

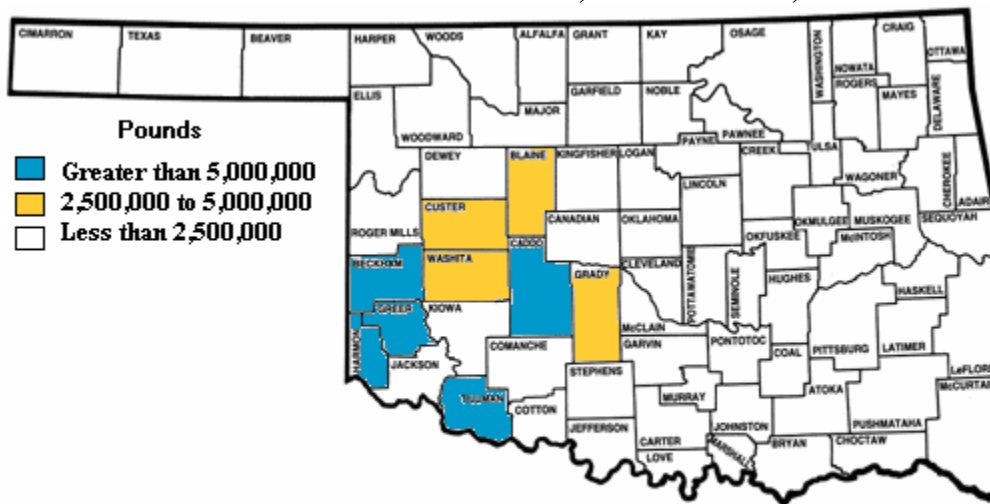
# Crop Profile for Peanuts in Oklahoma

Submitted: February 14, 2007

## General Production Information

- In Oklahoma in 2004, 35,000 acres of peanuts were planted.
- In 2004 peanut production was 102,300,000 pounds; down from the 2003 production of 98,000,000 pounds.
- In 2004 the value of production of Oklahoma peanuts was 19 million dollars, up one million from the 2003 production.
- From 2000 to 2004, the average yield for peanuts in Oklahoma was 2,614 pounds per acre.
- Within Oklahoma, 35,000 acres of irrigated peanuts were planted in 2002. According to Oklahoma Agricultural Statistics, 33,000 of those acres were harvested.
- In 2004, peanuts ranked 13<sup>th</sup> in value of production within Oklahoma.
- Oklahoma ranked 8<sup>th</sup> in the U.S. in peanut production.
- In 2002, the top five counties in Oklahoma peanut production from first to fifth were Caddo County, Beckham County, Tillman County, Harmon County, and Greer County.

## PEANUT PRODUCTION, OKLAHOMA, 2004



<b>Year</b>	<b>Acres Planted</b>	<b>Acres Harvested</b>	<b>Yield per Harvested acre</b>	<b>Production</b>	<b>Value of Production</b>
1994	102,000	100,000	2,610 lbs.	261,000,000 lbs.	\$80,910,000
1995	100,000	98,000	2,060 lbs.	201,880,000 lbs.	\$60,160,000
1996	85,000	81,000	2,410 lbs.	195,210,000 lbs.	\$58,562,000
1997	79,000	77,000	2,400 lbs.	184,800,000 lbs.	\$55,070,000
1998	80,000	75,000	2,130 lbs.	159,750,000 lbs.	\$49,203,000
1999	83,000	79,000	2,400 lbs.	189,600,000 lbs.	\$53,008,000
2000	97,000	67,000	1,800 lbs.	120,600,000 lbs.	\$35,336,000
2001	80,000	77,000	2,570 lbs.	197,890,000 lbs.	\$54,222,000
2002	60,000	57,000	2,800 lbs.	159,600,000 lbs.	\$27,132,000
2003	37,000	35,000	2,800 lbs.	98,000,000 lbs.	\$17,934,000
2004	35,000	33,000	3,100 lbs.	102,300,000 lbs.	\$19,232,000

### **Crop Rotation**

Peanut rotation with grass crops or cotton is essential rather than continuous growing of peanuts. There are several beneficial factors that come from rotating away from peanuts, including disease and weeds control, nutrient availability, and increased soil moisture. A three year rotation where a peanut crop follows two years of cotton, corn, grain sorghum, or other grass crops has been proven for keeping diseases at low levels, as well as lowering the amount of weeds and soil insects.

### **Soil Fertility**

Soil tests should be conducted after harvest, to determine the availability of essential elements. A major benefit of an effective crop rotation is that peanuts respond better to residual soil fertility than to direct fertilizer applications. This is best attained by fertilizing the previous crop. The primary tillage operations will distribute the fertilizer throughout the rooting zone.

**Production regions-** Primary production regions for Oklahoma peanuts are in Caddo, Tillman, Hughes, Love, and southern counties.

### **Peanut Varieties**

There are three market types of peanuts, which include Spanish, Virginias and Runners. Spanish and runner peanut varieties are the varieties mainly used in Oklahoma. Amount of rainfall and availability of irrigation will usually be the most important factors in choosing a market type. Oklahoma produces approximately 70% of the crop as Spanish, 25% as runners, and 5% as Virginias. Runners require a longer growing season, and irrigation but will out yield Spanish varieties. Planting both Spanish and runner varieties may offer acceptable yield, while spreading planting and harvest times and thus reducing risk of a poor harvest. Variety selection should be based on maturity date, disease resistance, yield and quality.

<b>Peanut Variety Yield Summary 1982 – 94 Oklahoma</b>				
<b>Variety</b>	<b>Market Type</b>	<b># of Tests</b>	<b>Yield (lb/ac)</b>	<b>Grade (%TSMK*)</b>
Pronto	Spanish	46	2788	70
Spanco	Spanish	46	3100	68
Tamspan 90	Spanish	22	3168	70
Florunner	Runner	45	3649	70
Okrun	Runner	45	3788	71

(TSMK = Total Sound Mature Kernels)

<b>Disease Reaction of Peanut Varieties Grown in Oklahoma</b>								
<i>Variety and Market type</i>	Early Leafsp	Late Leafsp	Pod Rot	Web blotch	Southern Blight	Scler. Blight	Vert. Wilt	Limb Rot
<b>Runner</b>								
<i>Florunner</i>	MR	S	S	MR	S	S	MR	S
<i>Okrun</i>	MR	S	S	MR	S	S	MR	S
<i>Southwest Runner</i>	S	?	MR	S	S	R	MR	MR
<b>Spanish</b>								
<i>Spanco</i>	S	S	MR	S	S	MR	S	MR
<i>Starr</i>	S	S	MR	S	S	MR	S	MR
<i>Pronto</i>	HS	S	MR	S	S	MR	S	MR
<i>Tamspan 90</i>	S	S	R	HS	S	R	S	MR
<b>Virginia</b>								
<i>NC 7</i>	MR	S	HS	S	S	S	S	S
HS=highly susceptible, S=susceptible, MR=moderately resistant, R=resistant, ?=unknown								

### **Cultural Practices**

The standard recommended planting dates for Oklahoma peanuts is May 1 through May 15 for runners and May 1 to May 30 for Spanish varieties. Planting should take place when the soil temperature reaches 65 degrees (F) at a four-inch depth, measured at 7 a.m. for three consecutive days. The optimum (air) temperature for rapid germination and seedling development is 86 to 91 degrees.

Peanut rotation with grass crops is essential rather than continuing to grow peanuts on the same land year after year. Fields that are rotated away from peanuts have fewer foliar and soil borne diseases, weeds, and soil insects. Fields must be rotated away from peanuts for at least 2 years, 3 years being optimal. Peanuts must be rotated away from to break the disease cycle. Rotation of peanuts, with a grass crop or cotton, can also provide residual fertilizer in the soil that is beneficial for peanut growth and development.

### **Worker Activities**

Worker activities in Oklahoma include loading seed boxes with treated seed, moving and maintenance of irrigation, and hand hoeing weeds. Worker exposure has decreased over the years in Oklahoma peanuts.

Planting peanuts may pose the most exposure to producers and workers today in Oklahoma peanut production. Exposure can still occur when loading seed boxes with peanut seed treated with fungicides. Other potential exposure could occur with granular insecticides loaded into granular application boxes on the planter that is put down with the seed when planting. These (?????)

In this day and age hand hoeing of weeds has decreased to maybe one time per season to no hand hoeing at all due to the effectiveness of new herbicides since the early 1990's. This eliminates the potential of humans being in the field after pesticides sprays especially later in the growing season when fungicides sprays are utilized for leaf spot control.

Reduction in exposure to pesticides while irrigating peanuts is due to a shift in irrigation practices. In the 1970's and 1980's many acres of peanuts were irrigated with side roll lateral move irrigation systems. These required daily moving of the irrigation system, which required walking or riding an ATV to a central motor system to move the irrigation system. Contact with treated foliage of peanuts was likely when moving the irrigation system. Since the mid 1990's due to a shift in acres and upgrading of irrigation systems most farms utilize center pivot irrigation which automatically moves the irrigation system allowing a producer or worker to avoid contact with the peanut foliage altogether. This would reduce any contact with treated foliage to a repair or maintenance issue with the center pivot irrigation system.

Peanuts crops are regularly scouted by producers and crop advisors for insects and especially diseases. Disease prevention, detection, and treatment are very important in the success of the peanut crop. These producers and crop advisors could be scouting the fields weekly for disease problems. This can be reduced by using Oklahoma State University Mesonet disease model to apply fungicides only when weather conditions warrant.

## **Soil Insect Pests**

### **Lesser Cornstalk Borer (LCB)**

*(Elasmopalpus lignosellus)*

Larvae of the LCB are reddish-brown with bluish-green bands. They are normally found beneath the soil surface in tubes, or sacs that are made of soil particles woven together with silken material. The larvae tend to prefer sandy soils and tend to feed on pegs, pods, stems, and roots. Pegs will frequently be cut off below the ground level and developing nuts may be hollowed out.

The larvae are generally most damaging to peanuts grown under non-irrigated conditions, or during drought. Prolonged rainfall or irrigation appears to significantly reduce populations of this pest. Late plated peanuts are particularly susceptible to damage in the seedling stage.

## Controls

**Cultural-** None commonly used

**Biological** – *Bacillus thuringiensis* (see pesticides below)

**Chemical** –

trade name	common name	rate	MOA
Asana XL*	esfenvalerate	9.6 oz/acre	3
Javelin	<i>Bacillus thuringiensis</i>	0.25-1.5 oz/acre	11B2
Lorsban 15G	chlorpyrifos	6.8-13.9 lb/acre	1B
Orthene 97	acephate	4.0-8.0 oz/acre	1B
Proaxis*	gamma-cyhalothrin	3.84 oz/acre	3
Prolex*	gamma-cyhalothrin	1.54 oz/acre	3
Warrior*	lambda-cyhalothrin	3.84 oz/acre	3

\* indicates a restricted use product

MOA= Mode of action category

## Granulated Cutworm

(*Agrotis subterranea*)

Larvae are found at the soil surface, beneath peanut foliage. The cutworm is mottled gray and tan with many dark granules over the surface of the body. This insect seldom damages large acreages of peanut, but can reach large population densities in some areas during August and September.

## Controls

**Cultural-** None commonly used

**Biological** - *Bacillus thuringiensis* (see pesticides below)

**Chemical** -

trade name	common name	rate	MOA
Asana XL *	esfenvalerate	5.8-9.6 oz AI/A	3
Lannate LV*	methomyl	0.75-1.5 pt AI/A	1A
Lannate SP*	methomyl	0.50-1.0 lb/acre	1A
Javelin	<i>Bacillus thuringiensis</i>	0.25-1.5 oz/acre	11B2
Proaxis*	gamma-cyhalothrin	1.92-3.20 oz/acre	3
Prolex*	gamma-cyhalothrin	0.77-1.28 oz/acre	3
Sevin XLR+	carbaryl	9.2-11.3 oz/acre	1A
Warrior*	lambda-Cyhalothrin	1.92-3.20 oz/acre	3

\*indicated a restricted use product

MOA= Mode of action category

# Foliage Feeding Insects

## Thrips

(Many species)

Thrips are minute, slender-bodied insects. Growers can identify thrip infestation by looking if the leaves on the peanut plant are cupped and malformed due to the feeding of the thrips. Research on peanuts has failed to show that thrips cause significant yield decrease, even when populations are large. If unusual ring spots are found on peanut foliage, when heavy thrip populations are present, there is a chance of Tomato Spotted Wilt Virus (TSWV). If there are ring spots on the peanut foliage growers should consult an OSU extension agent. TSWV incidence is very low and has not proven to be a serious threat to Oklahoma peanuts.

## Controls

**Cultural-** Managing the migration of thrips from wheat fields and grass areas after peanuts have newly emerged. Thrips do like to move from those areas to the new succulent peanut plants after emergence.

**Biological-** None commonly used

## Chemical-

Trade name	Common name	Rate	MOA
Orthene 97-Broadcast	acephate	6.0-12.0 oz/acre	1B
Orthene 97-Banded	acephate	3.0-6.0 oz/acre	1B
Lannate LV*	methomyl	1.5-3.0 pt/acre	1A
Lannate SP*	methomyl	0.5-1.0 lb/ acre	1A
Orthene 75S	acephate	0.5-1.0 lb AI/acre	1B
Sevin XLR	carbaryl	1.0 qt/acre	1A
Warrior*	lambda-cyhalothrin	2.56-3.84 oz/acre	3

\* indicates a restricted use product

- (At Plant Applications)

Trade name	Common name	Rate	MOA
Di-Syston 15G *	disulfoton	6.7-13.3 lb on 36" row spacing	1B
Temik 15G *`	aldicarb	7.0-14.0 lb/acre	1A
Thimet 20G *	phorate	3.87-5.28 lb/acre	1B

\* indicates a restricted use product

MOA=mode of action category

- (Hopperbox Application)

Trade name	Common name	Rate	MOA
Orthene 75S	acephate	4 oz AI/acre	1B

MOA=mode of action category

### **Spider Mites**

(*Tetranychus urticae*)

Spider mite damage may cause plants to have a gray or yellowish appearance. Mites damage peanut plants by sucking plant juices from the underside of leaves. Spider mites tend to be hot weather pests, and usually occur after August 1. Natural populations of beneficial insects usually control spider mites effectively. However, frequent applications of insecticides can result in the destruction of beneficial insects.

#### **Controls**

**Cultural-** None commonly used

**Biological-** None commonly used

#### **Chemical-**

Trade name	Common name	Rate	MOA
Comite	propargite	2 pt/acre	14
Danitol 2.4 EC	fenpropathrin	10.6-16.0 oz/acre	3
Omite 30W	propargite	3.0-5.0 lb/acre	14
Proaxis*	gamma-cyhalothrin	2.56-3.84 oz/acre	3
Prolex*	gamma-cyhalothrin	1.02-1.54 oz/acre	3
Warrior*	lambda-cyhalothrin	3.84 oz/acre	3

\*indicates a restricted use product

MOA= Mode of action category

### **Grasshoppers**

(Many)

During mid to late summer several species of grasshoppers may migrate from field margins, fence rows, or pastures to peanut crops. Severe grasshopper infestation can cause defoliation, resulting in a loss of yield. Most peanut plants can sustain heavy foliage damage, and not have a reduction in yield. Peanut plants that are 60 to 90 days old are very susceptible to yield losses through defoliation.

#### **Controls**

**Cultural-** None commonly used

**Biological-** None commonly used

**Chemical-**

Trade name	Common name	Rate	MOA
Asana XL*	esfenvalerate	5.8-9.6 oz AI/acre	3
Warrior*	lambda-cyhalothrin	2.56-3.84 oz AI/acre	3
Orthene 75S	acephate	0.33-0.66 lb AI/acre	1B

\*indicates a restricted use product

MOA=mode of action category

**Leafhoppers**

*(Empoasca fabae)*

The leafhopper is a small hopping, or flying wedge insect that chews on the foliage of peanut plants. Damage caused by the leafhopper includes the yellowing of foliage and brown leaf tips.

**Controls**

**Cultural-** None commonly used

**Biological-** None commonly used

**Chemical-**

Trade name	Common name	Rate	MOA
Asana XL *	esfenvalerate	2.9-5.8 oz/acre	3
Danitol*	fenpropathrin	6.0-10.6 oz/acre	3
Warrior*	lambda-cyhalothrin	1.92-3.20 oz/acre	3
Lannate LV *	methomyl	0.75-3.0 pt/acre	1A
Lannate SP*	methomyl	0.25-1.0 lb/acre	1A
Orthene 75S	acephate	1.0-1.3 lb/acre	1B
Proaxis*	gamma-cyhalothrin	1.92-3.20 oz/acre	3
Prolex*	gamma-cyhalothrin	0.77-1.28 oz/acre	3
Sevin XLR	carbaryl	1.0 qt/acre	1A

\* indicates a restricted use product

MOA= mode of action category

**Beet Armyworm**

*(Spodoptera exigua)*

Beet armyworms are striped-green caterpillars that have a black spot above the second pair of true legs.

**Controls**

**Cultural-** None commonly used

**Biological-** None commonly used

## Chemical –

trade name	common name	rate	MOA
Asana XL*	esfenvalerate	9.6 oz/acre	3
Tracer	spinosad	2.0-3.0 oz/acre	5
Warrior*	lambda-cyhalothrin	1.92 oz/acre	3
Lannate LV*	methomyl	1.25-3.0 pt/acre	1A
Lannate SP*	methomyl	0.25-1.0 lb/acre	1A
Proaxis*	gamma-cyhalothrin	3.84 oz/acre	3
Prolex*	gamma-cyhalothrin	1.54 oz/acre	3
Steward SC	indoxacarb	9.2-11.3 oz/acre	22

\* indicates a restricted use product MOA=mode of action category

## Fall Armyworm

(Spodoptera frugiperda)

The fall armyworm is a large striped caterpillar that has an inverted “y” on the front of its head.

## Controls

**Cultural-** None commonly used

**Biological-** *Bacillus thuringiensis* (see pesticides below)

## Chemical-

Trade name	Common name	Rate	MOA
Asana XL *	esfenvalerate	2.9-5.8 oz AI/acre	3
Tracer	spinosad	2.0-3.0 oz/acre	5
Danitol*	fenpropathrin	10.66-16.0 oz/acre	3
Warrior*	lambda-cyhalothrin	2.56-3.84 oz AI/acre	3
Lannate LV *	methomyl	0.75-1.5 pt AI/acre	1A
Lannate SP*	methomyl	0.25-0.50 lb/acre	1A
Javelin	<i>Bacillus thuringiensis</i>	0.25-1.5 oz/acre	11B2
Proaxis*	gamma-cyhalothrin	2.56-6.84 oz/acre	3
Prolex*	gamma-cyhalothrin	1.28-2.05 oz/acre	3
Orthene 75S	acephate	1.0-1.3 lb AI/acre	1B
Sevin XLR+	carbaryl	1.0-1.5 qt AI/acre	1A

\* indicates a restricted use product MOA=mode of action category

## Blister Beetle

(*Epicauta occidentalis*)

There are numerous species of blister beetles, but the 3-striped is most common in peanuts. Blister beetles can be beneficial, because they eat clusters of grasshopper eggs that are laid during the late summer and fall. Pigweed, goldenrod, goathead, puncturevine, soybeans, and many other plants serve host for blister beetles.

### Controls

**Cultural-** None commonly used

**Biological-** None commonly used

**Chemical-**

Trade name	Common name	Rate	MOA
Sevin XLR+	carbaryl	0.5 – 1.0 qt AI/A	1A

MOA=mode of action category

### Cabbage Looper

(*Trichoplusia ni*)

Cabbage loopers are large green caterpillars with white stripes that taper toward the head.

### Controls

**Cultural-** None commonly used

**Biological-** *Bacillus thuringiensis* (see pesticides below)

**Chemical-**

Trade name	Common name	Rate	MOA
Lannate LV *	methomyl	1.5-3.0 pt AI/acre	1A
Lannate SP*	methomyl	0.50-1.0 lb/acre	1A
Javelin	<i>Bacillus thuringiensis</i>	0.25-1.5 oz/acre	11B2
Orthene 75S	acephate	1.0-1.3 lb AI/acre	1B
Tracer	spinosad	2.0-3.0 oz/acre	5

\* indicates a restricted use product

MOA= mode of action category

### Corn Earworm

(*Helicoverpa zea*)

Corn earworms are caterpillars that chew holes in foliage and feed on terminal buds.

### Controls

**Cultural-** None commonly used

**Biological-** *Bacillus thuringiensis* (see pesticides below)

## Chemical-

Trade name	Common name	Rate	MOA
Sevin XLR	carbaryl	1.0-1.5 qt AI/acre	1A
Lannate LV *	methomyl	0.75-3.0 pt AI/acre	1A
Lannate SP*	methomyl	0.25-1.0 lb/acre	1A
Orthene 75S	acephate	1.0-1.3 lb AI/acre	1B
Warrior *	lambda-cyhalothrin	2.56-3.84 oz AI/acre	3
Tracer	spinosad	2.0-3.0 oz/acre	5
Danitol *	fenpropathrin	10.66-16.0 oz AI/acre	3
Asana XL *	esfenvalerate	2.9-5.8 oz AI/acre	3
Javelin	<i>Bacillus thuringiensis</i>	0.25-1.5 oz/acre	11B2
Proaxis*	gamma-cyhalothrin	2.56-3.94 oz/acre	3
Prolex*	gamma-cyhalothrin	1.02-1.54 oz/acre	3

\*indicates a restricted use product

MOA= mode of action category

## Southern Corn Rootworm

(*Diabrotica undecimpunctata*)

This rootworm is the larva of the spotted cucumber beetle. The larva is yellowish-white with a brown head and a wrinkled body. The larvae tend to occur mostly in clayey, or heavier soils. Damage can be seen as a small brown spot on the peanut.

## Controls

**Cultural-** None commonly used

**Biological-** None commonly used

## Chemical-

Trade name	Common name	Rate	MOA
Warrior*	lambda-cyhalothrin	2.56-3.84 oz/acre	3
Lorsban 15G*	chlorpyrifos	6.8-13.9 lb ai/acre	1B
Thimet* 20G	phorate	3.85-5.8 lb ai/acre	1B
Proaxis*	gamma-cyhalothrin	2.56-3.84 oz/acre	3
Prolix*	gamma-cyhalothrin	1.02-1.54 oz/acre	3

\*indicated a restricted use pesticide

MOA=mode of action category

## Rednecked peanutworm

(*Stegasta bosquella*)

“The rednecked peanutworm usually causes only minor losses to peanut. However, due to its feeding habits, damage is readily evident. Moths lay their eggs singly and larvae feed exclusively in the growing tip or bud of the plant. As the small

leaves unfold, the damage is pronounced, and the infested area takes on a tagged appearance. If damage occurs early in the season, plant stunting may result.

The larvae are pale green to cream-colored with a dark brown head and a reddish colored band just behind the head. Full grown larvae are approximately ½ inch in length. Larvae are very active when disturbed.” Sprengel, Richard K. *Identification and Monitoring of Insect Pests in Peanut*; University of Florida. Cooperative Extension Service, Institute of Food and Agricultural Sciences

**Cultural-** None commonly used

**Biological-** None commonly used

**Chemical-**

Trade name	Common name	Rate	MOA
Asana XL *	esfenvalerate	2.9-5.8 oz AI/acre	3
Warrior*	lambda-cyhalothrin	1.92-3.20 oz/acre	3
Sevin XLR	carbaryl	1.0 qt AI/acre	1A
Tracer	spinosad	1.5-3.0 oz/acre	5
Proaxis*	gamma-cyhalothrin	1.92-3.20 oz/acre	3
Prolex*	gamma-cyhalothrin	0.77-1.28 oz/acre	3

\*indicated a restricted use pesticide

MOA=mode of action category

## Diseases

### SEEDLING DISEASE CONTROL IN PEANUTS

The goal of seedling disease control is to achieve an adequate and uniform stand. Seedling diseases are effectively controlled in most instances by fungicide seed treatments already applied by seed dealers. However some growers report difficulty in stand establishment. Hopper-box or in-furrow treatments (see Table 1 ????? tables are not numbered) may increase the level of seedling disease control in problem fields over a seed treatment alone. Expect about 2-3 weeks of protection from these treatments. Other stresses such as cold soil, a poorly prepared seedbed, herbicide injury, excessive rain, and poor quality seed also commonly contribute to stand failures.

#### Seedling disease (*Rhizoctonia solani*)

This disease is the rotting of the seed and causes pre- or post-emergence death of seedlings. A dark brown sunken lesion on the plants stem is a symptom of the seedling disease.

## Controls

**Cultural-** Plant high quality seeds with strong seed vigor. Treat seed with fungicide(s). In-furrow or planter box application of fungicide.

**Biological-** None commonly used

**Chemical-** Fungicide seed treatments\*

Trade Name	Common Name	Rate/Acre or CWT Seed	MOA	Comments
Apron-Terraclor (25-6 dust)	metalaxyl + PCNB	(4-8 oz/cwt)	4 +14	Planter box treatment, premix with seed directly in planter box.
Terraclor Super X (20-5 dust)	ethazole + PCNB	(2-4 oz/cwt)	14	Planter box treatment, premix with seed directly in planter box.
Prevail	carboxin + PCNB + metalaxyl	4-8 oz/cwt	7+14+4	Planter box treatment, premix with seed directly in planter box.
Ridomil Gold PC 10.5G	mefenoxam + PCNB	12.5 to 25 lb/acre	4+14	Apply in 9-inch band and incorporate 2 to 4 inches deep. For row spacings other than 36 inches or band widths other than 9 inches, the amount will need to be calculated

### **Aspergillus crown rot** (*Aspergillus niger*)

Crown rot shows as the swelling of lower stems below the soil line. The plants stems become corky and brittle, and eventually dark decay develops. Branches and whole plants wilt and die, due to the covering by a black powdery mass.

## Controls

**Cultural-** Prevent dirt from being thrown onto plants during cultivation. Plant high quality seeds with good seed vigor.

**Biological-** None commonly used

**Chemical-** Fungicide seed treatment?

## FOLIAR DISEASE CONTROL IN PEANUTS

Early leaf spot is the most important foliar disease of peanuts in Oklahoma. The disease affects nearly all of the peanut acreage in the state each year. Web blotch is a problem mainly in the western half of the state on Spanish varieties. Late leaf spot is less common, but more difficult to control. Pepper spot also is an occasional problem. Foliar disease control is essential in the production of a high-yielding peanut crop. Yield losses can exceed 50% where foliar diseases are allowed to defoliate plants. Spanish varieties are particularly prone to leaf spot damage because they often become infected earlier in the season than runner varieties.

While crop rotation is useful in delaying the development of foliar diseases, fungicide sprays (see Table 3) are required for effective control. Fungicides provide from 10 to 14 days of protection before weathering and loss of effectiveness occurs. In addition, fungicides only protect healthy foliage from infection and do not cure established infections. Therefore, they must be applied preventively, and repeated applications are required to provide season-long control. Fungicides should be applied in a sufficient volume of water to achieve thorough coverage. A minimum volume of 15 gal/acre is suggested for ground applications while aerial applications should be in a minimum volume of 5 gal/acre. While chemigation is effective when targeting soilborne diseases, it is not very effective in the control of foliar diseases because residue left on the leaf after chemigation is not sufficient to provide adequate disease control. Chlorothalonil (e.g. Bravo) at the maximum labeled rate would be the only recommended fungicide for foliar disease control by chemigation. Spray programs should be started 30 to 45 days after planting. Delaying spray programs until disease appears is risky and resulting disease control may not be satisfactory. Once the first application is made, sprays should be repeated on 14-day intervals until two weeks before anticipated harvest.

### **Early leaf spot** (*Cerospora arachidicola*)

Early leaf spot can be detected by finding circular, brown spot on leaves usually surrounded by a yellow border. Spots are brown to dark brown on the lower leaf surface. Infected leaves turn yellow and fall off the plant. Stems and pods have oval, dark brown spots.

**Early Leaf Spot Advisory (MESONET)** - Daily leaf spot advisories are available to assist growers in the efficient application of fungicides for control of early leaf spot. Using a full-season calendar program to time sprays is very effective, but expensive. The advisory program permits growers to spray only when weather conditions are favorable for infection. Weather variables are collected from automated weather stations located in each county of the state. Use of the advisory program permits a reduction of the number of sprays while maintaining control. The advisory program has been extensively tested in Oklahoma and proven to be effective. However, strict adherence to risk management rules is required to ensure success. Fields must be closely monitored to ensure that early leaf spot does not exceed damaging levels or that other foliar diseases, not controlled with the advisory program, are not present. Daily advisories are available on the Internet at <http://agweather.mesonet.org/> by selecting “Crops” and then “Peanuts” and then “Peanut leaf spot model”.

The advisory program identifies and accumulates hours of weather favorable for infection of peanut leaves by the fungus that causes early leaf spot. An infection hour is one hour when the relative humidity is 95% or greater and temperature is between 60.8° and 86.7°F. Beginning 30 days after planting or ten days since the last spray, a spray is recommended when 36 infection hours are exceeded. To simplify advisories and make their use more general, the last effective spray date is reported daily. As favorable periods for infection accumulate, the last effective spray date moves forward in time. For the first spray, a spray is recommended when the last effective spray first exceeds 30 days after planting. For subsequent sprays, a spray is recommended when the last effective spray date first exceeds the date of the previous spray. A spray is not needed when the last effective spray date is before 30 days after planting or when the peanuts have been sprayed after the last effective spray date. Advisories must be received daily once the peanuts are thirty days old or it has been 10 days since the last spray. The Internet site for the advisory program contains an interactive page where a spray advisory can be obtained simply by entering the planting date and the date of the last spray (if applicable).

Risk management rules for the early leaf spot advisory are:

- 1) If fields cannot be sprayed within three days of exceeding the last effective spray date, spray on a 14-day schedule.
- 2) Use only highly effective fungicides (Bravo, Tilt/Bravo, Folicur, Stratego, Headline, Abound). If another fungicide is used, spray on a 14-day schedule.
- 3) If levels of early leaf spot exceed 25% infection (leaflets with spots or defoliated), revert to a 14-day schedule.
- 4) If late leaf spot, web blotch, or pepper spot are identified, revert to a 14-day schedule.
- 5) Be wary of weather forecasts, spray if rain or dew is in the forecast and a field is close to exceeding the last effective spray date. The Internet site contains a forecast page with 60-hr precipitation and dew point forecasts for several locations in the state. If forecasted temperatures are below the forecasted dew point, dew is expected.
- 6) Maintain the spray program until 14 days before anticipated harvest.

## Controls

**Cultural-** practice proper crop rotation.

**Biological-** None commonly used

### Chemical-

Trade Name	Common Name	Rate/Acre	MOA	Comments
Abound 2.1F	azoxystrobin:	18.5-24.6 fl oz/Acre	11	Apply 60 and 90 days after planting.
Endura 70WG	boscalid	6.5 to 10 oz	7	Ground-sprayer, aerial, and chemigation applications. Apply on 14-day intervals.
Bravo 720 Bravo Ultrex	chlorothalonil	1.5 pt/A or 0.9 – 1.4 lb/A	M	Use high rate on Spanish cultivars.
Kocide 101 or DF Kocide 2000 DF	Copper hydroxide:	1.5-3 lb/A, or 1.25-2.25 lb/A	M	Use high rate when used alone.
Tenn-Cop 5E	Copper resins:	3-4 pt/A	M	Tank mix or alternate applications with other fungicides where disease is heavy
Dithane DF Manzate 200 DF Penncozeb DF  Dithane F-45	mancozeb	(1.5-2.0 lb/A); or  (1.3-1.7 qt/A)	M	Use the high rate when used alone.
Mankocide DF	mancozeb + copper hydroxide	(2-4 lb/A)	M+M	Use the high rate when used alone.
Tilt 3.6E	propiconazole	(2.5-4 fl oz/A)	3	Do not exceed 16 fl oz per season.
Tilt/Bravo	propiconazole + chlorothalonil:	(18 fl oz)	3+M	Contains 2 fl. oz. Tilt and 1 pt. Bravo 720 per acre.
Headline 2.08E	pyraclostrobin:	6 to 12 fl oz	11	For foliar diseases, use the low rate for 14-day intervals and 9-12 fl oz for

				21 day intervals. Do not make more than two sequential applications before alternating with a non-strobilurin fungicide.
	Sulfur			Various formulations, see labels. Tank mix with another fungicide where disease pressure is heavy.
Folicur 3.6F	tebuconazole	(7.2 fl oz/A)	3	Make up to 4 mid-season applications starting 60 days after planting.
Topsin 70W+ Dithane DF+ Manzate 200 DF, or Penncozeb DF	thiophanate methyl + mancozeb:	(8 oz/A) + (1.5 lb/A);	1+M	Use a spreader/sticker.
Dithane f-45		(1.5 qt/A)		
Stratego 2.08F	trifloxystrobin + propiconazole:	7 fl oz	11+3	Ground-sprayer or aerial applications. Do not make more than 2 consecutive applications before switching to another fungicide.

### **Late leaf spot**

*(Cercosporidium personatum)*

Symptoms are similar to early leaf spot, except spots are darker in color and the yellow border is faint or absent. Spots are usually black on the lower leaf surface.

### **Controls**

**Cultural-** proper crop rotation

**Biological-** None commonly used

**Chemical- -**

<b>Trade Name</b>	<b>Common Name</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
About 2.1F	azoxystrobin:	(18.5-24.6 fl oz/Acre)	11	Apply 60 and 90 days after planting.
Endura 70WG	boscalid	6.5 to 10 oz	7	Ground-sprayer, aerial, and chemigation applications. Apply on 14-day intervals.
Bravo 720 or Bravo Ultrex	chlorothalonil	(1.5 pt/A)  (0.9 – 1.4 lb/A)	M	Use high rate on Spanish cultivars.
Kocide 101 or DF or  Kocide 2000 DF	copper hydroxide	(1.5-3 lb/A), or  1.25-2.25 lb/A	M	Use high rate when used alone.
Tenn-Cop 5E	copper resins	(3-4 pt/A)	M	Tank mix or alternate applications with other fungicides where disease is heavy
Dithane DF, Manzate 200 DF, or Penncozeb DF  Dithane F-45	mancozeb	(1.5-2.0 lb/A);  or (1.3-1.7 qt/A)	M	Use the high rate when used alone.
Mankocide DF	mancozeb + copper hydroxide	(2-4 lb/A)	M+M	Use the high rate when used alone.
Tilt 3.6E	propiconazole:	(2.5-4 fl oz/A)	3	Do not exceed 16 fl oz per season.
Tilt/Bravo	propiconazole + chlorothalonil:	(18 fl oz)	3+M	Contains 2 fl. oz. Tilt and 1 pt. Bravo 720 per acre.
Headline 2.08E	pyraclostrobin:	6 to 12 fl oz	11	For foliar diseases, use the low rate for 14-day intervals and 9-12 fl oz for 21 day intervals.

				Do not make more than two sequential applications before alternating with a non-strobilurin fungicide.
	Sulfur			Various formulations, see labels. Tank mix with another fungicide where disease pressure is heavy.
Folicur 3.6F	tebuconazole:	(7.2 fl oz/A)	3	Make up to 4 mid-season applications starting 60 days after planting.
Topsin 70W+ Dithane DF, Manzate 200 DF, or Penncozeb DF  or Dithane f-45	thiophanate methyl + mancozeb:	(8 oz/A)  (1.5 lb/A); (1.5 qt/A)	1+M	Use a spreader/sticker.
Stratego 2.08F	trifloxystrobin + propiconazole:	7 fl oz	11+3	Ground-sprayer or aerial applications. Do not make more than 2 consecutive applications before switching to another fungicide.

**Pepper Spot**  
(*Leptoshpaerulina*)

Pepper spot symptoms show up as numerous small, dark brown to black spots on one leaf surface and lack the yellow border that persists in leaf spot diseases. Leaves may develop a V-shaped scorch before yellowing and dropping. The dark pepper spots may also be visible on the stem of the plant.

**Controls**

**Cultural-** Proper crop rotation

**Biological-** None commonly used

**Chemical- -**

<b>Trade Name</b>	<b>Common Name</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Abound 2.1F	azoxystrobin:	(18.5-24.6 fl oz/Acre)	11	Apply 60 and 90 days after planting.
Endura 70WG	boscalid	6.5 to 10 oz	7	Ground-sprayer, aerial, and chemigation applications. Apply on 14-day intervals.
Bravo 720 or Bravo Ultrex	chlorothalonil	(1.5 pt/A) (0.9 – 1.4 lb/A)	M	Use high rate on Spanish cultivars.
Kocide 101 or DF or Kocide 2000 DF	copper hydroxide	(1.5-3 lb/A), or 1.25-2.25 lb/A	M	Use high rate when used alone.
Tenn-Cop 5E	copper resins	(3-4 pt/A)	M	Tank mix or alternate applications with other fungicides where disease is heavy
Dithane DF, Manzate 200 DF, or Penncozeb DF  Dithane F-45	mancozeb	(1.5-2.0 lb/A);  or (1.3-1.7 qt/A)	M	Use the high rate when used alone.
Mankocide DF	mancozeb + copper hydroxide	(2-4 lb/A)	M+M	Use the high rate when used alone.
Tilt 3.6E	propiconazole:	(2.5-4 fl oz/A)	3	Do not exceed 16 fl oz per season.
Tilt/Bravo	propiconazole + chlorothalonil:	(18 fl oz)	3+M	Contains 2 fl. oz. Tilt and 1 pt. Bravo 720 per acre.
Headline 2.08E	pyraclostrobin:	6 to 12 fl oz	11	For foliar diseases, use the low rate for 14-day intervals

				and 9-12 fl oz for 21 day intervals. Do not make more than two sequential applications before alternating with a non-strobilurin fungicide.
	Sulfur			Various formulations, see labels. Tank mix with another fungicide where disease pressure is heavy.
Folicur 3.6F	tebuconazole:	(7.2 fl oz/A)	3	Make up to 4 mid-season applications starting 60 days after planting.
Topsin 70W+ Dithane DF, Manzate 200 DF, or Penncozeb DF  or Dithane f-45	thiophanate methyl + mancozeb:	(8 oz/A)  (1.5 lb/A); (1.5 qt/A)	1+M	Use a spreader/sticker.
Stratego 2.08F	trifloxystrobin + propiconazole:	7 fl oz	11+3	Ground-sprayer or aerial applications. Do not make more than 2 consecutive applications before switching to another fungicide.

**Web Blotch**  
(*Phoma arachidicola*)

Web blotch symptoms show up as greenish-gray to brown webbing, or irregularly shaped blotches on the upper leaf surface. These blotches later become darker brown and extend through to the lower leaf surface.

## Controls

**Cultural-** proper crop rotation

**Biological-** None commonly used

**Chemical-** -

Trade Name	Common Name	Rate/Acre	MOA	Comments
Abound 2.1F	azoxystrobin:	(18.5-24.6 fl oz/Acre)	11	Apply 60 and 90 days after planting.
Endura 70WG	boscalid	6.5 to 10 oz	7	Ground-sprayer, aerial, and chemigation applications. Apply on 14-day intervals.
Bravo 720 or Bravo Ultrex	chlorothalonil	(1.5 pt/A)  (0.9 – 1.4 lb/A)	M	Use high rate on Spanish cultivars.
Kocide 101 or DF or  Kocide 2000 DF	copper hydroxide	(1.5-3 lb/A), or  1.25-2.25 lb/A	M	Use high rate when used alone.
Tenn-Cop 5E	copper resins	(3-4 pt/A)	M	Tank mix or alternate applications with other fungicides where disease is heavy
Dithane DF, Manzate 200 DF, or Penncozeb DF  Dithane F-45	mancozeb	(1.5-2.0 lb/A);  or (1.3-1.7 qt/A)	M	Use the high rate when used alone.
Mankocide DF	mancozeb + copper hydroxide	(2-4 lb/A)	M+M	Use the high rate when used alone.
Tilt 3.6E	propiconazole:	(2.5-4 fl oz/A)	3	Do not exceed 16 fl oz per season.
Tilt/Bravo	propiconazole + chlorothalonil:	(18 fl oz)	3+M	Contains 2 fl. oz. Tilt and 1 pt. Bravo 720 per acre.

Headline 2.08E	pyraclostrobin:	6 to 12 fl oz	11	For foliar diseases, use the low rate for 14-day intervals and 9-12 fl oz for 21 day intervals. Do not make more than two sequential applications before alternating with a non-strobilurin fungicide.
	Sulfur			Various formulations, see labels. Tank mix with another fungicide where disease pressure is heavy.
Folicur 3.6F	tebuconazole:	(7.2 fl oz/A)	3	Make up to 4 mid-season applications starting 60 days after planting.
Topsin 70W+ Dithane DF, Manzate 200 DF, or Penncozeb DF  or Dithane f-45	thiophanate methyl + mancozeb:	(8 oz/A)  (1.5 lb/A); (1.5 qt/A)	1+M	Use a spreader/sticker.
Stratego 2.08F	trifloxystrobin + propiconazole:	7 fl oz	11+3	Ground-sprayer or aerial applications. Do not make more than 2 consecutive applications before switching to another fungicide.

### **Tomato Spotted Wilt Virus (TSWV)**

Symptoms of this virus are variable and may include leaf mottling and distortion, ring spots on new leaflets, plant stunting, and yellowing, wilting, and death of shoots.

### Controls

**Cultural-** Plant specific peanut varieties that are resistant to TSWV. The variety Georgia Green, of the Runner type of peanut plant provides resistance from TSWV.

**Biological-** None commonly used

**Chemical-** none

## SOILBORNE DISEASE CONTROL IN PEANUTS

Important soilborne diseases of peanuts include southern blight, Sclerotinia blight, pod rot, and Verticillium wilt. Limb rot can also be a problem in the production of irrigated runner varieties. These diseases usually appear from mid-season to late-season. Soilborne diseases can increase to high levels with continuous cropping of peanuts, causing substantial yield losses. Crop rotation should be practiced in the long-term management of these diseases. Fungicides are effective in reducing losses to these diseases, but they must be applied preventively for maximum effectiveness. Knowledge of field history is essential in anticipating outbreaks of these diseases.

### Southern Blight (*Sclerotium rolfsii*)

Symptoms of southern blight include wilting and yellowing of branches. White, coarse mold cover the lower stems and may grow over the soil surface and plant debris. Numerous small, round, brown sclerotia form on stems and debris when southern blight is present.

### Controls

**Cultural-** Rotate peanuts with cotton, corn, or grain sorghum. Field rotation away from peanuts is suggested for three years. Moldboard plow to bury sclerotia, and does not throw soil onto plant stem during cultivation.

**Biological-** None commonly used

**Chemical-**

Trade Name	Common Name	Rate/Acre	MOA	Comments
Abound 2.1F	azoxystrobin:	(18.5-24.6 fl oz/A)	11	Apply 60 and 90 day after planting.
Moncut 50W	flutolanil:	(2 – 4 lb/A)	7	Use 4lb/A where disease pressure is heavy.
Tilt 3.6E	propiconazole:	(4-8 fl oz)	3	Do not apply more than 16 fl oz per season.

Headline 2.1 E	pyraclostrobin:	12-15 fl oz	11	Apply on 14-day intervals by ground sprayer, aircraft, or chemigation. Do not make more than two consecutive applications before alternation to a fungicide other than Abound or Stratego.
Folicur 3.6F	tebuconazole:	(7.2 fl oz/A)	1+M	Up to 4 mid-season applications can be made after 60 days from planting.

### **Limb Rot**

(*Rhizoctonia solani*)

Limb rot symptoms include circular, sunken lesions on lower limbs that contact the soil. These lesions are light to dark brown in color, becoming elongated and banded. Infected branches wilt and die, and may spread inward killing several branches or the whole plant.

### **Controls**

**Cultural-** Rotate away from peanuts with grain crops to slow the disease build-up. Avoid excessive mechanical damage to vines. Time irrigations to avoid excessive wetness, and manage peanuts to avoid excessive top growth.

**Biological-** None commonly used

### **Chemical-**

<b>Trade Name</b>	<b>Common Name</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Abound 2.1F	azoxystrobin:	(18.5-24.6 fl oz/A)	11	Apply 60 and 90 day after planting.
Stratego 2.08F	trifloxystrobin + propiconazole:	14 fl oz	7	Apply 60 days after planting and repeat 30 days later.
Moncut 50W	flutolanil:	(2-4 lb/A)	3	Use 4lb/A where disease pressure is heavy.

Headline 2.1 E	pyraclostrobin:	12-15 fl oz	11	Apply on 14-day intervals by ground sprayer, aircraft, or chemigation. Do not make more than two consecutive applications before alternation to a fungicide other than Abound or Stratego.
Folicur 3.6F	tebuconazole:	(7.2 fl oz/A)	1+M	Up to 4 mid-season applications can be made after 60 days from planting.

### **Sclerotinia Blight**

*(Sclerotinia minor)*

Sclerotinia blight shows many of the same symptoms as southern blight. White fluffy mold is evidence when a plant has become infected with sclerotinia blight. This white mold is most evident when the canopy is wet. The mold grows on lower stems near the crown or on lateral branches. Light tan to pale white lesions develop on the stem of the plant. Small, irregular shaped, black sclerotia develop on and in infected stems, pegs, pods, and seeds.

#### **Controls**

**Cultural-** Plant resistant varieties of peanuts, such as Tamsan 90. Growers should avoid excessive mechanical damage to vines, and time irrigation to avoid excessive canopy wetness.

**Biological-** None commonly used

**Chemical-**

<b>Trade Name</b>	<b>Common Name</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Endura 70WG	boscalid:	8 to 10 oz	7	Do not exceed 30 oz/season or apply within 14 days of harvest.
Omega 4F	fluazinam:	1 to 1.5 pt	M	Do not exceed 4 pints per season or apply within 30 days of harvest
Rovral 4F	iprodione:	(1 qt/A)	2	Apply by ground sprayer with a minimum of 40 gallons per acre.

**Pod Rot**

*(Rhizoctonia solani)*

Symptoms include light brown to reddish-brown areas on pods, that later become black. The pod may rot completely and be either soft and mushy, or firm and skeletonized. The kernel and inner pod wall may be covered with cream to dark brown mold called mycelium. The kernels of the peanut plant are often completely decayed when pod rot is present.

**Controls**

**Cultural-** None commonly used

**Biological-** None commonly used

**Chemical-**

<b>Trade Name</b>	<b>Common Name</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
-------------------	--------------------	------------------	------------	-----------------

Ridomil Gold 2.4G	mefanoxam:	(11.8 lb/A)	4	Apply in a 12-inch band at pegging to 45 days after planting. Use for Pythium pod rot only.
Ridomil Gold 4E	mefanoxam +PCNB:	(0.5-1 pt/A)	4+14	Use for Pythium pod rot only.
Ridomil Gold 4E	mefanoxam +PCNB:	(0.5-1 pt/A), or	4+14	Apply by chemigation in a minimum of 0.5 inch water at pegging to 45 days after planting. Use for Pythium and Rhizoctonia pod rot.
Terraclor or PCNB 2E	PCNB	(3 gal/A)	14	
Terraclor 4F	PCNB	(1.5 gal/A)	14	

\* indicates a restricted use product

### **Black Hull** (*Thielasviopsis basicola*)

Symptoms include superficial, large, dull black patches on pod hulls. It may cause seed discoloration and peg decay when severe.

**Cultural-** Rotate infested fields with grain sorghum.

**Biological-** None commonly used

**Chemical-** None commonly used

### **Verticillium wilt** (*Verticillium minor*)

Symptoms of verticillium wilt usually become apparent at mid-season when leaves turn yellow with brown marginal scorches. Plants are stunted, turn yellow, and may wilt and die especially under drought stress, when they are infected with verticillium wilt.

#### **Controls**

**Cultural-** Long-term rotation (3-4 years) with non-host crops will help eliminate. Avoid rotations with cotton, okra, or potatoes in infested fields. Cleaning equipment before

moving from infested fields is vitally important, along with irrigating to maintain adequate soil moisture.

**Biological-** None commonly used

**Chemical-** none

## **NEMATODE CONTROL IN PEANUTS**

Plant parasitic nematodes are microscopic, slender worm-like organisms that live in soil and feed on plant roots. The most important nematode pest of peanuts in Oklahoma is the northern root-knot nematode. The peanut root-knot nematode was recently identified in a few fields in southwestern Oklahoma. Root-lesion and ring nematodes are also common in peanuts, but they are less damaging. Reductions in plant growth and yield result when nematode populations exceed critical levels. High populations may damage peanuts to an extent that a crop cannot be grown profitably. The goal of nematode management is to reduce populations below damaging levels. Crop rotation is very effective in reducing populations of root-knot nematodes. Cotton, corn, grain sorghum, and sudan grass are excellent rotation crops for root-knot control. However, rotation is not as effective against the root-lesion nematode because it can reproduce on a wide range of crops. If rotation cannot be practiced or if root-lesion nematode is a problem, chemical control should be considered. Fields can be checked for potential nematode problems by examining roots and pods during the season for symptoms of nematode feeding. Above ground symptoms of nematode do not always develop, but where they do, these areas of poor growth or stunted plants should be examined. Declining yields are also symptom of a nematode problem.

Efficient nematode management depends upon knowing which species is present and its population level in the soil. Symptoms of nematode feeding on plants during the growing season are a warning of a potential nematode problem. Soil sampling also is useful for assessing the potential for economic damage. Sampling must be done before a peanut crop is planted because nematode problems cannot be corrected during the growing season. Samples can be collected before planting in the spring. However, sampling late in the season, just prior to or at harvest will increase the chances of accurately measuring nematode levels. Root-lesion nematode can be difficult to detect in soil. Therefore, both roots and soil are needed for more accurate analysis of this nematode. Entire fields, areas in fields where plants are growing poorly, or both may be sampled. If a large field is to be sampled, divide it into smaller units and process the samples separately or sample along a w-shaped pattern across the entire field to ensure a representative sample. Collect soil from root zone (2-10 inches deep avoiding the upper 2 inches of soil). Include some fibrous (feeder) roots when possible. Bulk the samples in a bucket, thoroughly mix the sampled soil and roots, and retain approximately one quart for analysis. Avoid letting the samples dry or exposing them to intense heat or freezing temperatures. Mail samples as soon as possible after collection to a lab that test for nematodes.

If the test report indicates a potentially damaging level of nematodes, management strategies should be implemented. Infested fields with damaging populations may either

be rotated to a non-host crops for two years, a nematicide applied (see Table 2), or a nematode resistant variety (NemaTAM) can be planted where peanut root knot is found. 'NemaTAM' is not effective against the northern root-knot nematode. Where crop rotation is applied, fields should be sampled again to ensure nematode populations have declined to safe levels before planting peanuts without nematicide. Nematicides are dangerous pesticides and should be used with utmost caution.

### **Root-knot nematode**

*(Meloidogyne hapla)*

Infected plants form dense, bushy root systems, and form swellings at the points of root branching. In sandy soils, plants may be stunted and pale green in color. Stunted plants are usually clustered and therefore rows grow unevenly.

#### **Controls**

**Cultural-** Sample soil prior to planting to determine nematode population level. Where populations are high, rotate away from peanuts with corn, grain sorghum, sudan grass, or cotton and sample again.

**Biological-** None commonly used

**Chemical-**

Trade Name	Common Name	Specification	Rate/Acre	MOA	Comments
Mocap 10G*	ethoprop:	“at planting”	(22.4-44.8 oz/1000 ft)	1B	Apply in a 12-inch band over the row and incorporate 2 to 4 inches deep.
Mocap 10G*	ethoprop:	“at pegging”	(33.6 oz/1000 ft)	1B	Apply in a 15- to 18- inch band over the row 45 days after planting.
Nemacur 15G*	fenamiphos:		(11-18.7 oz/1000 ft)	1B	Apply in a 12-inch band and incorporate into soil at planting.
Temik 15G*	aldicarb:		(15-22 oz/1000 ft)	1A	Apply at planting in a 6- to 12-inch band and incorporate 2 to 4 inches. Split application can be made if 11 oz/1000 ft rate is used. Do not apply within 90 days of harvest.
Telone II*	dichloropropene:		(52 to 106 fl oz/1000 ft)		Row fumigation at least 7 days before planting, apply when soil is dry. Seal by packing.

\* indicates a restricted use product

**Root-lesion nematode**  
(*Pratylenchus brachyurus*)

Root-lesion nematodes cause brown pin-point spots on pods and pegs. Spots enlarge and turn darker, leaving a peppered appearance on the rooting system. Pegs may be weakened enough to leave pods in the soil at harvest.

**Controls**

**Cultural-** Rotation of crops is not effective for this species of nematodes, unlike the root-knot nematode.

**Biological-** None commonly used

**Chemical-**

Trade Name	Common Name	Specification	Rate/Acre	MOA	Comments
Mocap 10G*	ethoprop:	“at planting”	(22.4-44.8 oz/1000 ft)	1B	Apply in a 12-inch band over the row and incorporate 2 to 4 inches deep.
Mocap 10G*	ethoprop:	“at pegging”	(33.6 oz/1000 ft)	1B	Apply in a 15- to 18- inch band over the row 45 days after planting.
Nemacur 15G*	fenamiphos:		(11-18.7 oz/1000 ft)	1B	Apply in a 12-inch band and incorporate into soil at planting.
Temik 15G*	aldicarb:		(15-22 oz/1000 ft)	1A	Apply at planting in a 6- to 12-inch band and incorporate 2 to 4 inches. Split application can be made if 11 oz/1000 ft rate is used. Do not apply within 90 days of harvest.
Telone II*	dichloropropene:		(52 to 106 fl oz/1000 ft)		Row fumigation at least 7 days before planting, apply when soil is dry. Seal by packing.

\* indicates a restricted use product

## Weeds

Weeds can cause losses to peanut production by competing for nutrients, water, and sunlight. This competition between weeds and the peanut crop result in a reduced yield potential.

### Chemical Controls

#### Annual weeds and grasses

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Prowl 3.3EC	Preplant	1.2-2.4	3	Incorporate as soon as practical.

(pendimethalin)		pt/acre (0.5-1.0 lb AI/acre)		
Treflan EC (trifluralin)	Preplant	1.0-1.5 pt/acre (0.5-0.75 lb AI/acre)	3	Thoroughly incorporate after application.
Sonalan EC (ethalfuralin)	Preplant	1.0 qt/acre (0.75 lb AI/acre)	3	Use rate according to soil type, properly incorporate.
ValorWP (flumioxazin)	Preplant	1.0 to 2.0 oz/A	14	Application must be made before crop emergence or cracking or injury could occur.
Zorial Rapid 80 (norflurazon)	Preplant	0.5 lb/A	12	Apply as preemergence surface application after planting before crop emergence.

**Annual weeds, grasses and yellow nutsedge**

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Dual Magnum (metolachlor)	Preplant or Preemergence	0.8-1.33 pt/acre	15	Follow incorporation directions if preplanted

**Many broadleaf weeds, some grasses and yellow nutsedge**

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Pursuit 2L (imazethapyr)	Preplant or Preemergence or early postemergence	4 oz/A (0.063 lb AI/A)+ Additives	2	Broadcast apply

**Small-seeded annuals and nutsedge**

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Frontier (dimethamid)	Preplant or Preemergence	1.25-2 lb/acre (13-25 oz/A)	15	Incorporate within 7 days before planting, to 1.5 to 2 inches deep.
Outlook (dimethenamid)	Preplant or Preemergence	10-21 fl oz/A	15	Incorporate within 7 days before planting, to 1.5 to 2 inches deep.

**Seedling weeds**

<b>Chemical Name</b>	<b>Time of App.</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Cyclone Max* (paraquat)	Groundcrack Broadcast Postemergence Postemergence	5.4 fl oz/acre + surfactant	22	Must be applied to small seedling weeds with a nonionic surfactant and high gallonage of water to be successful. It can be mixed with Basagran or Butyrac.

\* indicates a restricted use product

**Annual broadleaf weeds**

<b>Chemical Name</b>	<b>Time of App.</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Butoxone 175 (2,4-DB)	Postemergence	0.9-1.8 pt AI/acre	4	Do not apply later than 100 days after planting or 30 days before harvest.
Butoxone 200 (2,4-DB)	Postemergence	0.8-1.6 pt/A	4	Do not apply later than 100 days after planting or 30 days before harvest.
Basagran 4L+ Butyrac 200 or Butoxone 200 (bentazon)+(2,4-DB)	Postemergence	1-2 pt/acre 0.5 pt/acre 0.5 pt/acre	6+4	Apply before annual vines reach 10 inches long. Mixing helps reduce morningglory and sicklepd.
Blazer 2L (acifluorfen) + Surfactant	Postemergence	0.5-1.5 pt/acre + Surfactant (0.125-0.375 lb AI/A)	14	Addition of butyric helps control tough, bigger weeds.
Storm (bentazon+acifluorfen)	Postemergence	1.5 pt/acre + Surfactant or COC or UAN	6+14	Apply when weeds are small and actively growing. Some spurges may be controlled better with

				Blazer.
Storm + Butyrac 200 or Butoxone 200 (bentazon+acifluorfen)+(2,4-DB)	Postemergence	1.5 pt/acre + Butyrac 200 or Butoxone 200 Use Rate: 8-16 fl oz/A (0.3125-0.25 lb AI/A) + Surfactant or COC	6+14+4	This mixture helps to improve control of larger cocklebur, morning glory or velvetleaf and helps some on several other weeds.
Tough 3.75 EC (pyridate)	Cracking or Postemergence	2-3 pt/A (0.94-1.4 lb/acre)	14	Peanut plants are tolerant to Tough at all stages of development. Apply Tough when susceptible target weeds have germinated and are in the 2-4 leaf stage
Tough 3.75 EC + Butoxone 200 (pyridate)+(2,4-DB)	Postemergence	0.94-1.4 lb/acre 0.9-1.6 pt/acre	14+4	This mixture will control a broader spectrum of broadleaf weeds than Tough used alone.

**Yellow nutsedge and selected annual broadleaf weeds:  
pricly sida, cocklebur, velvetleaf**

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Basagran 4L (bentazon)+ COC	Postemergence	1-2 pt/acre	6	Apply 0.75-1 qt per acre when plants are 6 to 8 inches tall. Make a second application for yellow nutsedge control 7 to 10 days after initial application

**Morning glory, Eclipta, pigweeds, copperleaf, crotons, sparges**

<b>Chemical Name</b>	<b>Time of App.</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Blazer 2L (acifluorfen) + Surfactant	Postemergence	0.5-1.5 pt/acre  0.125-0.375 lb AI/acre	14	Apply Blazer in adequate volume to get thorough coverage of all weeds when weeds are small. See label

**cocklebur, crownbeard, morningglory, pigweed, prickly sida, and yellow nutsedge**

<b>Chemical Name</b>	<b>Time of App.</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Cadre (imazapic)	Postemergence	0.06 lb/acre 4 oz/acre	2	Observe rotation limitations on label

**Annual grasses and johnsongrass**

<b>Chemical Name</b>	<b>Time of App.</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Poast Plus 1E (sethoxydim) + COC or DASH or UAN	Postemergence	1.5-2.25 pt/acre (0.19-0.28 lb AI/acre)	1	It is important to use oil concentrate with Poast and to have the grasses actively growing at the time of application. Do not use when grasses are drought stressed

**Annual grasses, bermudagrass, and johnsongrass**

<b>Chemical Name</b>	<b>Time of App.</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Select 2EC (clethodim)	Postemergence before annual grasses exceed 14 days after emergence.	See label	1	Must be actively growing. Tank mix only according to herbicide labels. Do not use when grasses are drought stressed.

**Johnsongrass**

<b>Chemical Name</b>	<b>Time of App.</b>	<b>Rate/Acre</b>	<b>MOA</b>	<b>Comments</b>
Roundup Or Touchdown (glyphosate)	Prior to planting or spot treatment	52-78 fl oz/acre  2-3 qt/acre	9	Follow label instructions

### Broadleaf weeds

Chemical Name	Time of App.	Rate/Acre	MOA	Comments
Strongarm (diclosulam)	Preemergence to cracking	0.3-0.45 oz/acre	2	Peanut seed must be planted at least 1.5 inches deep. Apply immediately after planting through "at cracking."

## Contacts

Charles Luper, Extension Associate  
(405) 744-5808  
charles.luper@okstate.edu

Jim T. Criswell, Extension Pesticide Coordinator  
(405) 744-5531  
jim.t.criswell@okstate.edu

Pat Bolin, IPM Coordinator  
(405) 744-9420  
pat.bolin@okstate.edu

Case Medlin, Extension Weed Specialist  
405 744-9588  
case.medlin@okstate.edu

Phil Mulder, Extension Entomology Specialist Peanuts  
405 744-9413  
phil.mulder@okstate.edu

John Damicone, Extension Plant Pathologist Peanuts  
405 744-9962  
john.damicone@okstate.edu

## References

*Oklahoma Agricultural Statistics 2005*, Oklahoma Department of Agriculture, Food and Forestry

*Crop Protection Handbook 2005*; MeisterPro Information Resources

*Oklahoma Crop Production 2003*; Oklahoma Department of Agriculture, Food and Forestry

*2005 OSU Extension Agents' Handbook of insect, Plant Disease, and Weed Control*;  
Oklahoma Cooperative Extension Service Division Of Agricultural  
Sciences And Natural Resources: Oklahoma State University

Sprenkel, Richard K. *Identification and Monitoring of Insect Pests in Peanut*; University  
of Florida. Cooperative Extension Service, Institute of Food and  
Agricultural Sciences

*Oklahoma Farm Statistics April 1, 2004*, Bloyd, Barry L. National Agricultural Statistics  
Service, Oklahoma Department of Agriculture, Food and Forestry

*Oklahoma Farm Statistics February 27, 2004*, Bloyd, Barry L. National Agricultural  
Statistics Service, Oklahoma Department of Agriculture, Food and  
Forestry

*Classification of Herbicides According to Mode of Action*;  
<http://www.plantprotection.org/HRAC/>, Herbicide Resistance Action  
Committee

*IRAC Mode of Action Classification*;  
[http://www.irac-online.org/documents/moa/MoAv5\\_1.pdf](http://www.irac-online.org/documents/moa/MoAv5_1.pdf), Insect Resistance  
Action Committee

*FRAC CODE LIST 1:Fungicides sorted by FRAC Code*;  
<http://www.frac.info/>, Fungicide Resistance Action Committee