stem at the base of the plant and develops small round mustard seed-like sclerotia. Chemical control is not believed to be feasible or economical. Present control recommendations include plowing under infected crop residue and crop rotation.

NEMATODE DISEASE: When damaging populations of plant parasitic nematodes are present they can cause extensive damage. The soybean cyst, Heterodera glycines, nematode has received the greatest publicity due to more noticeable field symptoms of yellowing and stunting of soybean plants. Root lesion, Pratylenchus spp. and stunt, Tylenchorhynchus nematodes are more commonly found in Oklahoma soybean fields and because they are found in a greater number of fields, may have a potential of being far greater importance than the soybean cyst. Root-knot, Meloidogyne spp., and Lance, Hoplolaimus spp. Nematode have been found in only a few fields, thus their importance have not been established in Oklahoma.

DETECTING NEMATODE POPULATIONS:

Above ground symptoms from damaging nematode populations are stunting, poor growth, yellowing, general decline and early maturity. Root systems may show damage such as root tip burn or deformity. The Soybean Cyst may be found as a white pear-like growth about the size of a pinhead on the roots. Nematode infes-

tations are rarely uniform within a field, thus symptoms occur in small areas. For early positive nematode identification, soil and plant root samples should be taken from suspected areas in the field and analyzed by Oklahoma State University Plant Diagnostic lab. The samples should be sent to O.S.U. through your local County O.S.U. Extension Office.

HOW TO SAMPLE AND PACKAGE: Nematodes are very small worm-like animals living in the soil. The heavy populated areas in the field can be easily missed if proper procedures for collecting samples are not followed. These very small worm-like animals may die and be lost before reaching the laboratory, if the soil samples are not packaged and handled properly. Local OSU County Extension Offices have the procedures; Fact Sheet No, 7610. "Soil and Plant Sampling for Nematode Analysis".

NEMATODE CONTROL: Soybean nematode control program may include a rotation program of non-host crops, resistant soybean varieties and chemical control. A three year soybean rotation program for control of soybean cyst nematode would include utilizing resistant and susceptible varieties.

Fields with a known soybean cyst nematode infestation should not be planted to the same soybean variety for two consecutive years. Repeated plantings of cyst resistant varieties in cyst nematode infested fields tends to lead to the development of new races of the nematode. To avoid this situation the following rotation program should be followed:

1st YEAR: Plant varieties resistant to Race 3 of the Soybean Cyst nematode. Varieties yield tested by Oklahoma State University which are resistant to Race 3 of the cyst nematode: Forrest, Centennial or Pickett 71.

2nd YEAR: Plant varieties resistant to Races 3 & 4 of the Soybean cyst nematode. Varieties yield tested by Oklahoma State

University which are resistant to Races 3 & 4 of the cyst nematode: Jeff, Bedford or Nathan.

3rd YEAR: Plant varieties which are susceptible to Soybean Cyst nematode: Essex, Dare, Sohoma, Lee 74, Bragg or others.

Farmers (Commercial Seed Producers) who wish to continue to plant a susceptible variety or a race 3 resistant variety, in a cyst nematode infested field, will probably have to rely on chemical control (nematicides) to obtain desirable yields. Also other nematode species such as Root knot, Root lesion, Stunt and Lance can adversely affect nematode yields and often chemical control is the only method of controlling these nematodes. Chemical control of nematodes can be effective and when needed and properly applied has proven to give economical returns.

SUGGESTED NEMATICIDES FOR NEMATODE CONTROL IN SOYBEAN IN OKLAHOMA - 1982

Nematicide ^{1/}	Rate Formulation	
	Per Acre	oz/1000 ft row 36" row
Dasanit 15G	6-12 lbs	7-13 oz
Mocap 10G	15-30 lb	20-40 oz
Nemacur 15G	6-24 lb	11-22 oz
Nemacur 3	1.3-5 qt	3-11 fl oz
Temik 15G	10-20 lb	11-22 oz

^{1/} Dasanit suggested for use on all nematodes in soybeans except cyst (see table). Apply Dasanit and Mocap in a 12-14 inch band over row and incorporate. Apply Nemacur at lower rates in 6-10 inch band and higher rates in wider bands (10-18") and incorporate. Read supplemental label for narrow band application recommendations. Temik 15G apply lower rates (10-14 lb/a) in 8 to 12 inch band for root knot nematode control and higher rates (14-20 lbs/a) for cyst nematode control. All nema-

ticides must be incorporated. Read label for detailed application instructions; also hay, grazing and plant back instructions.

Properly chosen nematicides should give an economic return when nematode populations are great enough to limit production and when they are applied properly. Remember nematicides are effective for a short period of time and will reduce the nematode population. They do not completely eradicate them from the soil. Therefore, it would be advisable to have your field checked annually if susceptible soybeans are to be grown.

Before using any of the nematicides growers should read the label and apply in accordance with directions on container. Nematicides are safe for use when label precautions are followed.