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2010

Virginia Peanut Production Guide

Virginia Cooperative Extension

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VSU VIRGINIA STATE

2010

Virginia Peanut Production Guide

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SAFETY FIRST WITH PESTICIDES

Recommendations for the use of agricultural chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention or listing of commercial products or services in this publication does not imply endorsement by Virginia Tech nor discrimination against similar products or services not mentioned. Individuals who use agricultural chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Be sure to obtain information about usage regulations and examine a current product label before applying any chemical. For assistance, contact your county Extension agent.

Keys to Proper Use of Pesticides

1. Read the label on each pesticide container before each use. Follow the printed instructions to the letter; heed all cautions and warnings; note precautions about residues.

2. Store pesticides in the containers in which you bought them. Put them where children and animals cannot get to them — preferably locked-up and away from food, feed, seed, and other materials that may become harmful if contaminated.

3. Dispose of empty containers in the manner specified on the label.

SEE YOUR DOCTOR IF SYMPTOMS OR ILLNESS OCCURS DURING OR AFTER USE OF PESTICIDES!

IN CASE OF SUSPECTED POISONING

The procedure to be followed is:

1. Call a physician immediately. If the family physician is not available, the patient should be **taken** to the nearest physician or hospital emergency department together with the **container of the poisoning agent**.

2. If necessary, the **physician** will call the nearest poison control center for further information concerning the toxicity of the suspected agent, treatment, and prognosis.

Protective Clothing and Equipment Guide

Use this table as a guide to the selection of protective clothing and equipment. Cross-reference the signal word from the product label and the type of formulation to determine the minimum protection you should wear. This guide is not to be used in place of label statements; refer to the label for specific information.

Table 1. Personal Protective Equipment (PPE) Guide

	Label Signal Word		
Formulation	**Caution**	**Warning**	**Danger**
Dry	Long-leg trousers and long-sleeve shirt; shoes and socks.	Long-leg trousers and long-sleeve shirt; shoes and socks; wide-brim hat; gloves.	Long-leg trousers and long-sleeve shirt; shoes and socks; hat; gloves; cartridge or canister respirator if dusts in air or if label precautionary statement says: **"Poisonous or fatal if inhaled."**
Liquid	Long-leg trousers; long-sleeve shirt; shoes and socks; wide-brim hat.	Long-leg trousers and long-sleeve shirt; shoes and socks; wide-brim hat; rubber gloves. Goggles if required by label precautionary statement. Cartridge or canister respirator if label precautionary statement says: "Do not breathe vapors or spray mists," or "Poisonous if inhaled."	Long-leg trousers and long-sleeve shirt, rubber boots, wide-brim hat, rubber gloves or face shield. Canister respirator if label precautionary statement says: **"Do not breathe vapors or spray mists,"** or **"Poisonous if inhaled."**
Liquid (when mixing)	Long-leg trousers; long-sleeve shirt; shoes and socks; wide-brim hat; gloves; rubber apron.	Long-leg trousers and long-sleeve shirt; shoes and socks; wide-brim hat; rubber gloves; goggles or face shield; rubber apron. Respirator if label precautionary statement says: **"Do not breathe vapors or spray mist."** or **"Poisonous (or fatal or harmful) if inhaled."**	Long-leg trousers and long-sleeve shirt, rubber boots, wide-brim hat, rubber gloves, goggles, rubber apron, canister respirator.

Table 1. Personal Protective Equipment (PPE) Guide (cont.)

	Label Signal Word		
Formulation	**Caution**	**Warning**	**Danger**
Liquid (prolonged exposure to spray, or application in enclosed area).	Long-leg trousers and long-sleeve shirt, boots, rubber gloves, water-proof, wide-brim hat.	Water-repellent, long-leg trousers and long-sleeve shirt, rubber boots, rubber gloves, rubber apron, waterproof, wide-brim hat, face shield, cartridge or canister respirator.	Waterproof suit, rubber boots, rubber gloves, waterproof hood or wide-brim hat, face shield, canister respirator.

Source: *Apply Pesticides Correctly: A Guide for Private and Commercial Applicators.* **USDA/ USEPA - 1984. p. 102.**

Emergency Information

Poison Treatment

In the event of a known or suspected exposure to a toxic (poisonous) substance, one of the Regional Poison Centers listed below should be contacted immediately. These centers provide 24-hour information and consultation services by poison information specialists and board-certified medical toxicologists. If possible, these centers should be called in advance of a person's admission to a local hospital or emergency department so the poison center experts can provide information on the proper treatment. These centers are located in hospitals equipped for all toxicological (poisoning) emergencies.

Poison Hotline – 1-800-222-1222

REGIONAL POISON CENTERS

CHARLOTTESVILLE, VA
Blue Ridge Poison Center
University of Virginia Health System
P.O. Box 67
Charlottesville, VA 22908
(434) 982-3158 or (434) 924-0347
(Serving: Central and Western Virginia)

RICHMOND, VA
Virginia Poison Center
Virginia Commonwealth University
Medical Center
600 E. Broad St., Suite 640
Richmond, VA 23298
(804) 828-4780
(Serving: Central and Eastern Virginia)

WASHINGTON, D.C.
National Capital Poison Center
George Washington University Medical Center
3201 New Mexico Avenue NW, Suite 310
Washington, DC 22016
(202) 362-3867
(Serving: Northern Virginia and D.C. area)

In addition to the Regional Poison Centers, there are several area hospitals with staff members who will provide some poison information by telephone. These hospitals are equipped for most toxicological emergencies.

GREENSBORO, N.C.
Triad Poison Center
Moses H. Cone Memorial Hospital
1200 North Elm Street
Greensboro, NC 27401-1020
(919) 574-8105
(800) 953-4001
(Calls from Virginia counties on the Va.-N.C. border only, please)

Table 2. Emergency, Spill, Accident, and Incident Information

Incident	Contact	Phone
SPILLS, accidents and other related emergencies	**CHEMTREC** - Chemical Transportation Emergency Center Industry Hotline	(800) 424-9300
SPILLS into water	Virginia Department of Environmental Quality	(804) 527-5194 (8:00 a.m. to 5:00 p.m.) (804) 527-5200 (after 5:00 p.m.)
24-Hour Medical Consultation	National Pesticide Telecommunication Network	(800) 858-7378
FOR ASSISTANCE WITH SPILLS AND EMERGENCIES	Virginia Department of Emergency Services	(804) 674-2400 or (800) 468-8892 (24-hours/day)
ACCIDENTS OR INCIDENTS that constitute a threat to any person, public Field Operations safety and health or the environment	Virginia Department of Agriculture and Consumer Services, Office of Pesticide Management	(804) 371-6560

EXTENSION PERSONNEL WORKING WITH PEANUTS

County Extension personnel with peanut responsibilities as of January 1, 2010.

County	Name	Telephone	E-mail
Dinwiddie	Mike Parrish	(804) 469-4514	mparrish@vt.edu
Greensville	Cyndi Estienne	(434) 348-4223	cestienne@vt.edu
Isle of Wight	(vacant)	(757) 365-6262	
Prince George	Scott Reiter	(804) 733-2686	jreiter@vt.edu
Southampton	(vacant)	(757) 653-2572	
Suffolk	Rex Cotten	(757) 514-4332	rcotten@vt.edu
Surry	Glenn Slade	(757) 294-5215	gslade@vt.edu
Sussex	Kelvin Wells	(804) 834-1309	kewells2@vt.edu

Virginia Tech Extension specialists with peanut responsibilities as of January 1, 2010.

Name	Department	Telephone	E-mail
Ames Herbert	Entomology	(757) 657-6450, ext. 411	herbert@vt.edu
Pat Phipps	Plant Pathology	(757) 657-6450, ext. 413	pmphipps@vt.edu
Maria Balota	Peanut Variety	(757) 657-6450, ext. 427	mbalota@vt.edu
Henry Wilson	Weed Science	(757) 414-0724	hwilson@vt.edu
Bobby Grisso	Biological Systems Engineering	(540) 231-6538	rgrisso@vt.edu
Dell Cotton	PGCMA	(757) 562-4103	dcotton25@cs.com

AGRONOMIC RECOMMENDATIONS AND PROCEDURES

Maria Balota, Peanut Variety and Quality Evaluation Program Coordinator

The primary considerations when selecting a peanut variety are yield and quality. Other important characteristics to consider are grade characteristics, maturity and resistance to disease, drought, and extreme temperatures. A common practice thus far to alleviate the risks associated with peanut production is planting of several varieties instead of only one each year. These varieties can be selected to have high yields, different maturity, and high disease resistance. A good source of information regarding selection of the best Virginia market type peanut varieties for the farmers in Virginia, North Carolina, and South Carolina is the Peanut Variety and Quality Evaluation (PVQE) program. Within the PVQE, experimental research plots are planted and evaluated every year at multiple locations in VA, NC, and SC, and data on yield, grade characteristics, maturity, disease resistance, Ca uptake, and oil content are made available to growers and industry. However, little is known about resistance of these peanut varieties to drought, cold, and heat. New research projects at the Tidewater AREC include observations at multiple locations and years, and identification of peanut varieties the most tolerant to drought and extreme temperatures. This will allow further improvement of the risk management strategies in the region conducive to higher yields and better quality of the peanuts.

Commercially available Virginia type peanut varieties include Bailey, CHAMPS, Gregory, NC-V 11, Perry, Phillips, Sugg, and VA 98-R. These varieties were developed by the North Carolina State University and Virginia Tech breeding programs and through the PVQE program. In general, these varieties have high yields, and big pod and kernel size. The most recent ones, Bailey and Sugg, have improved disease resistance in particular early leaf spot, tomato spotted wilt virus (TSWV), Cylindrocladium black rot (CBR), and Sclerotinia blight (SB) resistance. Among them, CHAMPS is the earliest with only 135 days after planting (DAP) and Perry the latest with 165 DAP required to reach maturity. None of those varieties have however high oleic acid (O) content; high oleic acid content and high oleic to linoleic acid (O:L) ratio extend shelf life of the peanuts. New varieties with high O and O:L are currently being developed by the NCSU and will be included in the PVQE tests next year.

Other Virginia market type varieties developed by breeding programs in Georgia and Florida are Florida Fancy, GA05E, and GA08V. Just recently these varieties were included in the PVQE trials, for which data is insufficient at this time. In general, they have high yields, high O:L ratio, and good disease resistance, but require more DAP to mature in VA and NC.

Finally, runner type varieties, such as AP4, Georgia 03L, and Florida 07, could be grown in VA and NC as they mature relatively well in V-C region. The runner type varieties are resistant to diseases and have high O:L ratio, but have much smaller pods and kernels than Virginia type and require many DAP to mature, for which they may be more prone to early freeze that Virginia varieties.

Tables 3, 4a and 4b present pod yield, crop value, and content of fancy pods (% FAN), extra large kernels (% ELK), sound mature kernels (% SMK), and total meat of the kernels (% TM), from the last 5 years of PVQE testing at two locations in VA, three locations in NC, and one location in SC. At all locations tables report data from Dig I (approximately September 15) and Dig II (the first week in October). Through examining dig dates, maturity of varieties relative to the other varieties tested can be assessed. Combining the performance of varieties over years and locations should aid in evaluating the stability for the agronomic characteristics of the peanut varieties.

Table 3. Agronomic Performance of Commercially Available Peanut Varieties; Averages Across All Locations – Dig I & II – 5-Year Average, 2005-2009.

	Dig I		Dig II	
	Yield	Value	Yield	Value
Variety	(lb/acre)	($ /acre)	(lb/acre)	($ /acre)
Bailey	5043 ab*	957 a	5005 ab	891 a-c
NC-V 11	4846 a-c	877 ab	4439 ab	747 a-d
Sugg	4816 a-c	892 ab	4837 ab	864 a-d
CHAMPS	4759 a-c	861 ab	4172 b	695 cd
Phillips	4742 a-d	866 ab	4260 b	725 b-d
VA 98R	4708 a-d	839 ab	4232 b	702 cd
Gregory	4551 a-d	747 bc	4049 b	605 d
Perry	4162 cd	748 a-c	4231 b	744 a-d

*Averages followed by the same letters are not statistically different.

Table 4a. Agronomic Performance of Commercially Available Peanut Varieties; Averages Across All Locations – Dig I – 5-Year Average, 2005-2009.

	Fancy	Extra Large Kernels	Sound Mature Kernels	Total Meat
Variety	---------- % ----------			
Gregory	92 a*	46 c	62 de	69 d
Sugg	88 ab	46 c	65 bc	73 b
CHAMPS	87 cd	41 ef	66 bc	73 b
Phillips	86 bc	47 bc	65 bc	73 b
NC-V 11	83 cd	37 fg	65 cd	72 bc
Bailey	83 cd	42 de	66 bc	72 bc
VA 98R	81 de	39 e-g	64 c-e	73 bc
Perry	81 de	41 de	64 cd	72 bc

*Averages followed by the same letters are not statistically different.

Table 4b. Agronomic Performance of Commercially Available Peanut Varieties; Averages Across All Locations – Dig II – 5-Year Average, 2005-2009.

Variety	Fancy	Extra Large Kernels	Sound Mature Kernels	Total Meat
		---------- % ----------		
Gregory	90 ab*	48 a-e	60 de	71 fg
Sugg	86 ab	53 a	66 ab	75 b
CHAMPS	83 bc	43 e-h	66 bc	74 bc
Phillips	83 bc	51 a-c	65 bc	75 bc
NC-V 11	78 cd	40 gh	64 b-d	73 c-e
Perry	78 cd	46 c-f	66 a-c	75 bc
Bailey	78 cd	45 c-f	67 ab	74 b-d
VA 98R	75 d	42 f-h	63 cd	74 b-e

*Averages followed by the same letters are not statistically different.

Description of Virginia-type Peanut Commercial Varieties

Bailey

Bailey, released in 2008 by NCSU, is a large-size kernelled and high yielding Virginia-type peanut. It produces high yields across multiple years and locations, which is an indication of good tolerance to fluctuations of weather and growth conditions. Bailey has a growth habit intermediate between runner and bunch types, bright pods, and tan kernel color. More importantly, it is resistant to TSWV and trips. It matures in approximately 145 DAP, just a little after CHAMPS, but it holds pods much better than CHAMPS if picked later.

CHAMPS

CHAMPS has been introduced in 2004. It is a large-seeded Virginia-type peanut with a runner growth habit. It is the earliest maturing variety for which acreages planted with it in VA and NC increase every year. Yields at early digging (135-140 days after planting in Virginia) are high, and pod size, shape and color are suited for in-shell market. If an early frost advisory is in effect, CHAMPS can be harvested ten days earlier than NC-V 11 with no reduction in yield. CHAMPS is less susceptible to TSWV than most Virginia-type cultivars. Resistance to CBR and SB is medium. High yields and favorable pod characteristics were observed across years and locations and, similarly to Bailey, showed good tolerance to growth factors.

Gregory

Gregory has a growth habit intermediate between runner and bunch types. Maturity is similar to NC-V 11 (145-150 DAP). This variety produces an exceptionally high percentage of ELKs and Fancy pods. Due to large seed size, Gregory has a high soil calcium requirement which may result in reduced seedling vigor if seed is produced under conditions which limit calcium uptake. It is medium resistant to TSWV.

NC-V 11

Under good conditions, NC-V 11 has high yield and dollar value per acre. Maturity is 145-150 days depending upon growing season. NC-V 11 produces fewer fancy pods and a lower percentage of ELKs than CHAMPS, especially at early digging. NC-V 11 has a runner (spreading) growth habit. It is less susceptible to TSWV than other Virginia-type varieties.

Perry

Perry is a high-yielding, large-seeded, and CBR-resistant variety. Perry is less susceptible to SB and Web Blotch than other Virginia-type varieties, but tends to have high susceptibility to TSWV. Maturity is approximately 14 days later than that of NC-V 11. Growth habit is intermediate between runner and bunch types. Perry has a pink seed coat and good pod color. Fancy pod and ELK percentage is slightly lower than for other varieties.

Phillips

Phillips is a large-seeded Virginia-type peanut with an intermediate runner growth habit. Yield has been high relative to other Virginia-type varieties. Phillips has a high content of ELKs than most Virginia-type peanut varieties. It is susceptible to all the major diseases in the V-C region. It matures later than NC-V11 and CHAMPS.

Sugg

Sugg was released in 2009. Before release, it was known as N 03091T, a line developed at the NCSU to hold multiple disease resistance. It has resistance to TSWV, CBR, SB, and early leaf spot. Sugg has an intermediate runner growth habit and the color of seed coat is pink. Sugg produces high yields and has larger kernels than Bailey. It also has good blanching and flavor characteristics.

VA 98R

VA 98R has a runner growth habit and high yield potential. Maturity is considered early (5 to 7 days earlier than NC-V 11). This variety has pod-size, shape, and color which is well suited for in-shell markets. Fancy pod percentage is approximately equal to NC-V 11, but lower than NC 12C, or Gregory. VA 98R is susceptible to the major peanut diseases of the V-C production area.

Other Virginia-type Peanut Varieties

Florida Fancy

Florida Fancy is a high oleic Virginia-type peanut variety released University of Florida. It is being researched in Virginia because of its high oleic trait and its resistance to TSWV and *Sclerotinia* blight. This variety has an intermediate runner growth habit, pink seed-coat color, and a high proportion of ELK.

Georgia 05E

Georgia 05E is a new high oleic Virginia-type peanut released by the Georgia Agricultural Experiment Station in 2005. It is being researched in Virginia because of its improved oil quality (high O:L ratio) and its leaf spot and TSWV resistance. This peanut has a runner growth habit and a tan seed-coat color. Its medium to late maturity (over 150 DAP) may not make it suitable for Virginia.

Georgia 08V

Georgia 08V is also a new high oleic Virginia-type peanut release by the Georgia Agricultural Experiment Station. It is being researched in Virginia because of its improved oil quality (high O:L ratio) and its leaf spot and TSWV resistance. This peanut has a runner growth habit and also require over 150 DAP to mature in V-C region.

Runner Market Types

For several years, runner market type peanuts have been evaluated for variety performance and disease resistance in Virginia. In 2007, 15 to 20% of the peanut acres in Virginia were planted with Georgia Green runner market type variety. Research in Virginia thus far indicates that several runner varieties may have the potential to yield equal to Virginia-type peanuts and offer more TSWV resistance relative to Virginia market type peanuts.

Table 5. Agronomic and Market Characteristics of Virginia Market-type Peanut Varieties Recommended for Virginia

Characteristics	Bailey	CHAMPS	Gregory	NC-V 11	Perry	Phillips	Sugg	VA 98R
General								
Growth Habit	Int.-Runner	Runner	Int.	Runner	Int.	Int.-Runner	Int.-Runner	Runner
Maturity[a]	-5	-10	0	0	+15	-5	-5	-5
Pod Retention	0	-	-	0	-	-	0	-
Seed Coat Color	Tan	Pink-Lt. pink	Pink	Pink	Pink	Tan	Lt. pink	Pink
Soil Type (Adapt.)[c]	M-L	M-L	M-L	M-L	M-L	M-L	M_L	M-L
Seed Count/lb	525	475	450	600	500	500	475	550
Calcium[d]	Mod.	High	Low	Mod.	Mod.	Low	Mod.	Mod.
Seed Vigor[b]	0	0	-	0	0	0	0	+
Grade & Quality Factors[b]								
% ELK	0	+	++	0	+	+	+	0
% SMK	0	+	-	0	0	0	0	0
% Fancy	+	+	++	0	-	+	+	-
Blanchability	++	-	-	0	-	-	0	0
Shelf-life	+	+	+	0	0	+	0	0
Splitting	0	-	0	0	0	0	0	0

[a] *0 = Same as NC-V 11; '+' = Days later than NC-V 11; '-' – Days earlier than NC-V 11*

[b] *0 = Same as NC-V 11; '++' = Substantially higher than NC-V 11; '--' = Substantially lower than NC-V 11; '-' = lower than NC-V 11; '+' = higher than NC-V 11*

[c] *Performs best on L = light; M = medium; H = heavy soil type*

[d] *Ability to absorb calcium*

Table 6. Disease and Insect Resistance Characteristics of Virginia Market-type Peanut Varieties Recommended for Virginia								
Characteristics	**Bailey**	**CHAMPS**	**NC-V 11**	**Gregory**	**Perry**	**Phillips**	**Sugg**	**VA 98R**
Disease Resistance[a]								
CBR	S	S	S	S	MR	S	R	S
Leaf spot	S	S	S	S	S	S	R	S
Pod Rot	S	S	S	S	S	S	S	S
Sclerotinia	S	S	S	VS	MR	S	R	S
Stem Rot	S	S	S	S	S	S	S	S
TSWV	R	MR	MR	MR	VS	S	R	S
Web blotch	S	S	VS	S	MR	S	S	VS
Insect Resistance[a]								
Corn earworm	S	S	S	S	S	S	S	S
Leafhopper	S	S	S	S	S	S	S	S
Rootworm	S	S	S	S	S	S	S	S
Spider mites	S	S	S	S	S	S	S	S
Thrips	MR	S	S	S	S	S	S	S

[a] *VS = Very Susceptible; S = Susceptible; MR = Moderately Resistant; R = Resistant*

Table 7a. Cultural Practices: Plant Population, Seed Size, and Seeding Rates for Recommended Varieties[1]

Seeding Rates			Variety and Approximate Seed Count Per Pound						
Seed pacing (inches)	**# Seed (per foot)**	**# Seed (per acre)**	**Gregory (450)**	**Sugg CHAMPS (475)**	**Phillips Perry (500)**	**Bailey (525)**	**VA 98R (550)**	**NC-V 11 (600)**	**Georgia Green (825)**
For 36" rows[2]			Lbs seed required to plant 1 acre in 36" rows						
2.0	6	81,120	180	167	174	156	152	145	98
3.0	4	58,080	129	123	116	111	101	97	70
4.0	3	43,560	97	92	87	83	76	73	53
6.0	2	29,040	65	62	58	55	51	48	35

[1] Seed requirements for one acre at 4 intra-row seed spacings in 36-inch rows

[2] For any seed spacing in 32", 34", or 38" rows, multiply the pounds of seed required to plant 36-inch rows as noted below:

Row spacing	Multiply lbs for 36 rows by:
32"	1.125
34"	1.060
38"	0.947

Twin-row Planting Patterns

The impact of twin-row planting has been somewhat inconsistent. Yield increases (5-10 percent) due to twin-row planting have been documented with the NC-V 11, Perry and VA 98R varieties. Twin-row planting more consistently resulted in yield increases on light-textured soils (sands to loamy sands) than on medium- to heavy-textured soils (loam to sandy clay loams). Yield increases have been documented in twin-row plantings both with seed spaced 3 to 4 inches apart and with seed spaced 5 to 6 inches apart. Twin-row planting has also been noted to reduce the severity of TSWV disease. Good early season weed control is essential when planting in twin rows.

Use of Inoculants

The peanut plant depends upon association with Rhizobium bacteria to form root nodules which “fix” atmospheric nitrogen for use by the plant. Commercial inoculants are available which can be applied to the seed or put into the furrow with the seed at planting. In-furrow inoculants are available as either granular or liquid products. If peanuts are to be planted in a field which has not been planted to peanuts within four to five years, or if the field has not produced a well-nodulated, nitrogen-fixing peanut crop, inoculate the seed at planting or use an in-furrow inoculant.

Crop Rotation

A long crop rotation is essential for achieving high peanut yields. Also, not all other crops rotate well with peanut. For example, soybean is a poor choice because both are legumes and share many common disease. In fact, a good rotation program is aimed to reduction of sources of soil borne diseases that can infect peanut, damage the crop, and reduce the yield. A minimum of 3 years is recommended and used at the Tidewater Agricultural Research and Extension Center in Suffolk. Good crops to rotate peanut with are corn and cotton. If soybean has been grown, it is probably a wise decision to plant peanut after 4, 5, or more years after the bean. According to specialists at NCSU, peanut varieties have different requirements relative to crop rotation. A good example of the influence of rotation on yield is presented for Gregory in table 7b, adapted from David Jordan, NCSU Peanut Specialist. Similarly, under the same rotations during 2001-2006, Perry lost only 26% of yield due to poor rotation (tobacco-corn-peanut-tobacco-corn-peanut instead of corn-corn-corn-corn-corn-peanut), while Gregory lost 40%.

Table 7b. Cultural Practices: Influence of Rotation on Yield when Gregory was used

Rotation (1997-2006)	Peanut yield, 2006 (lb/A)
Corn-Cotton-Corn-Peanut-Corn-Corn-Corn-Corn-Corn-Peanut	5,920
Peanut-Corn-Corn-Peanut-Corn-Corn-Peanut-Corn-Corn-Peanut	5,030
Corn-Peanut-Corn-Peanut-Corn-Peanut-Corn-Peanut-Corn-Peanut	4,350
Peanut-Soybean-Corn-Peanut-Soybean-Corn-Peanut-Soybean-Corn-Peanut	3,800
Peanut-Peanut-Peanut-Peanut-Peanut-Peanut-Peanut-Peanut-Peanut-Peanut	2,600

Trace-element Requirements

While nitrogen is supplied through the symbiotic relationship with Rhizobium bacteria and phosphorus and potassium residues from previous crops suffice, peanut requires extra calcium and minor elements call trace elements. For trace-elements and calcium needs, rates and number of applications should be based on soil test results from specialized soil testing laboratories. Virginia Tech provides soil testing through the Soil Testing Laboratory, 145 Smyth Hall (0465), Blacksburg, VA 24061. Soil samples are analyzed for pH (acidity), and content of phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), zinc (Zn), boron (B) and manganese (Mn), and results are expressed in parts per million (ppm) numbers.

Manganese

Manganese is needed in small amounts for peanut production. Soils in the peanut area, until recent years, contained adequate available manganese but now most sandy soils are deficient in this nutrient. Manganese availability to plants most commonly becomes critical with a soil pH of 6.2 to 6.5 or higher. In the heavier and more poorly drained soils, manganese deficiency symptoms (leaf yellowing) often will occur when soil pH exceeds 6.2. On sandy soils, deficiency symptoms usually will not occur until the soil pH exceeds 6.5. Since peanut yields are not increased by pH values which exceed 6.2, it is recommended that peanut soils retain a pH value of 5.8 to 6.2. Generally, if soil tests indicate less than 3 ppm manganese, one or more foliar applications of the nutrient will be required. Monitor the crop for visual symptoms of manganese deficiency. If deficiency symptoms appear, foliar applications of the nutrient will be required. Soil application of manganese is not recommended. Typical plant deficiency symptoms are yellowing of leaflet tissues between the veins while the veins remain green. Nitrogen deficiency is sometimes confused with manganese deficiency when the whole leaf, including the veins, is pale yellow.

Manganese Recommendations

Apply 1 to 3 applications of manganese [Tecmangam, MnSO4, MnCl2, or Mn(NO3)2] as a foliar spray as needed between mid-June and August 15 at the rate of 1.0 lb elemental manganese per acre per application. Manganese sources may be tank-mixed with leaf-spot sprays. Cone-type nozzles used for leaf-spot sprays are well suited for application of manganese. If other manganese materials are available, spray the material to deliver 1.0 lb elemental manganese per acre. Do not mix Solubor with any of these manganese products. Boric acid may be mixed with these manganese products. When soil tests for manganese are 3.0 ppm or below, three preventative applications should be made at 2-week intervals, beginning mid-June.

Soil Application – Application of manganese to the soil has been ineffective in providing this element to the crop.

Liquid Manganese Products

A number of liquid formulations containing manganese are available for use on peanuts. When used according to label instructions many of these products provide less than 1.0 lb elemental manganese per acre. Recent Virginia research results have shown that liquid manganese formulations should be applied in multiple applications, which supplies a total of at least 0.5 to 1.0 lb elemental manganese per acre per application. With manganese EDTA chelate, the material should supply 0.25 to 0.50 lb elemental manganese per acre per application. EDTA chelate products may be tank mixed with cupric hydroxide and with inorganic sources of boron.

Boron

Boron is needed during kernel development; hence, it should be applied about the time of, or immediately following, flowering. Generally, boron is applied as a wettable powder or liquid spray with the leaf spot fungicides. When plants are under stress or if the recommended rates are exceeded, leaf burning will occur. Excessive use of boron can cause severely reduced yields even when foliage burning is not obvious. Boron can be applied satisfactorily as a soil application in fertilizer. Do not mix solubor with inorganic sources of manganese due to potential compatibility problems.

Boron Recommendation

Apply 0.5 lb elemental boron per acre at the early bloom stage to prevent internal damage. The application of boron is especially important on light sandy soils. The following sources and rates are suggested:

2.5 lb/A Solubor foliar applied in 10-30 gal spray/A

2.8 lb/A Boron-spray foliar applied in 10-30 gal spray/A

2.9 lb/A Boric Acid foliar applied in 10-30 gal spray/A

Apply boron at the time of second or third leaf spot application. Do not apply when plants are under moisture stress. Do not apply with sulfur or other chemicals which tend to burn foliage and do not exceed 0.5 lb/A elemental Boron. Split applications, each of 0.25 lb elemental boron per acre, at 2- to 4-week intervals up to August 15 are suggested. Do not mix Solubor with Techmangam, MnS04, MnCl2, Mn(NO3)2, or with leaf-spot disease control products containing cupric hydroxide due to potential compatibility problems.

Landplaster-Calcium Recommendations

Table 8. Landplaster-Calcium Recommendations

Source	% $CaSo_4$	Band (16-18″)	Broadcast
		lb/A	
US Gypsum Bagged	85		
US Gypsum Bulk 420 (granular)	83	600	900-1200
US Gypsum Bulk 500 (granular)	70		900-1200
Texasgulf Gypsum (Phosphogypsum)	50		1500-1800
ISG Resources, Inc. Peanut Maker (semi-granular)	71		1100-1500

Special Recommendation for Peanut Seed Production

It is essential that peanuts being grown for seed receive a continuously available supply of calcium from pegging through seed development to insure high germination. This can be accomplished by either using two (2) applications or by increasing the amount used at the first application by 50 percent; being certain to apply it after June 10. Specific recommendations are:

1. a) June 10-June 30: Apply 75 percent of recommended amounts above for non-seed crop.

   b) July 1-July 20: Apply 400-500 lb/A of bagged or dry USG 420 or USG 500 landplaster in a band over the row.

OR

2. June 10-June 30: Apply the higher rate of the above rate ranges.

CAUTION: If soil potash level is relatively low, this choice could cause a potash deficiency to occur unless potash is applied prior to planting.

Recommendations for Runner Market Type Peanut Production

Runner market type peanuts require less calcium (Ca) for optimum seed development than Virginia market types. To assess the need for supplemental Ca, soil samples should be taken up to a 3-inch depth in the pegging zone in mid to late June. If the ratio of calcium to potassium (K) exceeds 3 to 1 and the calcium levels exceed 250 ppm, Ca is not recommended. To calculate the ratio of Ca to K, use the following formula:

Ca to K ratio = Ca saturation (%) / K saturation (%)

To calculate Ca concentration in ppm, use the following formula:

Ca ppm = Ca saturation (%) x CEC x 200

The CEC is cation exchange capacity, and it can be found on the soil test result sheets.

WEED CONTROL IN PEANUTS

Henry P. Wilson, Professor, Weed Science, Eastern Shore AREC

With production costs escalating, efficient and effective weed control is very important. Failure to control weeds almost always results in a poor peanut crop. Detailed information on the use of herbicides cannot be included in a guide such as this. Refer to product labels for use suggestions and restrictions. Proper application is required to obtain satisfactory weed control and minimize carry-over residues.

Soil incorporation is necessary for some herbicides. Compliance with the label directions for incorporation is very important in obtaining effective weed control.

With postemergence herbicides, good spray coverage of the target plants, treatment at the proper stage of weed development, and use of relatively small droplets of spray under relatively high pressure are required to insure good control.

Effective weed management requires integration of all control strategies.

Crop Rotation

Peanuts should be grown in rotation with corn, grain sorghum, and/or cotton to aid in management of various pests including weeds. Crop rotation allows for the use of different types of herbicides on the same field in different years. A good rotation and weed management system in each crop prevents the buildup of problem weeds in the field. Most annual and perennial broadleaf weeds can be controlled more economically and easier in corn than in peanuts. For example, there are no registered herbicides for use in peanuts that will effectively control perennial broadleaf weeds such as horsenettle, trumpetcreeper, or maypop passionflower.

Crop Competition

Peanuts are relatively poor competitions with weeds. Horsenettle, lambsquarter, cocklebur, and palmer amaranth have been shown to reduce yield by 17, 40, 70, and 28 percent, respectively. Fewer weeds are required to reduce yield and quality of peanuts than for most other crops. Generally, if peanuts are kept weed free for 6-8 weeks after planting, peanut yield will not be reduced by weed competition. However, late season weeds often interfere with digging and combining of peanuts and reduce harvesting efficiency and peanut quality.

Cultivation

Cultivation is often required to supplement chemical weed control. In addition, cultivation permits banding of herbicides, which reduces herbicide costs. Cultivations must be flat and non-dirting. Soil must not be moved upon or around the peanut plant. Such soil movement results in physical damage to the peanut plant and often results in increased disease problems.

Weed Identification and Scouting

Proper weed identification is essential. Generally, one herbicide will not control every weed that is likely to be present in a typical field. Every field should be scouted and mapped for weeds present. Using graph paper, a grower should mark the approximate location of weeds in the fall of each year. Weeds present in the fall will generally have set seed and will be present the following year. Weed seeds often will stay viable in the soil for several years. As a result, they will be a problem for many years. By knowing what weeds to expect, a grower will be able to make more intelligent decisions on herbicide applications and save money and time in the process.

Herbicide Selection

To develop a herbicide program, a grower must know what weeds are present, the soil characteristics of the field, and herbicide limitations and capabilities. Seldom will one herbicide provide control of all weeds present. As a result, several herbicides must be used together for a successful program. By knowing what each herbicide provides to the program, the grower may eliminate expensive duplication or choose the herbicide that provides the best overall balance of weed control capabilities, crop safety, and the best buy.

Problem Weeds

Perennial Broadleaf Weeds

Perennial broadleaf weeds such as horsenettle, alligatorweed, Virginia buttonweed, trumpetcreeper, maypop passionflower, and bigroot morningglory cannot be controlled in peanuts. These weeds can be controlled in corn grown in rotation with peanuts. In corn, make a layby application of 1.0 pt/A of 2,4-D amine plus surfactant. After corn harvest, spot spray any remaining infestations with glyphosate or a mixture of 1.0 pt/A of 2,4-D amine plus 0.5 pt/A of Banvel plus surfactant. See glyphosate product labels for suggested application rates.

Bermudagrass

In addition to controlling bermudagrass in the field, efforts should also be directed at controlling bermudagrass on edges of field. This prevents encroachment into the field.

Ideally, control procedures should begin in the fall following corn harvest. This allows the grower several options and reduces the risk of yield reduction. After corn harvest, mow the stalks. If the bermudagrass foliage appears wilted or damaged, set the mower low to remove the old foliage. Do not till; allow the bermudagrass to regrow (8-10 inches tall) and be actively growing before applying glyphosate at 3.0 lb ai/A in a spray volume of 15 gpa using flat fan nozzles and 30-40 psi. Apply at least two weeks before frost and wait 14 days before tillage. Using moldboard or chisel plow followed by several diskings spaced at 4-6 week intervals (during the fall and winter if soil conditions allow) is most effective.

Glyphosate may also be applied in the spring. Remove old thatch by burning or mowing. Allow bermudagrass to regrow before applying 3 quarts of glyphosate as described above. Wait 14 days before seedbed preparation.

Two applications of Poast, Poast Plus, or Select Max in combination with good crop competition will usually provide good control or suppression of bermudagrass. See Table 4 for application rates and weed size for treatment. Always include a crop oil concentrate in the spray mixture.

Nutsedge

Both yellow and purple nutsedge occur in peanut fields. Know which nutsedge species is present; management practices vary for the two species.

Fields infested with yellow nutsedge should receive a preplant-incorporated or preemergence application of Pursuit, Frontier, Outlook, Strongarm, or Dual. Pursuit, Frontier, Outlook, or Dual may also be used as ground-cracking applications. Basagran may be applied postemergence when the yellow nutsedge is 6-8 inches tall. Apply 1.5-2.0 pt Basagran per acre. A second application of Basagran at same rate 7-10 days later may be required. The addition of 1 quart per acre of crop oil concentrate with Basagran will improve control. Either Cadre or Pursuit plus nonionic surfactant or crop oil concentrate may be applied for control of either yellow or purple nutsedge at the 1-4 inch stage.

Purple nutsedge is not controlled by Basagran, Frontier, Outlook, or Dual. Soil incorporated or preemergence treatments of Pursuit or Strongarm provide suppression of purple nutsedge.

Broadleaf Signalgrass and Texas Panicum

These two annual grasses are becoming more widespread in Virginia's peanut production area. Because management programs vary for the two species, it is important to have accurate information concerning the species present.

A management program for broadleaf signalgrass should begin with a preplant-incorporated treatment of Prowl, Sonalan, Dual, Frontier, Outlook, or Lasso. The preplant-incorporated treatment should be followed by a preemergence or ground-cracking application of Lasso, Frontier, Outlook, or Dual. Broadleaf signalgrass which escapes soil treatments may be controlled with postemergence application of Poast, Poast Plus, or Select Max. Cracking stage application of Gramoxone Inteon, or Boa effectively controls seedling broadleaf signalgrass.

Texas panicum is not effectively controlled by Dual, Frontier, Outlook, Lasso, or Pursuit. Management should begin with a preplant-incorporated application of Prowl or Sonalan. Texas panicum may emerge from deeper in the soil than other annual grasses. As a result, Prowl or Sonalan should be incorporated to a depth of 3 inches (this is deeper than specified on Prowl label). Dual, Frontier, Outlook, or Lasso applied preemergence or at ground-cracking provides some suppression. Texas panicum which escapes soil treatments may be controlled with postemergence application of Poast, Poast Plus, or Select Max. Cracking stage application of Gramoxone Inteon, or Boa also effectively controls seedling Texas panicum.

Table 9. Recommended Herbicides for Weed Control in Peanuts

	Preplant Incorporated		
Weed Problem	**Chemical Rate Per Acre**	**Product Per Acre**	**Remarks**
Crabgrass, goosegrass, fall panicum, johnsongrass, broadleaf signalgrass, Texas panicum, carpetweed, lambsquarters, pigweed	Pendimethalin 0.75-1.0 lb	Prowl 3.3EC 1.8-2.4 pt or Prowl H_2O 1.6-2.1 pt	Incorporate into the top 1 to 2 inches within 7 days of application. Incorporate 3 inches deep for Texas panicum (note this is deeper incorporation than the label specifies). Use higher rate for broadleaf signalgrass, fall panicum, or Texas panicum. May be tank mixed with Dual Magnum, Strongarm, Pursuit, or dimethenamid for control of mixed infestations of nutsedge and annual grasses.
	Ethalfluralin 0.56-0.75 lb	Sonalan 3HFP 1.5-2.0 pt	Incorporate 2 to 3 inches deep within 2 days of application (incorporation as soon as possible after application is preferred). For Texas panicum incorporate 3 inches deep. Use higher rate for fall panicum, Texas panicum, or broadleaf signalgrass. See label for application rates for particular soil. May be tank mixed with Dual Magnum, Pursuit, Strongarm, or dimethenamid for control of mixed infestations of nutsedge and annual grasses.
Broadleaf weeds and suppression of nutsedges	Diclosulam 0.024 lb	Strongarm 84WDG 0.45 oz	Incorporate into the top 3 inches of soil within 4 weeks of planting. When applied in tank mixture with other herbicides, follow incorporation directions for the tank-mix partner. May be tank mixed with Dual Magnum, Prowl, Sonalan, Pursuit, or dimethenamid for improved control of nutsedge and annual grasses.

Table 9. Recommended Herbicides for Weed Control in Peanuts

Preplant Incorporated (cont.)			
Weed Problem	**Chemical Rate Per Acre**	**Product Per Acre**	**Remarks**
Crabgrass, fall panicum, goosegrass, broadleaf signalgrass, pigweed, yellow nutsedge	s-Metolachlor 0.95-1.27 lb	Dual Magnum 7.62EC 1.0-1.33 pt or Dual II Magnum 7.64EC 1.0-1.33 pt	Incorporate 2 inches deep within 14 days of planting. Will not control purple nutsedge or adequately control Texas panicum. A sequential application may be used with 1/2 rate applied PPI and 1/2 rate applied either preemergence or at cracking. May be tank mixed with Prowl or Sonalan to obtain control of broadleaf signalgrass and Texas panicum.
Crabgrass, fall panicum, goosegrass, broadleaf signalgrass, pigweed, yellow nutsedge, carpetweed	Dimethenamid 0.56-0.84 lb	Outlook 6E 10.0-14.0 oz	Incorporate 2 inches deep within 14 days of planting. May be applied in a split application with 1/2 to 2/3 the maximum rate applied PPI and 1/2 to 1/3 the maximum rate applied as a sequential application. Specifically, apply 10.0-14.0 oz/A preplant and incorporate. Follow planting with a preemergence application of Outlook at 7.0-10.0 oz/A sequentially. Do not apply more than 18.0 fl oz/A Outlook per season on coarse soils and 18.0-21.0 oz/A on medium and fine textured soil. Will not control purple nutsedge or adequately control Texas panicum. May be tank mixed with Prowl or Sonalan for improved broadleaf signalgrass and Texas panicum control.

Table 9. Recommended Herbicides for Weed Control in Peanuts

	Preplant Incorporated		
Weed Problem	**Chemical Rate Per Acre**	**Product Per Acre**	**Remarks**
Controls most annual grasses and broadleaf weeds in conventional and reduced tillage production systems. Control or temporary suppression of many weeds, including hemp dogbane, yellow nutsedge, and rhizome johnsongrass. Provides residual control of large crabgrass, goosegrass, fall panicum, foxtails.	Glyphosate 0.703-0.984 lb ae/A + s-Metolachlor 0.938-1.31 lb ai/A	Sequence 2.5-3.5 pt	Apply to soil surface at planting, but before crop emerges. **Do not incorporate.** Crop injury has been observed, especially when heavy rainfall is received shortly after peanut emergence. Do not exceed 2.5 pt/A of Sequence on medium or fine textured soils. Do not apply to sands or loamy-sand soils. May be useful in no-till peanut and for suppression of yellow nutsedge. **Do not apply Sequence to cracking peanuts.**
Spurred anoda, pigweeds, prickly sida, vealvetleaf, yellow nutsedge, purple nutsedge	Imazethapyr 0.063 lb	Pursuit 2EC 4.0 oz	May be applied and uniformly incorporated 1-2 inches deep prior to planting or applied to soil surface after planting. A sequential application may be used with 1/2 rate applied PPI and 1/2 rate applied either at ground crack or early postemergence. Soil incorporated treatments may be tank mixed with Prowl, Sonalan, Dual Magnum, Outlook, or Strongarm. Do not apply more than 4.0 oz Pursuit total for all application methods.

Table 9. Recommended Herbicides for Weed Control in Peanuts (cont.)

Preemergence			
Weed Problem	**Chemical Rate per Acre**	**Product Per Acre**	**Remarks**
Yellow and purple nutsedges, many broadleaf weeds	Imazethapyr 0.063 lb	Pursuit 2EC 4.0 oz	Apply after planting and preferably before emergence of weeds. May be tank mixed with Dual Magnum, Outlook, or Strongarm. Preemergence application of Pursuit has been less consistent in weed control than either soil incorporated or split (PPI + PRE) application.
Broadleaf weeds and suppression of nutsedges	Diclosulam 0.024 lb	Strongarm 84WDG 0.45 oz	Apply after planting but prior to crop or weed emergence. May be tank mixed with other herbicides registered for preemergence application.
Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, goosegrass, pigweed, carpetweed	Alachlor 3.0 lb	Micro-Tech 4ME 3.0 qt	Generally good annual grass control except Texas panicum. Can be applied preplant incorporated, preemergence surface or at peanut ground-cracking. For Texas panicum control, applications should be as a tank mixture preplant incorporated with a labeled rate of Prowl or Sonalan. Can also be applied sequentially at ground-cracking following a labeled preplant incorporated herbicide. Will not control emerged weeds and grasses.
Crabgrass, fall panicum, goosegrass, broadleaf signalgrass, pigweed, yellow nutsedge	s-Metolachlor 0.95-1.27 lb	Dual Magnum 7.62EC 1.0-1.33 pt or Dual II Magnum 7.64EC 1.0-1.33 pt or Dual IIG Magnum 6.0-8.0 lb	Apply to the soil surface before weeds or crop emerge. Good annual grass control except for Texas panicum. Do not use Dual II Magnum, or Dual II G after peanuts have emerged.
Crabgrass, fall panicum, goosegrass, broadleaf signalgrass, pigweed, yellow nutsedge	Dimethenamid 0.56-0.84 lb	Outllook 6E 12.0-18.0 oz	Apply to soil surface before weeds or crop emerge. Good annual grass control except for Texas panicum.

Table 9. Recommended Herbicides for Weed Control in Peanuts (cont.)

Weed Problem	Chemical Rate per Acre	Product Per Acre	Remarks
Preemergence			
Broadleaf weeds	Flumioixazin 0.063 oz	Valor SX 2.0 oz	Apply within 2 days following planting. Significant injury has been observed if applied 3 or more days after planting. Do not incorporate. Will not control nutsedge (purple or yellow) or sicklepod. Effective on ragweed, sicklepod, eclipta, and pigweed. Follow labeled sprayer cleanout instructions. Spray equipment used to apply Valor SX should not be used to apply other material to crop foliage. If heavy rain occurs at emergence, foliar injury from splashing Valor can occur. Peanut typically recovers by mid season.
Ground Cracking			
Small annual grasses, broadleaf weeds	Paraquat 0.125 lb	Gramoxone Inteon 8.0 oz	Gramoxone Inteon is effective only on small emerged weeds (less than 1 inch tall) and does not provide residual control. Add 1 pt of nonionic surfactant per 100 gal of spray solution. May cause foliar burn on emerged peanuts but crop recovers and yield is not affected. May be tanks mixed with Basagran (1 pt/A), Butyrac or Butoxone (0.5-1.0 pt/A), Dual Magnum (1.0-1.3 pt/A), Outlook (see label) or Pursuit (2-4 oz/A, see label). Do not apply Dual II Magnum after peanuts have emerged. Do not apply later than 28 days after ground cracking. Maximum of 16 oz/A of Gramoxone Inteon may be used per season. Consult labels of Basagran, Butyrac, Butoxone, Dual Magnum, Outlook, or Pursuit.

Table 9. Recommended Herbicides for Weed Control in Peanuts (cont.)

Weed Problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Ground Cracking (cont.)			
Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, goosegrass, pigweed, carpetweed	Alachlor 3.0 lb	Micro-Tech 4ME 3.0 qt	Generally good annual grass control except Texas panicum. Micro-Tech can be applied preplant incorporated, preemergence surface or at peanut ground-crack. For Texas panicum control, applications should be as a tank mixture preplant incorporated with a labeled rate of Prowl or Sonalan. Can also be applied sequentially at ground-crack following a labeled preplant incorporated herbicide. Will not control emerged weeds and grasses.
Postemergence			
Mainly cocklebur, annual morningglory (except pitted morningglory), sicklepod **(See Tables 12 and 13)**	2,4-DB 0.2-0.25 lb	Butoxone 1.75SC 0.9-1.1 pt or Butyrac 2SC 0.8-1.0 pt	Use when weeds are in the seedling stage and actively growing. Apply with 10 to 30 gal/A spray volume and 20 to 40 psi spray pressure. Cocklebur and morningglory are most susceptible. Ragweed, lambsquarters, jimsonweed, pigweed, and teaweed (prickly sida) are rather tolerant and may only be suppressed. The higher rate should be used if the difficult-to-control species are present. Do not graze or feed treated forage to livestock. May be applied from 2 weeks after planting to within 45 days of harvest. Avoid drift to other crops.

Table 9. Recommended Herbicides for Weed Control in Peanuts (cont.)

Postemergence			
Weed Problem	**Chemical Rate Per Acre**	**Product Per Acre**	**Remarks**
Broad-spectrum broadleaf weed control **(See Tables 12 and 13)**	Bentazon 0.5 lb + Acifluorfen 0.25 lb	Storm 4EC 1.5 pt (premix)	Apply to small, actively growing weeds with a minimum of 20 gal/A spray volume and 40 psi. Apply with 1 to 2 pt/A crop-oil concentrate or 1.0 pt of nonionic surfactant/100 gal spray solution. See label for weeds controlled. May be tank mixed with 0.5 to 1.0 pt/A 2,4-DB for improved control of certain broadleaf weeds.
Same as for bentazon alone; however, the addition of acifluorfen improves control of pigweeds, morningglories and common ragweed. **(See Table 13)**	Bentazon 0.75-1.0 lb + Acifluorfen 0.25-.0.5 lb	Basagran 4SC 1.5-2.0 pt + Ultra Blazer 2L 1.0-2.0 pt (tank mix)	Apply to small, actively growing weeds. Use spray pressures of 40 to 60 psi. Do not use large-orifice nozzles. Apply with 1.0 pt nonionic surfactant/100 gal spray solution or a crop-oil concentrate at 1.0 to 2.0 pt/A. Increased leaf burn and weed control is usually observed with use of crop oil and higher rates of Blazer. Do not apply within 75 days of harvest.
Cocklebur, jimsonweed, smartweed, prickly sida (teaweed), spurred anoda, wild mustard, yellow nutsedge **(See Table 13)**	Bentazon 0.5-1.0 lb	Basagran 4SC 1.0-2.0 pt	Apply when broadleaf weeds are small and actively growing. Apply with 1.0 to 2.0 pt/A crop-oil concentrate. Peanuts are tolerant at any growth stage. Use minimum of 10 gal/A spray volume at 40 to 50 psi. Split applications 7 to 10 days apart, applying 1.5 to 2.0 pt each usually improves control of morningglory and spurred anoda. Do not apply more than 4.0 pt/A/season.
Same as for bentazon alone, however, the addition of 2,4-DB improves control of morningglories and spurred anoda.	Bentazon 0.75-1.0 lb + 2,4-DB 0.12 lb	Basagran 4SC 1.0-2.0 pt + Butyrac 2SC 8.0 fl oz or Butoxone 1.75SC 9 fl oz	Apply in a minimum of 20 gal/A spray volume and 40 psi. Apply to actively growing small weeds. Avoid drift to other crops. Label directions prohibit addition of oil concentrate or other additives. Do not apply within 45 days of harvest or make more than 2 applications/year.

Table 9. Recommended Herbicides for Weed Control in Peanuts (cont.)

Postemergence (cont.)			
Weed Problem	**Chemical Rate Per Acre**	**Product Per Acre**	**Remarks**
Cocklebur, eastern black nightshade, ragweed, eclipta, jimsonweed, morningglory, and pigweed	Lactofen 0.2 lb	Cobra 2 EC 12.5 fl oz	Apply to actively growing weeds after peanut reaches the 6 true leaf stage. Do not apply sequential application within 14 days of the first. Good coverage with spray solution is essential. Use a minimum of 25-40 gpa and a spray pressure of 40-60 psi. Add nonionic surfactant at 1 qt. per 100 gallons or petroleum or vegetable based crop oil concentrate at 1-1.5 pt. per acre. See label for adjuvant use. Do not apply within 90 days of harvest. May be tank mixed with Butyrac and/or Butoxone to enhance spectrum of weeds controlled. In tank mixes, use use nonionic surfactants, not crop oil.
Common ragweed, jimsonweed, morningglory, pigweed, carpetweed, purslane, cocklebur, tropic croton, lambsquarters, eastern black nightshade, smartweed, spotted and prostrate spurge, wild mustard **(See Table 13)**	Acifluorfen 0.25-0.5 lb	Ultra Blazer 2L 1.0-2.0 pt	Apply when broadleaf weeds are small and actively growing. Refer to label for proper growth stage of weed. Good coverage by spray solution is important. Follow label directions concerning best application procedures and rates for different weed sizes to be controlled. Use a minimum of 25 to 40 gal/A, and spray pressures of 40 to 60 psi. Do not use flood tips. Add 2.0 pt/A crop-oil concentrate or 1.0 pt nonionic surfactant/100 gal of spray solution. Do not apply more than 2.0 pt/A of Ultra Blazer postemergence/season. Do not apply within 75 days of harvest. May be tank mixed with Butyrac and/or Butoxone to enhance spectrum of weeds controlled.

Table 9. Recommended Herbicides for Weed Control in Peanuts (cont.)

Postemergence (cont.)			
Weed Problem	**Chemical Rate Per Acre**	**Product Per Acre**	**Remarks**
Morningglories, pigweeds, velvetleaf, yellow nutsedge, purple nutsedge	Imazethapyr 0.063 lb	Pursuit 2EC 4.0 oz	Apply from ground crack to early postemergence when weeds are actively growing and are less than 3 inches tall. Certain weeds such as common lambsquarters, prickly sida, and velvetleaf should be treated less than 2 inches in height. Apply with a nonionic surfactant (1.0 qt/100 gal spray volume) or crop-oil concentrate (1.0 qt/A). Do not apply more than 0.063 lb ai A/ season. Do not apply within 85 days of harvest.
Spurred anoda, morningglories, pigweeds, velvetleaf, yellow and purple nutsedge, sicklepod	Imazapic 0.063 lb	Cadre 70DG 1.44 oz	Apply when broadleaf weeds are actively growing and are less than 3 inches tall. Certain weeds such as common lambsquarters, prickly sida, velvetleaf, and spurred anoda should be treated when 2 inches tall or less. Apply with 1.0 qt/A crop-oil concentrate or 1.0 qt nonionic surfactant/100 gal spray solution. Apply as a sequential treatment following application of a soil-applied grass control herbicide.
Annual grasses **(See Table 13)**	Clethodim 0.094-0.125 lb	Select 2EC 6.0-8.0 oz or SelectMax 0.97EC 12.0-16.0 oz	Apply to actively growing grasses. In general, annual grasses should be 2 to 4 inches tall for best results. Do not apply within 40 days of harvest. See labels for tank-mix instructions. See table 16 for adjuvant recommendations.
	Sethoxydim 0.19 lb	Poast 1.5EC 1.0 pt or Poast Plus 1EC 1.5 pt	

Table 9. Recommended Herbicides for Weed Control in Peanuts (cont.)

Postemergence (cont.)			
Weed Problem	**Chemical Rate Per Acre**	**Product Per Acre**	**Remarks**
Bermudagrass **(See Table 14)**	Clethodim 0.125-0.25 lb	Select 2EC 8.0-16.0 oz or SelectMax 0.97EC 16.0-32.0 oz	Apply to actively growing bermudagrass when stolons (runners) are 3 to 6 inches in length. If needed, a second application of 8.0 to 16.0 oz/A may be applied for control of regrowth when stolons are 3 to 6 inches in length. See table 16 for adjuvant recommendations.
	Sethoxydim 0.28 lb	Poast 1.5EC 1.5 pt or Poast Plus 1EC 2.25 pt	Apply to actively growing bermudagrass before plant stolon (runner) length exceeds 6 inches. A second application of 1.0 pt/A Poast or 1.5 pt/A Poast Plus is usually necessary for good control. Make the second application when stolon regrowth is 1 to 4 inches in length. See table 16 for adjuvant recommendations.
Rhizome Johnsongrass **(See Table 14)**	Clethodim 0.125-0.25 lb	Select 2EC 8.0-16.0 oz or SelectMax 0.97EC 16.0-32.0 oz	Apply to actively growing johnsongrass when 12 to 24 inches tall. If needed, a second application of 6.0 to 8.0 oz/A may be applied for control of regrowth when plants are 6 to 18 inches tall. See table 16 for adjuvant recommendations.
	Sethoxydim 0.28 lb	Poast 1.5EC 1.5 pt or Poast Plus 1EC 2.25 pt	Apply to actively growing johnsongrass when 15 to 25 inches tall. A second application of 1.0 pt/A Poast or 1.5 pt/A Poast Plus may be made when new plants or regrowth are 6 to 12 inches tall. See table 16 for adjuvant recommendations.

Table 9. Recommended Herbicides for Weed Control in Peanuts (cont.)

Postemergence (cont.)			
Weed Problem	**Chemical Rate Per Acre**	**Product Per Acre**	**Remarks**
Extended late-season residual grass control	s-Metolachlor 0.95-1.27 lb	Dual Magnum 7.62EC 1.0-1.33 pt	Apply over-the-top of peanuts for control of late-season grasses in years when excessive rains may have reduced the residual control of early-season applications. Will not control emerged grasses. Do not apply within 90 days of harvest. Do not apply more than an equivalent of 2.67 lb ai/A s-metolachlor during any one year. Dual IIG Magnum and Dual II Magnum are not registered for this method of application in peanut.
	Dimethenamid 0.56-0.98 lb	Outlook 6E 16.0-21.0 oz	Maximum Outlook rates in a single application are 12-18 fl oz/A on course-textured soils and 18-21 fl oz/A on medium or fine-textured soils and are influenced by soil organic matter. Outlook may be applied in a single application of up to 21 fl oz/A or used in split applications of 10-14 fl oz/A initially and the remaining 2-10 fl oz applied in the sequential application. Do not apply more than 21 fl oz/A of Outlook per season. See label for specific and labeled mixtures and sequential herbicide applications.

Table 10. Weed Species Response to Herbicides for Peanuts[1]

	Soil-applied Herbicides[2]									
Species	Sonalan PPI[2]	Prowl PPI[2]	Micro-Tech PPI	Dual PPI/PRE[2]	Outlook PPI/PRE[2]	Strongarm PPI/PRE[2]	Pursuit PPI[2]	Pursuit PRE[2]	Sequence PRE[2]	Valor PRE[2]
Texas panicum	G-E	G-E	P	P	P-F	P	P-F	P-F	P	PF
Barnyardgrass	G-E	G-E	E	G	G	P	G	G	F-G	PF
Crabgrass	E	E	E	E	E	P	F	P-F	F-G	PF
Goosegrass	E	E	E	E	E	P	P	P	F-G	F
Fall panicum	G-E	G-E	G	G	G-E	P	P-F	P-F	F-G	PF
Signalgrass, broadleaf	G-E	G	G	G	G	P	G	G	P-F	P
Foxtails	E	E	E	G	G	P	F-G	F-G	F-G	PF
Nutsedge, yellow	N	N	F	G	F-G	F-G	F-G	F-G	P-F	P
Nutsedge, purple	N	N	P	P	P	F-G	F-G	P	P-F	P
Cocklebur	N	N	P	P	P	G	G	G	N	PF
Jimsonweed	P	P	P	P	P	G-E	G	G	N	G
Lambsquarters, common	G	G	F	F	P	F-G	G	F-G	P	GE
Morningglory	P	P	P	P	P	G	F-G	F-G	N	GE
Pigweed, common	G	G	E	G-E	G-E	N	E	E	F-G	E
Prickly sida (teaweed)	P	P	P	P	P-F	F-G	G	G	N	FG
Ragweed	P	P	P	P	P-F	G-E	P	P	P	GE
Smartweed	P	P	P	P	P-F	G	G	G	P	-
Eclipta	P	P	P	P	P	G-E	P	P	G	G
Carpetweed	G	G	F-G	F	F-G	G	F-G	F-G	E	F
Sicklepod	P	P	P	P	P	N	P	P	N	P
Spurred anoda (cottonweed)	P	P	P	P	P	F-G	G	G	G	F
Velvetleaf	P	P	P	P	P	G-E	F-G	F-G	P	F
Tropic croton	P	P	P	P	P	F	P	P	F	-

[1] *Control Capabilities:*
E = Excellent Control; 90% or better
G = Good Control; 80-90%
F = Fair Control; 60-80%
N = less than 20%
P = Poor Control; 20-60%

[2] *Application Method:*
PPI = Pre-plant soil incorporated
PRE = Pre-emergence

Table 10. Weed Species Response to Herbicides for Peanuts (cont.)[1]

	Postemergence Herbicides[2]										
Species	Pursuit AC/EPOE	Paraquat AC	2,4-DB POE	Paraquat + 2,4-DB AC	Paraquat + Basagran AC	Basagran POE	Ultra Blazer POE	Cadre[3] POE	Storm POE	Select Max or Poast POE	Cobra POE
Texas panicum	P-F	E	N	G-E	F	N	P	G-E	N	E	N
Barnyardgrass	G	G	P	G	P-F	N	P	G-E	N	E	N
Crabgrass	P-F	G	P	G	P-F	N	P	G-E	N	E	N
Goosegrass	P	E	P	G-E	P-F	N	P	G-E	N	E	N
Fall panicum	P-F	E	P	F-G	P-F	N	P	G-E	N	G	N
Signalgrass, broadleaf	G	E	P	G-E	P-F	N	P	G-E	N	E	N
Foxtails	G	E	P	G-E	P-F	N	P	G-E	N	E	N
Nutsedge, yellow	F-G	P-F	P	F	F-G	G	P	G-E	F	N	N
Nutsedge, purple	F-G	P	N	N	N	N	N	G-E	N	N	N
Cocklebur	G	E	E	E	E	E	G	G-E	E	N	G
Jimsonweed	G	E	F	G	E	E	E	F-G	E	N	E
Lambsquarters, common	P	F	G	F-G	F-G	G	G	P-F	G	N	P
Morningglory	F-G	F	E	G-F	F	F-G	G-E	G-E	G	N	G
Pigweed, common	E	E	G	G	G	P-F	E	E	G	N	E
Prickly sida (teaweed)	P	P-F	F	P	G	G	P	G	F-G	N	G

Table 10. Weed Species Response to Herbicides for Peanuts (cont.)[1]

	Postemergence Herbicides[2]										
Species	Pursuit AC/EPOE	Paraquat AC	2,4-DB POE	Paraquat + 2,4-DB AC	Paraquat + Basagran AC	Basagran POE	Ultra Blazer POE	Cadre[3] POE	Storm POE	Select Max or Poast POE	Cobra POE
Ragweed	P	F	F-G	F	G	F-G	G	P-F	G	N	E
Smartweed	G	G	F	G	G	E	G	G-G	E	N	F
Eclipta	P	F-G	P	P	F	P	G	F	G-E	N	G
Carpetweed	F-G	F-G	F	F-G	P	P	G	G	G	N	G
Sicklepod	P	G[5]	G[5]	G[5]	G[5]	N	P	E	P	N	P
Spurred anoda (cottonweed)	F-G	P	P	P	G	G	P	G	F	N	F
Velvetleaf	F-G	F	P	F	G	G	P-F	G-E	F-G	N	G
Tropic croton	P	F	P-F	F	F	P	G-E	P	G-E	N	G

[1] *Response expressed as activity on emerged seedlings in early stages of development at relatively low rates. Control is erratic or poor on weeds if they are larger.*

E = Excellent control; 90% or better *F = Fair control; 60-80%* *P = Poor control; 20-60%*

G = Good control; 80-90% *N = None; less than 20%*

[2] *Application Method:*

POE = Postemergence *EPOE = Early postemergence* *AC = At cracking*

[3] *Cadre provides G-E control of emerged annual grasses which escape soil-applied grass control herbicides.*

[4] *Rating assumes sequential application 10 to 14 days after initial treatment.*

[5] *Rating assumes sequential application of 2,4-DB 10 to 14 days after initial treatment.*

Table 11. Recommended Weed Sizes for Treatment and Application Rates for Control of Annual Grasses

	Application Rates and Annual Grass Size							
	Poast[1]		Poast Plus[1]		Select[1]		Select Max[1]	
Species	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)
Broadleaf signalgrass	8	16	8	24	2-6	6-8	2-6	12-16
Crabgrass	6	16	6	24	2-6	6-8	2-6	12-16
Fall panicum	8	16	8	24	2-8	6-8	2-8	12-16
Giant foxtail	8	16	8	24	2-12	6-8	2-12	12-16
Green foxtail	8	16	8	24	2-8	6-8	2-8	12-16
Yellow foxtail	8	16	8	24	2-8	6-8	2-8	12-16
Goosegrass	6	16	6	24	2-6	6-8	2-6	12-16
Seedling johnsongrass	8	16	8	24	4-10	6-8	4-10	12-16
Texas panicum	8	16	8	24	2-6	6-8	2-6	12-16
Volunteer corn	20	16	20	24	4-12	4-6	4-12	8-12
					12-24	6-8	12-24	12-16

[1] *See table 16 for adjuvant recommendations.*

Table 12. Plant Size and Application Rates for Control of Perennial Grasses

Perennial Grass	Herbicide and Application Rate		Plant Size
Bermudagrass	First Application		
	Poast	1.5 pt/A[1]	stolons (runners) 6 inches or less
	Poast Plus	2.25 pt/A[1]	stolons (runners) 6 inches or less
	Select Select Max	8.0-16.0 oz/A[1] 12.0-32.0 oz/A	stolons (runners) 3-6 inches
	Second Application		
	Poast	1.0 ptA[1]	stolons (runners) 1-4 inches
	Poast Plus	1.5 pt/A[1]	stolons (runners) 1-4 inches
	Select Select Max	8.0-16.0 oz/A[1] 12.0-32.0 oz/A	stolons (runners) 3-6 inches
Johnsongrass	First Application		
	Poast	1.5 pt/A[1]	plants 15-25 inches tall
	Poast Plus	2.25 pt/A[1]	plants 15-25 inches tall
	Select Select Max	8.0-16.0 oz/A[1] 12.0-32.0 oz/A	plants 12-24 inches tall
	Second Application		
	Poast	1.0 pt/A[1]	plant/regrowth 6-12 inches tall
	Poast Plus	1.5 pt/A[1]	plant/regrowth 6-12 inches tall
	Select Select Max	6.0-8.0 oz/A[1] 9.0-24.0 oz/A	plant/regrowth 6-18 inches tall

[1] *See table 16 for adjuvant recommendations.*

Table 13. Recommended Weed Sizes for Treatment and Application Rates for Control of Annual Broadleaf Weeds.

Species	1.0 pt/A Basagran		1.5 pt/A Basagran		2.0 pt/A Basagran		1.5 pt/A Storm	
	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)
Prickly Sida	–	–[a]	6	3	6-8	4	4	2
Common ragweed	–	–	–	–	4-6[b]	3[b]	4-6	3
Cocklebur	2-4	4	2-6	6	6-10	10	2-6	6
Morningglory								
Pitted	–	–	4[c]	4[c]	SUD[c]	SUD[c]	4	4
Others	–	–	4[c]	4[c]	SUD[c]	SUD[c]	4	4
Smartweed	4[g]	4[g]	6	6	6-10	10	6	6
Jimsonweed	4	4	6	6	6-10	10	6	6
Pigweed	–	–	–	–	–	–	–	–
Lambsquarters	–	–	6[d]	1.5[d]	4-8[d]	2[d]	4-6	2
Tropic croton	–	–	2	2	2-4	4	6[i]	6[i]
Spurred anoda	–	–	6	3	6-8	4	4[h]	2[h]
Velvetleaf	–	–	4[a]	2[a]	4-6	5	4[h]	2[h]
Eclipta	–	–	–	–	–	–	–[j]	–[j]

Species	1.0 pt/A Ultra Blazer[e]		1.5 pt/A Ultra Blazer[e]		2.0 pt/A Ultra Blazer[e]		12.5 fl oz/A Cobra	
	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)
Prickly Sida	–	–	–	–	–	–	4	–
Common ragweed	2	<2	4	4	6	3	8	–
Cocklebur	–	–	–	–	2-4	2-4	6	–

Table 13. Recommended Weed Sizes for Treatment and Application Rates for Control of Annual Broadleaf Weeds. (cont.)

Species	1.0 pt/A Ultra Blazer[e]		1.5 pt/A Ultra Blazer[e]		2.0 pt/A Ultra Blazer[e]		12.5 fl oz/A Cobra	
	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)
Morningglory							4	–
Pitted	2	<2	4	2	4	2	4[a]	–
Others	–	–	–	–	3	2		
Smartweed	–	–	–	–	4	4	–	–
Jimsonweed	3	3	6	6	8	8	4	–
Pigweed	–	–	4	2	6	3	–	–
Lambsquarters	–	–	–	–	3[e]	1[e]	–	–
Tropic croton	2	<2	2	2	2	2	4	–
Spurred anoda	–	–	–	–	–	–	–	–
Velvetleaf	–	–	–	–	–	–	–	–
Eclipta	–[f]	–[f]	–[f]	–[f]	–[f]	–[f]	6	–

[a] *Control not claimed on label.*

[b] *Add crop-oil concentrate according to label directions.*

[c] *See label for Special Use Directions. Label claims control only with two applications.*

[d] *Control of this species not claimed on peanut label but is claimed on soybean label. Add 2.0 pt of crop-oil concentrate/A.*

[e] *Add 1.0 pt of nonionic surfactant/100 gal of spray solution.*

[f] *Control not claimed on label. Experience indicates that 2.0 pt/A plus surfactant will suppress 1- to 2-inch Eclipta.*

[g] *Follow with second application of 1.0 pt/A, 7 to 14 days later if needed.*

[h] *Control may be inconsistent with this rate of Storm.*

[i] *Control not claimed on label, field experience indicates that Storm is very effective on tropic croton under 4 inches in height.*

[j] *Control not claimed on label, field experience indicates that Storm is effective on eclipta under 2 inches in height.*

Table 14. Restrictions on Feeding Herbicide-Treated Peanut Vines to Livestock and Preharvest Intervals for Peanut Herbicides

Herbicide	Preharvest Interval (PHI)	Do not feed treated vines to livestock	No feeding restrictions on label
Basagran	through pegging	within 50 days of treatment	X
Ultra Blazer	75 days	X	
Cadre	90 days	X	
Cobra	90 Days	X	
Dual Magnum	90 days		X
Outlook	80 days	within 80 days of treatment	X
Gramoxone	28 days after GC[1]		X
Micro-Tech	GC[1]		X
Poast/Poast Plus	40 days	X	X
Prowl	preplanting		X
Pursuit	85 days	X	
Select Max	40 days	X	
Sonalan	preplanting	X	
Strongarm	30 days	X	
Storm	75 days	X	
Valor			X
2,4-DB (Butyrac, Butoxone)	45 days	X	

[1]*GC = ground cracking*

Table 15. Suggested Rain-Free Periods after Applications of Postemergence Herbicides and Tank Mixes

Herbicide or tank mix	Rain-free period (hours)
2,4-DB	NR1
Basagran	NR2
Ultra Blazer	NR2
Cadre	3
Cobra	0.5
Gramoxone Inteon	0.5
Poast/Poast Plus	1
Pursuit	1
Select Max	1
Storm	NR2

NR1 = No restrictions on label. Suggest at least 1 hour for best results.
NR2 = No restrictions on label. Suggest 4 to 6 hours for best results.

Table 16. Adjuvant Recommendations for Postemergence Herbicides

Herbicide	Application Method	Adjuvant recommendations
Basagran	Ground	2.0 pt/A crop-oil concentrate when treating lambsquarters, common ragweed, hemp sesbania, or yellow nutsedge. Vegetable oils may be used. Use 1.0 gal/A of 30% nitrogen instead of crop-oil concentrate if velvetleaf is the primary target weed.
	Air	1.0 pt/A crop-oil concentrate when treating lambsquarters, common ragweed, hemp sesbania, or yellow nutsedge. Vegetable oils may be used. Do not use 30% nitrogen with aerial applications.
Ultra Blazer	Ground or Air	Use 0.125 percent nonionic surfactant for most weeds. For lambsquarters, hemp sesbania, or cowpea, use 0.25 percent nonionic surfactant or 0.5 to 1.0 gal/A of 30% nitrogen.
Cadre	Ground only	Use 0.25 percent nonionic surfactant or 2 pt/A crop-oil concentrate.
Cobra	Ground only	Add nonionic surfactant at 1 qt/100 gallons or petroleum or vegetable based crop oil concentrate at 1 to 1.5 pt per acre (See label for specifics).
Select	Ground	Always use 2.0 pt/A crop-oil concentrate.
Select Max	Ground	0.25% nonionic surfactant, 1% crop-oil concentrate or 1% methylated seed oil.
Gramoxone Inteon	Ground	Use 0.125 percent nonionic surfactant in cracking stage sprays.
Poast Poast Plus	Ground or Air	2.0 pt/A crop-oil concentrate. Vegetable oils may be used.
Pursuit	Ground	Use a petroleum or vegetable seed based oil concentrate at a rate of 1.5 to 2.0 pt/A **or** a nonionic surfactant containing at least 80% active ingredient at 1 qt/100 gallons of spray mixture.
Storm	Ground or Air	2.0 pt/A crop-oil concentrate. Vegetable oils may be used.

Note: Information in this table was taken from product labels. See the labels. See the labels for adjuvant recommendations with specific tank mixes.

Adjuvant rates given in percentages are on a volume/volume basis:

0.125% - 1 pt per 100 gal of spray solution; 0.50% - 2 qt per 100 gal of spray solution;

0.25% - 1 qt per 100 gal of spray solution; 1.00% - 4 qt per 100 gal of spray solution.

Table 17. Rotation Restrictions for Peanut Herbicides

	Rotational Crop							
	Corn	Cotton	Soy-beans	Barley	Winter Rye	Winter Wheat	Sorg-hum	Tobacco
Basagran	NS	NS	NS	NS	NS	NS	NS	NS
Ultra Blazer	AH	AH	NR	AH	AH	AH	AH	AH
Cadre	9M	18M	9M	18M	4M	4M	18M	9M
Cobra	NR	NR	NR	NR	NR	NR	NR	NR
Dual (PRE, PPI, cracking)	NR	NR	NR	4.5M	4.5M	4.5M	NR	FY
Dual (layby)	FY	FY	FY	FY	FY	FY	FY	FY
Outlook	NR	FY	NR	4M	4M	4M	FY	FY
Micro-Tech	NR	NR	NR	NR	NR	NR	NR	NR
Poast	NR	NR	NR	NR	NR	NR	NR	NR
Poast Plus	NR	NR	NR	NR	NR	NR	NR	NR
Prowl	FY	NR	NR	4M	FY	4M	FY	NR
Pursuit	NR /8.5M[1]	9.5M /18M[2]	NR	9.5M	4M	4M	18M	9.5M
SelectMax	NR	NR	NR	NR	NR	NR	NR	NR
Sonalan	FY	FY	NR	AH	AH	AH	FY	FY
Strongarm	18M /10M[3]	10M	NR	4M	6M	4M	18M	18M
Storm	AH	AH	NR	AH	AH	AH	AH	AH
2,4-DB	NS	NS	NS	NS	NS	NS	NS	NS
Valor	4M[4]	1M	NR	4M	4M	1M	1M	1M

The above table provides a general summary of crop rotation restrictions specified on the labels of herbicide products commonly used for peanuts. Consult product labels for details and specific information.

KEY: M = month; FY = following year; NR = no restrictions; AH = after harvest; NS = Crop rotation sequence not specified in label directions

[1] *IMI-Corn (resistant/tolerant varieties) = NR, Non IMI-Corn = 8.5M*

[2] *For sandy loam to loamy sand soils 16 inches of rainfall or irrigation occurring from application through October, 9.5M; (refer to supplemental label of Virginia/North Carolina) otherwise, 18M.*

[3] *With IMI-corn (resistant/tolerant varieties) = 10 M, Non IMI-corn 18M.*

[4] *1M restriction for sweet corn, 4M for field corn.*

INSECT CONTROL IN PEANUTS

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Thrips

Seedling peanut plants are usually attacked by thrips within the first 6 to 8 weeks after planting, and thrips may complete several generations per season under favorable conditions. These tiny, spindle-shaped insects feed primarily within the developing, unfolded leaflets causing crinkling of the leaflets and stunting of the plants. Blackening of the small leaflets occurs with severe infestations and can be mistaken for chemical injury. Under favorable conditions, plants normally outgrow this injury with no reduction in yield or grade. However, the delay in vine growth from early-season thrips injury may retard maturity. This in combination with other injury, such as herbicide burn, can reduce yield.

Thrips can be controlled with either systemic or with foliar-applied insecticides. Systemics can be incorporated in the furrow with the seed at planting. Foliar treatments can be applied as needed after crop emergence. During dry seasons or seasons with excessive rains, the systemic insecticides may not give adequate thrips control due to poor systemic uptake by the plants or leaching of chemicals from the soil. Foliar treatments may be warranted to allow more rapid plant growth to assist in weed control if systemics are ineffective, or if injury appears excessive. Foliar treatment is recommended when 25 percent of the leaves show thrips damage and pest populations are still active.

Table 18. Recommended Insecticides for Thrips Control

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar	methomyl (Lannate LV) (Lannate SP)	 1.5-3.0 pt 0.5-1.0 lb	 21 21	**RESTRICTED USE.** Do not feed treated vines.
	acephate (Orthene 97) band rate broadcast rate	 3.0-6.0 oz 6.0-12.0 oz	 14	Do not feed treated forage or hay to livestock or allow animals to graze treated areas.
	lambda-cyhalothrin (Warriot T) (Karate Z) (Karate EC) (Kaiso 24WG)	 2.56-3.84 oz 1.28-1.92 oz 2.56-3.84 oz 2.0 oz	 14 14 14 14	**RESTRICTED USE**. Do not apply more than 15.36 oz/A/season. Do not graze livestock in treated areas, or use treated vines or hay for animal feed.
	gamma-cyhalothrin (Proaxis) (Prolex)	 2.56-3.84 oz 1.02-1.54 oz	 14 14	**RESTRICTED USE**.
	beta-cyfluthrin (Baythroid XL)	 2.8 oz	 14	**RESTRICTED USE.**
	bifenthrin (Brigade 2EC)	5.12-6.4 oz	14	**RESTRICTED USE.** Do not feed immature plants and peanut hay to livestock.
In-furrow	disulfoton (Di-Syston 15G)	6.7-13.3 lb	--	**RESTRICTED USE.** Place granules in a band on each side of the seed furrow at planting, or as a side dressing at pegging. Do not apply directly on the seed. Do not feed treated vines.
	phorate (Thimet 20G)	5.0 lb	90	**RESTRICTED USE.** Distribute granules evenly in the furrow. Do not graze or feed treated hay or forage to livestock.

Table 18. Recommended Insecticides for Thrips Control (cont.)

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
In-furrow cont.	aldicarb (Temik 15G) In Twin rows	7.0 lb 5.0-7.0 lb/ row	90	**RESTRICTED USE.** Apply granules in seed furrow and cover with soil. Do not hog-off treated fields. Do not feed green forage, hay or straw to livestock. Do not plant corn, small grains, or forages within 12 months after last application.
	acephate liquid in furrow (Orthene 97)	12.0-16.0 oz	14	Apply as a liquid into the seed furrow in 3 to 5 gal of water/A with a system that ensures good seed coverage. Do not feed treated forage or hay to livestock or allow animals to graze treated areas.
	on seed (Orthene 75S)	4.0 oz/100 lb seed	14	Mix in the planter to obtain good coverage of ALL seed by layering seed and product. Fill the planter box 1/3 full of seed with 1/3 cup of the product, add the next 1/3 of the seed and product; then add the last 1/3 of the seed and product. Gently stir each layer before adding the next. CAUTION: Do not use with seed inoculants. Not recommended for air planters. Do not use treated seed for food or feed purposes or process for oil.

Potato Leafhopper

The potato leafhopper is a common “above ground” pest of peanuts in Virginia. This small, wedge-shaped, light green to yellow insect damages the peanut plant by feeding on the undersides of leaves in a piercing-sucking manner. The injured leaf tips first turn yellow then brown and tend to curve downward. During feeding, toxins also are passed into plants at feeding sites. If enough damage is done, the toxins can stop vine growth, resulting in reductions in yield and grade. Injury may occur at any time from early June to the middle of August or later in some years. It is important to note that although late-season damage appears worse in some years, damage done early in the season probably has a greater effect on plant vigor and yield. Systemic insecticides applied at planting time will usually control potato leafhoppers that occur early, but if no pegging-time insecticide is applied, it may be necessary to make one or two foliar applications in July or early August. Pegging-time applications of rootworm insecticides will usually control leafhoppers from that time until harvest.

Foliar treatments should be made only on a basis of need. When 25 percent of the leaves show tip yellowing typical of leafhopper damage and active adult and immature leafhoppers are seen, treat with an effective chemical. When foliar treatments are required, the first application usually is made about mid-July, and the second about the first of August (if needed). If scheduled treatments are being made for control of leafspot, insecticides may be tank mixed. Do not include insecticides with all leaf-spot treatments as a matter of course. Too many insecticide applications, or applications later in the season, could cause spider mite populations to increase, especially in dry years after adjacent corn and weedy areas have been cut. Make leafhopper applications only when problems have been identified.

Table 19. Recommended Insecticides for Potato Leafhopper Control

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar	methomyl (Lannate LV) (Lannate SP)	 0.75-3.0 pt 0.25-1.0 lb	 21 21	**RESTRICTED USE.** Do not feed treated vines.
	acephate (Orthene 97)	6.0-12.0 oz	14	Do not feed treated forage or hay to livestock or allow animals to graze treated areas.
	lambda-cyhalothrin (Warrior T) (Karate Z) (Kaiso 24WG)	 1.92-3.2 oz 0.96-1.6 oz 1.0-1.67 oz	 14 14 14	**RESTRICTED USE.** Do not apply more than 15.36 oz/A/season. Do not graze livestock in treated areas or use treated vines or hay for animal feed.
	esfenvalerate (Asana XL)	2.9-5.8 oz	21	**RESTRICTED USE.** Do not feed or graze livestock on treated vines. Do not exceed 29 oz/A/season.
	zeta-cypermethrin (Mustang Max)	1.28-4.0 oz	7	**RESTRICTED USE.** Do not graze livestock in treated areas. Do not use treated vines for hay for animal feed.
	fenpropathrin (Danitol 2.4EC)	6.0-10.6 oz	14	**RESTRICTED USE.** Do not graze or feed treated vine forage or dried hay within 14 days of the last application. Do not exceed 2.6 pt /A/season.
	gamma-cyhalothrin (Proaxis) (Prolex)	 1.92-3.2 oz 0.77-1.28 oz	 14 14	**RESTRICTED USE**.
	beta-cyfluthrin (Baythroid XL)	 1.0-1.8 oz	 14	**RESTRICTED USE.**

* **GENERAL** - *Apply pegging treatments in 10- to 18-inch bands on row from the last week in June through mid-July after pegging begins and before vines close in middles. Effectiveness of treatments is increased if insecticides are covered by shallow cultivation to avoid exposure to sunlight and lateral movement with heavy rains.*

Table 19. Recommended Insecticides for Potato Leafhopper Control (cont.)

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar (cont.)	bifenthrin (Brigade 2EC)	2.1-6.4 oz	14	**RESTRICTED USE.** Do not feed immature plants and peanut hay to livestock.
Pegging*	chlorpyrifos (Lorsban 15G)			Lorsban 15G is not labeled for use against leafhopper but will provide suppression if applied for soil insects.
	phorate (Thimet 20G)	10.0 lb	90	**RESTRICTED USE.** Distribute granules as a band over the fruiting zone at pegging. Work into the top few inches of soil immediately. Do not graze or feed treated hay or forage to livestock.
In-furrow	disulfoton (Di-Syston 15G)	6.7-13.3 lb	–	**RESTRICTED USE.** Place granules in a band on each side of the seed furrow at planting, or as a side dressing after emergence. May also be applied in a band over the row or as a side dressing at pegging. Do not apply directly on the seed. Do not feed treated vines.
	phorate (Thimet 20G)	5.0 lb	90	**RESTRICTED USE.** Distribute granules evenly in the furrow. Do not graze or feed treated hay or forage to livestock.

* **GENERAL** - *Apply pegging treatments in 10- to 18-inch bands on row from the last week in June through mid-July after pegging begins and before vines close in middles. Effectiveness of treatments is increased if insecticides are covered by shallow cultivation to avoid exposure to sunlight and lateral movement with heavy rains.*

Southern Corn Rootworm

The southern corn rootworm, which is the immature stage of the spotted cucumber beetle, can cause extensive injury to the Virginia peanut crop. Rootworm larvae develop in the soil and feed directly on pegs and pods. Finding rootworms in the soil is very difficult and injury is often not detected until after peanuts are dug when it is too late for control measures. A preventive treatment is the best strategy. After an infestation is established, control is difficult and often ineffective. Determining the need to treat for southern corn rootworm should be done on a field-by-field basis. Decisions can be based on both adult populations and past history of peanut fields. Adult beetles can be readily detected in peanut fields. Their presence in moderate to high numbers from mid-July to early August should be a warning that a problem could develop. Adults will lay eggs that could develop into the damaging larval stage. Thus, early detection of adults can allow for timely treatment and prevention of injury.

Knowledge of the past history of rootworm injury also can be useful in determining the need for treatment. If injury has ever occurred in a field, it will likely occur in other years. Keep field records on the extent of pod and peg injury noticed at harvest time. Pay particular attention to fields with higher levels of organic matter and clay. Rootworms have a higher survival rate in those soils due to higher moisture holding capacity, and injury will typically be more severe than in “light” soils. Use the “Peanut Rootworm Advisory” (VCE Publication 444-351) to aid you in deciding which fields need insecticide treatment.

If rootworm treatments are necessary, they should be applied as 10- to 18-inch bands on the row during early pegging. Usually, this period occurs from the last week in June through mid-July. Treatment effectiveness is increased if materials are lightly incorporated using shallow cultivation. If vine growth and pegging are in an advanced stage, do not cultivate, as vine “dirting,” which leads to disease development and injury to pegs, may offset the gain from insect control. Carefully calibrate equipment to deliver recommended insecticide rates. Using more than is recommended will not increase effectiveness and using less could result in a complete insecticide failure.

Table 20. Recommended Insecticides for Southern Corn Rootworm Control

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Pegging[1]	chlorpyrifos (Lorsban 15G)	13.0 lb	21	Do not apply more than 13.3 lb/season. Do not feed peanut forage or hay to meat or dairy animals.
	phorate (Thimet 20G[2])	10.0 lb	90	**RESTRICTED USE.** Distribute granules as a band over the fruiting zone at pegging. Work into the top few inches of soil immediately. Do not graze or feed treated hay or forage to livestock.

[1] **GENERAL -** *Apply pegging treatments in 10- to 18-inch bands on row from the last week in June through mid-July after pegging begins and before vines close in middles. Effectiveness of treatments is increased if insecticides are covered by shallow cultivation to avoid exposure to sunlight and lateral movement with heavy rains.*

[2] *Label stipulates light soil incorporation.*

Corn Earworm and Fall Armyworm

Annual infestations of the corn earworm and fall armyworm occur in most Virginia peanut fields. Usually there is a single generation of each species per season. Worms feed on leaf tissue causing peanuts to look ragged; however, research has shown that one-third of peanut foliage can be lost at the normal time of corn earworm infestations (mid-August to early September) without loss of yield or grade. Scouting fields is the only way to determine if treatment is needed. Scout by reaching halfway across 2 row-feet of plants and shaking foliage vigorously towards the row middle. Repeat on the opposite row. Count the worms on the ground and repeat the sample in several spots in the field. Treatment is recommended if an average of 8 or more worms are found per sample, or 4 per row-foot. This number should increase to 6 per row-foot later in the season.

If treatment is necessary, apply sprays using systems that provide good canopy penetration and coverage. If spider mites are already present in the field, use of some insecticides may allow for rapid build-up. Scout fields for treatment effectiveness and for possible increases in spider mite activity soon after applications.

Table 21. Recommended Insecticides for Corn Earworm Control

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar*	carbaryl (Sevin 4F) (Sevin 80S) (Sevin XLR PLUS)	 2.0-3.0 pt 1.25-1.87 lb 2.0-3.0 pt	 0 0 0	To avoid possible injury to foliage, do not apply to wet foliage or during periods of high humidity.
	acephate (Orthene 97)	12.0-16.0 oz	14	Do not feed treated forage or hay to livestock or allow animals to graze treated areas.
	methomyl (Lannate LV) (Lannate SP)	 0.75-3.0 pt 0.25-1.0 lb	 21 21	**RESTRICTED USE.** Do not feed treated vines.
	esfenvalerate (Asana XL)	2.9-5.8 oz	21	**RESTRICTED USE.** Do not feed or graze livestock on treated vines. Do not exceed 29.0 oz/ season.
	zeta-cypermethrin (Mustang Max)	3.2-4.0 oz	7	**RESTRICTED USE.** Do not graze livestock in treated areas. Do not use treated vines for hay for animal feed.
	lambda-cyhalothrin (Warrior T) (Karate Z) (Karate EC) (Kaiso 24WG)	 2.56-3.84 oz 1.28-1.92 oz 2.56-3.84 oz 2.0 oz	 14 14 14 14	**RESTRICTED USE.** Do not graze livestock in treated areas, or use treated vines or hay for animal feed. Do not exceed 15.36 oz/A/season.
	fenpropathrin (Danitol 2.4EC)	10.6-16.0 oz	14	**RESTRICTED USE.** Do not graze or feed treated peanut vine forage or dried hay within 14 days of the last application. Do not exceed 2.6 pt/A/season.

*__GENERAL__ - Treat ONLY IF foliage loss is heavy (1/3 or more). Earworms are easier to control when they are less than 1/2 inch long.

Table 21. Recommended Insecticides for Corn Earworm Control (cont.)

Treat-ment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar* (cont.)	gamma-cyhalothrin			**RESTRICTED USE.**
	(Proaxis)	2.56-3.84 oz	14	
	(Prolex)	1.02-1.54 oz	14	
	beta-cyfluthrin (Baythroid XL)	1.8-2.4 oz	14	**RESTRICTED USE.**
	bifenthrin (Brigade 2EC)	2.1-6.4 oz	14	**RESTRICTED USE.** Do not feed immature plants and hay to livestock.
	indoxacarb (Steward EC)	9.2-11.3 oz	14	Do not feed or graze livestock on treated fields.
	spinosyn (Tracer 4SC)	1.5-3.0 oz	3	Do not allow grazing of crop residue or harvest of crop residue for hay until 14 days after last application.

*__GENERAL__ - Treat ONLY IF foliage loss is heavy (1/3 or more). Earworms are easier to control when they are less than 1/2 inch long.

Table 22. Recommended Insecticides for Fall Armyworm Control

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar	methomyl			**RESTRICTED USE.**
	(Lannate LV)	0.75-1.5 pt	21	Do not feed treated vines.
	(Lannate SP)	0.25-0.5 lb	21	High rates may be required for good control.
	esfenvalerate (Asana XL)	9.6 oz	21	**RESTRICTED USE.** Suppression only. Do not feed or graze livestock on treated vines. Do not exceed 29.0 oz/season.
	zeta-cypermethrin (Mustang Max)	3.2-4.0 oz	7	**RESTRICTED USE.** Do not graze livestock in treated areas. Do not use treated vines for hay for animal feed.

Table 22. Recommended Insecticides for Fall Armyworm Control (cont.)

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar (cont.)	acephate (Orthene 97)	12.0-16.0 oz	14	Do not feed treated forage or hay to livestock or allow animals to graze treated areas.
	lambda-cyhalothrin (Warrior T) (Karate Z) (Karate EC) (Kaiso 24WG)	 2.56-3.84 oz 1.28-1.92 oz 2.56-3.84 oz 2.0 oz	 14 14 14 14	**RESTRICTED USE.** Do not graze livestock in treated areas, or use treated vines or hay for animal feed. Do not exceed 15.36 oz/A/season.
	fenpropathrin (Danitol 2.4EC)	10.6-16.0 oz	14	**RESTRICTED USE.** Do not graze or feed treated peanut vine forage or dried hay within 14 days of the last application. Do not exceed 2.6 pt/A/season.
	gamma-cyhalothrin (Proaxis) (Prolex)	 2.56-3.84 oz 1.02-1.54 oz	 14 14	**RESTRICTED USE.**
	beta-cyfluthrin (Baythroid XL)	2.4-2.8 oz	14	**RESTRICTED USE.**
	bifenthrin (Brigade 2EC)	2.1-6.4 oz	14	**RESTRICTED USE.** Do not feed immature plants and peanut hay to livestock.
	indoxacarb (Steward EC)	9.2-11.3 oz	14	Do not feed or graze livestock on treated fields.
	spinosyn (Tracer 4SC)	2.0-3.0 oz	3	Do not allow grazing of crop residue or harvest of crop residue for hay until 14 days after last application.

Spider Mite

Mites, which have become more numerous during the past several years, are especially injurious during hot, dry weather. While insecticides are very valuable in controlling leafhoppers, thrips, and worms, they may be responsible for destroying some of the natural enemies of spider mites, thus promoting the build-up of mite populations. Insecticides should be used **only when needed** for insect control. Tank mixes including fungicides and insecticides are more likely to allow spider mite build-up than when either material is used separately.

Spider mites feed mainly on the undersides of the leaves. They suck the juice from the foliage and cause the leaves to turn brown and eventually drop off. Heavy infestations usually first occur around the borders of peanut fields; then they spread inward throughout the fields. Avoid mowing weedy areas next to peanut fields until peanuts are harvested. Spider mites will readily move into peanuts when corn dries down or is harvested. Be prepared to treat peanuts if adjacent corn is infested.

IMPORTANT: If you are going to treat, calibrate your equipment to deliver the right amount of pesticide per acre. Arrange and adjust the nozzles or spouts in a manner that will direct the chemical into the desired area to be treated. Adequate sprayer pressure (40 to 60 psi) will aid in getting chemicals in contact with the undersides of leaves and within denser foliage. Penetration of foliage with 20 to 30 gal of water per acre is very important for the control of spider mites.

Table 23. Recommended Insecticides for Spider Mite Control

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar	propargite (Comite 6.5EC) (Omite 30W)	 2.0 pt 3.0-5.0 lb	 14 14	Use a minimum of 20 gal/A with ground equipment or 5 gal by air. Make no more than 2 applications/year (either Comite **OR** Omite). Do not plant rotational crops within 6 months of last application. Do not feed hay to livestock.

Table 23. Recommended Insecticides for Spider Mite Control (cont.)

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Foliar (cont.)	aldicarb (Temik 15G)	7.0 lb	90	**RESTRICTED USE.** Apply in 12- to 18-inch band on the row at pegging, immediately incorporate into soil. Do not hog-off treated fields. Do not feed green forage, hay, or straw to livestock. Must be applied at the onset of pegging to comply with 90-day tolerance time.
	lambda-cyhalothrin (Warrior T) (Karate Z)	 3.84 oz 1.92 oz	 14 14	**RESTRICTED USE.** **Suppression only**. Do not graze livestock in treated areas or use treated vines or hay for animal feed. Do not exceed 15.36 oz/A/ season.
	gamma-cyhalothrin (Proaxis) (Prolex)	 3.84 oz 1.54 oz	 14 14	**RESTRICTED USE.** **Suppression only**.
	fenpropathrin (Danitol 2.4EC)	10.6-16.0 oz	14	**RESTRICTED USE.** Do not graze or feed treated vine forage or dried hay within 14 days of the last application. Do not exceed 2.6 pt/A/season.
	bifenthrin (Brigade 2EC)	5.12-6.4 oz	14	**RESTRICTED USE.** Do not feed immature plants and peanut hay to livestock.

Lesser Cornstalk Borer

Lesser cornstalk borer typically is not a problem in Virginia peanut fields. However, it does thrive under hot dry conditions and can become a problem when those conditions continue for 3 to 4 weeks. Infestations will be most severe where soils are sandy and in high, well drained areas within fields. Larvae are 0.5 to 0.75 inch long and are banded with alternating brown and blue stripes. They wiggle vigorously when disturbed. Larvae feed by burrowing into main stems, lateral

limbs, plant crowns, and pods and can do extensive damage, even kill plants. Larvae produce a silk-and-sand web tube which is attached to pods or stems at the point of feeding. Evidence of web tubes is a sure sign of borer activity.

If weather conditions become favorable for borers, survey fields for damaged plants and larvae. If damage is obvious and active larvae are still present in 10 percent or more of the plants, treatment is recommended.

Table 24. Recommended Insecticides for Lesser Cornstalk Borer Control

Treatment	Insecticide (Formulation)	Amount product per acre	Time limits: days before harvest	Remarks
Granular	chlorpyrifos (Lorsban 15G)	6.7-13.3 lb	21	Apply in 10- to 18-inch band on row at first sign of borer. Do not feed peanut forage or hay to meat or dairy animals. Do not apply more than 13.3 lb/season. 10.0-13.0 lb may be broadcast by air as a rescue treatment.

Table 25. Recommended Insecticides for Grasshopper Control

Foliar	carbaryl (Sevin 80S) (Sevin XLR PLUS)	 1.5 lb 1.0-2.0 pt	 0 0	To avoid possible injury to foliage, do not apply to wet foliage or during periods of high humidity.
	acephate (Orthene 97)	4.0-8.0 oz	14	Do not feed treated forage or hay to livestock or allow animals to graze treated areas.
	esfenvalerate (Asana XL)	5.8-9.6 oz	21	**RESTRICTED USE.** Do not feed or graze livestock on treated vines. Do not exceed 29.0 oz/season.
	zeta-cypermethrin (Mustang Max)	3.2-4.0 oz	7	**RESTRICTED USE.** Do not graze livestock in treated areas. Do not use treated vines for hay for animal feed.
	beta-cyfluthrin (Baythroid XL)	1.8-2.4 oz	14	**RESTRICTED USE.**
	bifenthrin (Brigade 2EC)	2.1-6.4 oz	14	**RESTRICTED USE.** Do not feed immature plants and peanut hay to livestock.

Pesticide Usage Charts

Many pesticides control more than one pest. The three following tables summarize the effectiveness of some popular pesticides used at time of planting, at time of pegging, or as foliar treatments for the control of major insect pests which attack peanuts.

Table 26. Insecticide Activity of Products Applied at Time of Planting

	Pests			
Chemical	**Thrips**	**Leafhopper**	**Rootworm**	**Spider Mite**
Temik	E	Early	P	may aid early
Di-Syston	G	Early	P	No
Thimet	G	Early	P	No
Orthene	E	Early	No	No

Table 27. Insecticide Activity of Granules Applied at Time of Pegging

	Pests			
Chemical	**Rootworm**	**Leafhopper**	**Spider Mite**	**Corn Earworm**
Thimet	G	Aids	No	No
Temik	P	Aids	G	No
Lorsban[1]	E	G	No	No

[1] *NOT SYSTEMIC. Do not apply in the furrow.*

P=poor control, F=fair control, G=good control, E=excellent control, No=not labeled or no activity expected.

Table 28. Insecticide Activity of Foliar Treatments Applied When Pests are Present

		Pest Species Controlled						
Insecticide	**Formulation**	**Thrips**	**Leafhopper**	**Rootworm**	**Corn Earworm**	**Fall Armyworm**	**Less Cornstalk Borer**	**Spider Mite**
Sevin[2]	4F, 80S, XLR PLUS	P	E	No	F	F	No	No
Malathion	57%EC	P	G	No	P	P	No	P
Lannate	L	P	G	No	E	G	No	No
Comite, Omite	6.5EC, 30W	No	No	No	No	No	No	E
Asana[2]	XL	No	E	No	E	G	No	No
Orthene[2]	97	E	E	No	G	F	No	No
Karate	Z	E	E	No	E	G	No	F
Danitol	2.4EC	No	E	No	E	G	No	E
Steward	1.25SC	No	No	No	E	E	No	No
Tracer	4SC	No	No	No	E	E	No	

There are other insecticides and other formulations which have federal registration for use on peanuts.

[2] *Use of these insecticides may allow rapid build-up of spider mites. Use with caution during extended periods of dry weather.*

P=poor control, F=fair control, G=good control, E=excellent control, No=not labeled or no activity expected.

PEANUT DISEASES

P.M. Phipps, Extension Plant Pathologist, Tidewater AREC

Management Tools

Advisory Programs

A network of weather monitors in southeastern Virginia record data for improving the efficiency of disease management. These data are collected electronically and used to produce daily advisories and reports for growers and industry workers. Included are daily weather summaries (air and soil temperature, rainfall), peanut leaf spot and Sclerotinia blight advisories, heat-unit reports for peanuts, and degree-day reports for cotton. The Peanut Frost Advisory is provided during the fall-harvest period. Each program is designed to guide growers in making decisions that maximize yield, quality, and net profit. The Tidewater Agricultural Research and Extension Center (AREC) in cooperation with Extension agents, growers, and the industry make this information available in the following ways:

Peanut/Cotton InfoNet: Information from 4 weather monitors is available on the Internet at *http://www.ipm.vt.edu/infonet/*. Contact your local Extension agent or call, (757) 657-6450 and ask for Pat Phipps, Steve Byrum, or Barron Keeling if you need assistance in accessing or interpreting the information.

Hotlines: Disease advisories, heat units, and frost advisories are recorded daily at the Tidewater AREC for access by telephone. Regional advisories for Capron, Waverly, Suffolk, and Skippers are available by calling (800) 795-0700. The information is also available through local county Extension offices. Numbers for obtaining the local reports are announced annually in agent newsletters.

Clinical Services

Diagnostic services for plant diseases are provided by the Tidewater AREC in Suffolk. Plant samples should be submitted with the required forms by unit Extension agents. A period of 5 days is needed to complete biopsy tests and mail reports. Diagnostic tests for nematodes and soil fertility problems during the season are also performed in cooperation with laboratories at Virginia Tech.

Predictive Nematode Assay

This program provides data on the numbers and kinds of nematodes in the soil and recommendations on needs for control. Nematode population thresholds for damage to peanut, cotton, corn, and soybean are available on the Internet at *http://ipm-www.ento.vt.edu/states/va.html*. Soil samples must be collected in the fall no later than November 20. Local Extension offices have instructions, sample information sheets, and bags for packaging samples. A service charge of $11 per sample is required at the time of sample submission. If an alternative crop such as soybean or tobacco may be planted, then counts of cyst nematodes in soil are needed for these crops. The cost for cyst nematode counts is $11 per sample.

Management Inputs

The most effective and economical strategy for disease control combines the benefits of sanitation, crop rotation, resistant varieties, scouting, and judicious use of pesticides. Inputs for disease control should be determined on the basis of field history, scouting, disease advisory programs, and recommendations by Virginia Cooperative Extension. This approach to disease management will enable the judicious use of chemicals while providing for a maximum return on investments.

Sanitation

Soil and decayed plant debris may contain residual inoculum of disease-causing organisms. Wash equipment frequently to avoid transport of inoculum from field to field. Peanut combines should be cleaned to remove loose soil and plant material after harvesting fields with heavy infestations of soil-borne diseases. The removal and/or destruction of peanut vines after harvest has limited value for disease management because much of the diseased plant parts and inoculum remains intact in the field. Furthermore, this practice negates a significant part of the soil fertility benefits of peanut hay in the following year.

Crop Rotation

A 4-year rotation of peanut with corn, grain sorghum, fescue, and other grass-type crops is beneficial for control of peanut diseases. Cotton is also a good rotational crop for peanuts in Virginia, but growers should not apply potash (K) in excess of recommended rates of the soil test report. Elevated levels of potash can interfere with calcium uptake and result in pod rot by fungi such a *Rhizoctonia* and *Pythium* species. Soybean and other leguminous crops share many of the common destructive diseases with peanuts and should be avoided. Where soybean is grown in a peanut rotation, double-crop soybean with wheat and follow with either cotton, corn, or another grass-type crop.

Tillage

Recent research has demonstrated that strip tillage into a wheat or rye cover crop can reduce production costs without increasing the risk of soilborne diseases in peanut. Strip tillage has been most successful in sandy-textured soils, peanut production in a 3-year or longer rotation, and plantings of summer-type peanuts. This practice allows for land preparation to be completed in a single trip that can include application of Vapam for control of CBR.

Resistant Varieties: Virginia-Type

No peanut varieties are immune to disease, but there is a wide range in susceptibility. Some important differences are noted below with respect to the most common diseases.

Cylindrocladium black rot (CBR): Bailey and Perry are partially resistant to CBR. Disease severity in suspectible varieties can be reduced by good nematode control and delayed planting to May 10 or later. Cool, wet conditions at planting favor epidemics of CBR.

Sclerotinia blight: Bailey and Perry are partially resistant to this disease. Early planting at seed rates of 110 lb/A or lower can reduce the susceptibility of varieties in some years. However, this practice will increase the risk of tomato spotted wilt disease.

Early leaf spot: Perry, Bailey, and Wilson are moderately susceptible. All other virginia-type varieties are susceptible.

Web blotch: Perry has good resistance, whereas CHAMPS and VA 98R are highly susceptible.

Tomato spotted-wilt virus: VA 98R and Perry are highly susceptible. CHAMPS and Gregory are partially resistant. Reduced plant populations and planting before May 1 sometimes increases disease incidence.

Resistant Varieties: Runner-Type

Recent releases of disease resistant runner-type varieties that mature as early as Wilson or Perry can be grown with reduced input costs and offer good disease resistance in southeastern Virginia. These varieties include:

Florida 07: resistant to TSWV; moderately susceptible to CBR and Sclerotinia

AP-4: moderately resistant to CBR, TSWV, and Sclerotinia

Georgia 02C: resistant to TSWV and CBR; susceptible to Sclerotinia and late maturing

Whenever growing runner-type peanuts, early planting is recommended to improve opportunities for achieving maturity between October 1 and 10.

Scouting

Peanut fields should be scouted once a week for disease after pegging. Scouts should use different entry and exit points as well as travel patterns across fields at each visit. After a canopy of foliage covers the soil, scouts should part the vines and look for signs of soilborne diseases on plant stems at the soil surface (e.g. Sclerotinia, Southern stem rot, and CBR).

Chemicals

A wide array of chemicals are registered for disease control in peanuts. Selection of the most effective/economical chemical requires knowledge of the target disease and other diseases in the field. Whenever the cause of disease is uncertain, plant samples should be submitted for diagnostic tests in the plant pathology clinic at the Tidewater AREC. If nematode or soil fertility problems are suspected, a 1-pt sample of soil should be submitted. The Peanut/Cotton InfoNet and Peanut Hotlines are important sources of information on timing of fungicide applications to control leaf spot and Sclerotinia blight. The following tables provide listings of approved chemicals for control of specific disease problems.

READ THE LABEL INSTRUCTIONS ATTACHED TO PESTICIDE CONTAINERS BEFORE APPLICATION.

Table 29. Seed Treatments[1]

Disease	Product and Formulation	Rate of Formulation	Method and Timing of Application	Precautions and Remarks
Seed decay and seedling disease	Allegiance-FL or Apron 50W or Apron XL LS	0.75 fl oz 0.5-1.0 oz 0.16-0.64 fl oz	Apply as water-based slurry with commercial seed treatment equipment.	Control Pythium seed rot and damping-off. Use in combination with a broad-spectrum fungicide.
	Maxim 4FS	0.08-0.16 fl oz	Same as above.	Protects against seed decay, damping-off, and seed transmission of CBR.
	Captan 30DD or Captan 400	6.0 fl oz 3.0-6.0 fl oz	Same as above.	Protects against seed decay, damping-off, and seedling blights.
	RTU-PCNB	1.75-2.5 fl oz	Same as above.	Same as above.
	42-S Thiram	3.0 fl oz	Same as above.	Same as above.
	Vitavax-30C	3.0 fl oz	Same as above.	Controls Sclerotium rot and damping-off. Use in combination with a broad-spectrum fungicide.
	Thiram 50WP	4.5 oz	Apply with dust treater.	Controls seed decay, damping-off, and seedling blights.

[1] *All rates of seed treatments are formulated product/100 lb seed. Do not use treated seed for food, feed, or oil purposes. Bags with treated seed should bear a tag or label cautioning their use for these purposes as well as against the reuse of bags for packing feed or foodstuffs. Read use restrictions on labels and follow all labeling requirements for packaging treated seed.*

Table 29. Seed Treatments[1] (cont.)

Disease	Product and Formulation	Rate of Formulation	Method and Timing of Application	Precautions and Remarks
Seed decay and seedling disease (cont.)	Vitavax PC (captan, PCNB, Vitavax)	4.0-5.0 oz	Same as above.	Same as above.
	Trilex Optimum DS (captan, trifloxystrobin, metalaxyl)	4.0 oz	Same as above.	Same as above.
	Trilex Star DS (captan, trifloxystrobin, thiophanate-methyl, metalaxyl)	4.0 oz	Same as above.	Same as above.
	Dynasty PD (azoxystrobin, fludioxonil, mefenoxam)	4.0 oz	Same as above.	Same as above, and reduces seed transmission of CBR.

[1] *All rates of seed treatments are formulated product/100 lb seed. Do not use treated seed for food, feed, or oil purposes. Bags with treated seed should bear a tag or label cautioning their use for these purposes as well as against the reuse of bags for packing feed or foodstuffs. Read use restrictions on labels and follow all labeling requirements for packaging treated seed.*

Table 30. Foliar Fungicides[1]

Disease	Product and Formulation	Rate of Formulation	Method and Timing of Application	Precautions and Remarks
Cercospora leaf spot, web blotch	Bravo 720 Bravo Ultrex 82.5 WDG Echo 720 Echo 90DF Equus 720	1.5 pt 1.4 lb 1.5 pt 1.2 lb 1.5 pt	Apply according to leaf-spot advisory program.	**Caution**. Sclerotinia blight will be more difficult to control when these products are applied at intervals of less than 21 days.
	Bravo 720 + SoyOil 937	1.0-1.5 pt 0.5-1.0% V/V	Same as above.	Same as above.
	Propimax EC + Echo 720	2.0 fl oz 1.0 pt	Same as above.	Same as above.
	Echo PropiMax Co-Pack	Use contents to treat 10 acres	Same as above.	Co-Pack is a mixture of Propimax and Echo.
	TILT-Bravo Twin Pack (equal to Tilt 3.6EC 2 fl oz + Bravo 720 1.0 pt/A)	Same as above.	Same as above.	Twin Pack is a mixture of Tilt and Bravo. Do not add Latron AG-98 or Latron B-1956 as phytotoxicity may result.
	TILT- Bravo SE	1.5 pt	Same as above.	Same as above.
	Folicur 3.6F + surfactant or Tebuzole 3.6F 7.2 fl oz	7.2 fl oz Use lowest rate recommended on label of surfactant	Apply according to leaf spot advisory program	Also controls stem rot and suppresses pod rot diseases. The final spray of the season must be a chlorothalonil product (e.g. Bravo) for resistance management.

[1] *All rates are listed as formulated product/A. Read labels and observe all precautions and restrictions on application, pre-harvest interval, and restrictions on feeding treated hay, vines, or hulls to livestock. For best results, apply sprays according to leaf-spot advisory program in a volume of 12.0 to 15.0 gal/A by ground sprayers or 5.0 gal/A with aircraft.*

Table 30. Foliar Fungicides[1] (cont.)

Disease	Product and Formulation	Rate of Formulation	Method and Timing of Application	Precautions and Remarks
Cercospora leaf spot, web blotch (cont.)	Stratego	7.0 fl oz	Same as above.	Label also allows up to 2 sprays at 14 fl oz/A for control of Rhizoctonia limb rot in addition to foliar diseases. Use chlorothalonil as final spray for resistance management.
	Abound 2.08F	9.3-12.3 fl oz	Same as above.	Use chlorothalonil as final spray for resistance management. See label for restrictions.
	Headline 2.09EC	6.0-9.0 fl oz	Same as above.	Make no more than 2 sequential sprays, then follow with chlorothalonil for resistance management.
	Provost	7.0-8.0 fl oz	Same as above.	Label allows up to 10.3 fl oz/A for suppression of BCR.
	Evito 480SC	3.8-5.7 fl oz	Same as above.	Number of sprays must not exceed one-half the total, and each spray should be followed by a non-strobilurin.
	Absolute 500SC	3.7-7.0 fl oz	Same as above.	Do not apply more than 4 sprays and apply chlorotholonil as final season spray.

[1] *All rates are listed as formulated product/A. Read labels and observe all precautions and restrictions on application, pre-harvest interval, and restrictions on feeding treated hay, vines, or hulls to livestock. For best results, apply sprays according to leaf-spot advisory program in a volume of 12.0 to 15.0 gal/A by ground sprayers or 5.0 gal/A with aircraft.*

Table 30. Foliar Fungicides[1] (cont.)

Disease	Product and Formulation	Rate of Formulation	Method and Timing of Application	Precautions and Remarks
Southern stem rot (*Sclerotium rolfsii*), Rhizoctonia pod and limb rot	Folicur 3.6F + surfactant or Tebuzole 3.6F 7.2 fl oz	7.2 fl oz Use lowest rate recommended on label of surfactant	Apply with leaf-spot nozzles at spray volume of 15 gal/A starting at pegging.	Also controls leaf spot and suppresses pod rot by CBR. The total seasonal dose must not exceed 28.8 fl oz/A
	Artisan (equal to Tilt 4.0 fl oz + Moncut 1.2 lb/A)	18.5-24.6 fl oz	Apply 2 or 3 times starting 45 to 60 days after planting.	Also controls leaf spot, but always end season with chlorothalonil for resistance management.
	Moncut 50WP or Convoy 3.8F	1.5-2.0 lb 1 pt	Tank mix with a leaf-spot fungicide spray or band over row in spray volume of 40 gal/A.	Two or 3 applications may be necessary, depending on disease pressure.
	Abound 2.08F	18.5-24.6 fl oz	Make 2 applications in spray volume of 15 gal/A between 60 and 90 days after planting.	Abound also controls early leaf spot and web blotch. Do not apply within 50 days of harvest. Do not use more than 49.2 fl oz/season.
	Headline 2.09EC	9.0-15.0 fl oz	Make no more than 2 sequential applications, then follow with non-strobilurin fungicide for resistance management.	Also controls leaf spot and web blotch.

[1] *All rates are listed as formulated product/A. Read labels and observe all precautions and restrictions on application, pre-harvest interval, and restrictions on feeding treated hay, vines, or hulls to livestock. For best results, apply sprays according to leaf-spot advisory program in a volume of 12.0 to 15.0 gal/A by ground sprayers or 5.0 gal/A with aircraft.*

Table 30. Foliar Fungicides[1] (cont.)

Disease	Product and Formulation	Rate of Formulation	Method and Timing of Application	Precautions and Remarks
Sclerotinia blight (*Sclerotinia minor, S. sclerotiorum*)	Omega 500	1.0-1.5 pt	Make first application according to the Sclerotinia advisory program in problem fields or when disease first appears. Up to 2 additional sprays may be required.	Provides good control of Sclerotinia blight and suppression of southern stem rot and Rhizoctonia pod rot.
	Endura 70WG	8.0-10.0 oz	Same as above, except do not apply more than 2 times consecutively.	Also controls web blotch and suppresses leaf spot.
Nematodes, Cylindro-cladium black rot (CBR) (*Cylindro-cladium parasiticum*)	Metam 42% Sectagon 42% Vapam HL 42%	7.5-15.0 gal 7.5-15.0 gal 7.5-15.0 gal	Use with NC 12C or Perry in cases or severe disease pressure; plant other varieties only in cases of light CBR pressure. Apply 8 inches deep at least **14 days preplant** with1 injector shank in front of a bed shaper to mark rows. Do not mix treated soil with untreated soil by tillage or other cultural practices after application.	Apply after soil temperatures exceed 60°F at 4-in depth, and temperatures are likely to be at this level or warmer for 5 days. Delay application if >1 in. of rainfall is forecast in next 72 to 96 hr period.

[1] *All rates are listed as formulated product/A. Read labels and observe all precautions and restrictions on application, pre-harvest interval, and restrictions on feeding treated hay, vines, or hulls to livestock. For best results, apply sprays according to leaf-spot advisory program in a volume of 12.0 to 15.0 gal/A by ground sprayers or 5.0 gal/A with aircraft.*

Table 31. Nematicides

Disease	Product and Formulation	Rate of Formulation	Method and Timing of Application	Precautions and Remarks
Cylindrocladium black rot (CBR)	Proline 480SC	5.7 fl oz or 0.4 fl oz/1000 ft or row	Apply to seed furrow at planting in a volume of 5 gal/A with either spray nozzle or microtube.	Use for suppression of CBR in fields with low to moderate disease pressure and crop rotations of 4 years or longer.
Nematodes	Temik 15G	7.0 lb (Note: 5 lb may be sufficient if used in combination with Telone, Vapam, Metam, or Sectagon)	Apply Temik 15G in-furrow for suppression of nematodes and thrips.	Label prohibits the use of hay, vines, or hulls from treated soil as a livestock feed.
	Temik 15G	12.0-20.0 lb	Apply to the seed furrow or apply 12-inch band and incorporate in soil.	Same as above.
	Telone II	3.0-6.0 gal	Apply 8 to 12 inches deep in row and bed soil. Wait 7 to 14 days before planting.	See label for precautions and restrictions.
	Metam 42% Sectagon 42% Vapam HL 42%	7.5 gal 7.5 gal 7.5 gal	Same as above, but wait 14 days before planting.	Same as above.

PEANUT IRRIGATION

Robert Grisso, Biological Systems Engineer, Virginia Tech

Although considered to be somewhat drought resistant, peanuts exhibit a variation in drought tolerance depending upon the stage of growth and variety. There are critical times during the growth of the peanut plant that a soil moisture deficit can severely limit yields and/or diminish quality. The table below divides the peanut growing season into four stages and indicates the relative response of the plants to a lack of moisture during each stage.

Response of Peanut Plants to Irrigation at Various Growth Stages

Plant Growth Stage (Duration)	Plant Indicators	Relative Drought Susceptibility
germination (1-2 weeks)	planting to emergence	high
early vegetative growth (5-6 weeks)	emergence to flowering/ pegging	low
nut development/fruiting (8-9 weeks)	flowering/pegging to pod formation	high
maturation (5-6 weeks)	pod formation to harvest	moderate

While adequate moisture during the germination stage is necessary for a good, uniform stand, the mid-season nut development, or fruiting stage, is the most critical time for irrigation if there is a shortage of rainfall. In addition to being the stage in which the peanut plant is most susceptible to drought stress, it is also the stage of maximum water use by the plant.

In Virginia, the critical part of the nut development/fruiting period includes the latter part of July and the month of August. Irrigation in June or earlier is discouraged, unless extremely dry conditions persist, because excess moisture can trigger excessive vine growth. Irrigation of peanuts in September is also not preferred because too much moisture during the plant maturing stage can increase the severity of diseases such as CBR, Sclerotinia blight, and leaf-spot diseases. Late unnecessary irrigation can also delay maturity and promote the development of small pods. In dry years, irrigation can reduce the threat of Aflatoxin and suppress the outbreak of spider mites.

Irrigation Scheduling Methods

Soil Feel Method

A soil sample should be taken from several sites, representative of the predominant soil type in the field, by digging down to a 6- to 12-inch depth. To evaluate soil moisture, hold a sample of soil in the palm and fingers of the hand and squeezed to form a ball. Based on the appearance of the ball, the following table can be used to estimate plant-available water. The upper end of the ranges given should be used for coarse-textured soils, such as loamy sands, while medium-textured soils, such as sandy loams, apply to the lower end of the ranges.

Estimating Soil Moisture By The Soil Feel Method

Plant-available Water Remaining In Soil	Feel or Appearance at 6-12 Inches
100%	No free water appears on soil, but wet outline of ball is left on hand
75-100%	Forms a ball that breaks easily
50-75%	Forms a weak ball that falls apart
<50%	Appears dry, will not form a ball
0%	Dry, loose, flows through fingers

In deciding whether to irrigate or not, the plant growth stages described earlier should be considered. For the germination and nut development/fruiting stages, soil moisture should not be allowed to drop below the 50 percent to 60 percent plant-available water level, while during the early vegetative growth and maturation stages it could be allowed to drop below the 50 percent level. The amount of irrigation water which should be applied once an irrigator has determined the approximate soil moisture content will be discussed below.

Tensiometer Methods

Tensiometers are well-suited to the light, sandy soils found in southeast Virginia. Depending upon the size of the irrigated field and the variability in soil textures, one or more tensiometer stations should be installed. A station consists of 2 tensiometers, 1 inserted to a 12-inch depth and the other at 24 inches. The shallow instrument reflects the need for irrigation while the deep one provides an indication of whether or not irrigation amounts have been adequate. If the deep tensiometer continues to dry during the season while irrigation is continuing, it indicates that insufficient irrigation water is being applied. Manufacturers' recommendations should be closely followed regarding installation and interpretation of tensiometer readings.

The following table relates tensiometer gauge vacuum reading to approximate soil moisture content. In the case of soil tension, readings differ according to soil texture.

Soil Water Availability at Various Tensiometer Readings

Irrigation Trigger Point		Tensiometer Reading (Centibars)	
Peanut Plant Growth Stage	Plant-available Water Remaining in Soil (%)	Sandy loam	Loamy sand
germination	60	40	20
early veg. growth	40	60	40
nut devel./fruiting	60	40	20
maturation	40	60	40

Electrical Resistance Methods

A gypsum soil block is an “electrical resistance” device which uses gypsum as a porous material in which electrodes are embedded. Electrical resistance between the electrodes varies with soil water content. Gypsum has a characteristic much like a very heavy clay with small pores. Gypsum blocks, therefore, are not recommended for the light, sandy soils of southeast Virginia.

Another electrical resistance type sensor is called the Watermark sensor. As with the gypsum block, the sensor’s resistance varies with the electrical conductivity of solution between the electrodes. Pore sizes in this matrix are larger than those of the gypsum block, thereby making it more suitable for coarse-textured soils. Unlike gypsum blocks, Watermark sensors may be reused year after year.

Watermark sensors (and gypsum blocks) come with a meter that is attached to the terminals. Some meters give an instant reading of soil water tension while others provide a digital readout which can be converted to tension using a simple chart. Irrigation should occur when sensor readings exceed a set tension level as with tensiometers. Follow manufacturer’s recommendations carefully when using this method.

How Much Irrigation?

In peanut irrigation, it may be advisable to bring soil moisture back up to only 85 percent to 90 percent of plant available water-holding capacity in the event that rainfall occurs shortly thereafter. This will allow the soil to accommodate part of the rainfall and may help to reduce associated disease incidence.

The amount of water to apply depends on soil texture, root zone depth, and the plant-available water level when irrigation is begun as well as the sprinkler irrigation efficiency. The following table provides irrigation estimates considering these factors for two soil textures.

Maximum Water Application at Various Growth Stages, Soil Moisture Levels, and Soil Textures

Peanut Plant Growth Stage	Plant-available Water Remaining in Soil (%)	Maximum Amount of Irrigation Water to Apply (Inches)*	
		Sandy Loam	Loamy Sand
germination	60	0.33-0.50	0.25-0.33
early veg. growth	40	2.00-2.25	1.25-1.50
nut devel./fruiting	60	1.25-1.50	0.75-1.00
maturation	40	2.00-2.25	1.25-1.50
**Acre-inch of water = 27,154 gallons.*			

To determine if these applications are adequate, an irrigator can evaluate the deep tensiometer readings or examine deep soil samples by the soil feel method.

SPRAYER INFORMATION

Information on Spray Tips for Herbicides

Tip No. 8004 is recommended for application of preplant and at-cracking herbicides.

Flat Fan Spray Tip No.	Liquid Pressure in psi (at tip)	Gallons Per Acre[1]		
		3 MPH	4 MPH	5 MPH
8004[2] (50-mesh screen)	20	28	21	17
	25	31	24	19
	30	34	26	21
	40	40	30	24

[1] *Values are based on a nozzle spacing of 18 inches.*

[2] *or equivalent.*

Information on Spray Tips for Soil Fungicides

Tip numbers 8008 LP, 8010 LP, TK 7.5, and TK 10 are recommended for application of soil fungicides (i.e., Terraclor 75W, Rovral 4F, Vitavax 3F). Center each nozzle directly over the row, and calibrate to deliver 40 gal of spray per acre.

Flat Fan Spray Tip No.	Liquid Pressure in at tip (psi)	Gallons Per Acre[1]		
		3 MPH	4 MPH	5 MPH
8008 or 11008 (no strainer)	15	26.9	20.2	16.2
	20	31.1	23.2	18.7
	30	38.1	28.6	22.9
	40	44.0	33.0	26.4
8010 or 11010 (no strainer)	15	33.7	25.3	20.2
	20	38.9	29.2	23.3
	30	47.6	35.7	28.6
	40	55.0	41.3	33.0
TK 7.5 (no strainer)	10	41.3	30.9	24.8
	20	58.3	43.8	35.0
	30	71.4	53.6	42.9
	40	82.5	61.9	49.5
TK 10 (no strainer)	10	55.0	41.3	33.0
	20	77.8	58.3	46.7
	30	95.3	71.4	57.2
	40	110.0	82.5	66.0

[1] *Values are based on a nozzle spacing of 36 inches.*

Flat Fan Spray Tip No.	Pressure (psi) required to achieve 40 Gallons per acre 36" Row Spacing		
	3 MPH	4 MPH	5 MPH
8008 or 11008 (no strainer)	33 psi	59 psi (NR)[1]	92 psi (NR)
8010 or 11010 (no strainer)	21 psi	38 psi	59 psi (NR)
TK7.5 (no strainer)	9 psi (NR)	17 psi	26 psi
TK 10 (no strainer)	5.3psi (NR)	9psi (NR)	15 psi

[1] NR - Not recommended, outside of the operating pressure for the nozzle.

Information on Spray Tips for Leaf-Spot Fungicides

Orfice disc number D_2 or D_3 and core number 13 or 23 are routinely used to spray leaf-spot fungicides. Three nozzles per row, a minimum of 50 lb spray pressure, and a spray volume of 15 gal/A are recommended.

Combination Disc and Core No.	Liquid Pressure (at tip) (psi)	Gallons Per Acre - 36" Row Spacing Using 3 Nozzles Per Row		
		3 MPH	4 MPH	5 MPH
D_2-13	40 60 80	13.1 16.4 18.1	9.8 12.3 13.7	7.9 9.9 10.9
D_2-23	40 60 80	16.5 20.5 23.3	12.3 15.4 17.3	9.9 12.3 13.9
D_3-23	40 60 80	19.4 23.3 26.6	15.5 17.3 19.8	11.7 13.9 16.0

NOTE: Consult a commercial spray guide and/or your Extension agent for selection of suitable tips to achieve special low- or high-volume spray needs.

Using three nozzles per row, a minimum of 560 psi spray pressure, and a spray volume of 15 gal/A are recomended. The following tables shows the speed needed to achieve 50 psi and 15 gal/A.

Combination Disc and Core No.	Speed (MPH) required to achive 15 Gallons Per Acre @ 50 psi Using 3 Nozzle Per Row
D_2-13	3 MPH
D_2-23	3.7 MPH
D_3-23	4.4 MPH

Calibration of Boom Sprayers

Be sure to calibrate your sprayer properly. NEVER exceed the labeled rate. Using too much pesticide is illegal and may injure your crop. Using too little may result in little or no pest control. Pressure, nozzle orifice size, spacing of nozzles, and speed all affect the application rate. Be sure that all of your spray equipment is in good working order and your sprayer is configured properly.

Large-area Method of Calibration

1. Measure and stake off one acre (43,560 sq ft) in the field to be treated.

2. Fill sprayer tank with water.

3. Maintain constant pressure and speed while spraying the acre. Mark pressure, throttle, and gear settings.

4. Measure the amount of water used. The amount of water necessary to refill the tank is equal to gallons per acre applied.

5. Make up the spray solution with the correct amount of chemical, based on the amount of water applied per acre.

6. Make the application at pressure, throttle, and gear settings used in calibrating.

“Ounce” Calibration Method

1. Mark off a test course, based on the chart below. (Measure nozzle spacing for booms; row spacing for directed and band rigs.)

2. Set the throttle for spraying and operate the equipment as you drive the measured distance. Operate under field conditions. Fill your tank half full (average weight). Get a running start. Drive the measured distance several times while operating the equipment, recording driving times (# of seconds).

3. Calculate the average time in seconds required to drive the measured distance.

4. Run the equipment for the average time it took to drive the course, using the same settings (RPM5, pressure). Catch output during that time in a container marked in ounces. (If you are using a boom sprayer, catch the output from one nozzle. If you are using a directed/band rig, catch the spray from all nozzles per row for the prescribed time.)

5. Output in ounces = gallons per acre (GPA) applied.

"Ounce" Method Distances Row Width or Nozzle Spacing

Spacing (inches)	Distance (feet)
40	102
38	107
36	113
30	136
28	146
24	170
20	204
18	227

This method works because the test course is 1/1 28th of an acre, and 128 ounces in a gallon - the proportions are the same.

A word of caution: If you use the "ounce" method, your calibration check is based on only one nozzle. Be sure your calibration check is based on the right nozzle (and pressure) for the job - and that the nozzle is in good condition. This method is valid ONLY if the output from each nozzle (or sets of nozzles) is uniform! So, you should check ALL nozzles (or sets of nozzles, in the case of banding/ directed applications) to be sure the output from each one (or each set) is the same. You can do this by using a flow meter, or by catching the output from each for a short time (ex. 10 seconds). Replace any nozzles that do not match the pattern and flow rate of the one(s) you used in the calibration test.

For more information concerning the "Ounce" calibration method review: "Fine Tuning a Sprayer with the "Ounce" Calibration Method." Virginia Cooperative Extension, Publication 442-453, *http://www.ext.vt.edu/pubs/bse/442-453/442-453.html*

For information and/or for guidance on calibration methods for other types of equipment, contact your local Extension agent.

Travel Speed Chart

Miles per hour	Time required to travel[1]		
	88 feet	176 feet	352 feet
1	1 minute	2 minutes	4 minutes
2	30 seconds	1 minute	2 minutes
3	20 seconds	40 seconds	1 minute 20 seconds
4	15 seconds	30 seconds	1 minute
5		24 seconds	48 seconds
6			40 seconds
7			34 seconds

[1] *1 MPH = 88 feet per minute; 1 MPH = 1.466 feet per second*

Measure Equivalency Tables

Land Measure

16.5 feet = 5.5 yards OR 1 rod

66 feet = 4 rods OR 1 chain

272.25 square feet = 30.25 square yards OR 1 square rod

4,356 square feet = 16 square rods OR 1 square chain

43,560 square feet = 160 square rods OR 10 square chains OR 1 acre

Length of Row Required for One Acre

Row spacing	Length or distance
24 inches	7260 yards = 21,780 feet
30 inches	5808 yards = 17,424 feet
32 inches	5445 yards = 16,335 feet
34 inches	5125 yards = 15,374 feet
36 inches	4840 yards = 14,520 feet
38 inches	4585 yards = 13,756 feet
40 inches	4356 yards = 13068 feet

Measurement Equivalency Chart

A teaspoon or tablespoon throughout this table refers to a level, standard measuring teaspoon or tablespoon.

80 drops	=	1	teaspoon or about 1/6 fluid ounce
	=	5	milliliters or cubic centimeters (cc)
1 tablespoon	=	3	teaspoons
		15	milliliters (ml) or cubic centimeters (cc)
		1/2	fluid ounce
1 cup	=	16	tablespoons
		8	fluid ounces
		236.6	milliliters (ml) or cubic centimeters (cc)
		1/2	pint
1 pint	=	16	fluid ounces
			(NOTE: 1 pint or quart dry measure is about 16 percent larger than 1 pint or 1 quart liquid measure.)
		473.2	milliliters (ml) or cubic centimeters (cc)
1 fluid ounce	=	2	tablespoons or 29.6 milliliters (ml) or cubic centimeters (cc)
1 U.S. gallon	=	4	quarts
		8	pints
		3,785	milliliters (ml) or cubic centimeters (cc)
		8.3	pounds (lb) water
1 milliliter	=	1	cubic centimeter (cc)
	=	0.2	teaspoon
1 liter	=	1,000	milliliters (ml) or cubic centimeters (cc)
		1.08	quarts (1 quart + 1 fluid ounce)
1 pound	=	16	ounces
		453.59	grams
1 kilogram	=	1,000	grams, approximately 2 pounds 3 ounces
1 ounce	=	28.4	grams
1 bushel of soil	=	1.25	cubic feet
1 mile	=	5,280	feet
		320	rods
		1,609.4	meters
1 acre	=	43,560	square feet
		160	square rods
		0.4047	hectare
10 millimeters (mm)	=	1	centimeter (cm)
		0.3937	inch
100 centimeters	=	1	meter (m)
		39.37	inches

ESTIMATED CROP PRODUCTION COSTS

Mike Roberts, Southeast District Farm Management Agent

Based on 3,000 pound per acre yield.

Variable Costs	**Costs Per Acre - Your Farm**
Seed	
Fertilizer, Lime, Landplaster	
Chemicals	
Machinery	
Miscellaneous	
Interest	
Total Variable Costs	
Fixed Costs	
Machinery	
Labor	
Total Fixed Costs	
Total Costs (excluding land)	

Notes:

1. Costs per acre for producing peanuts will vary from farm to farm depending in many factors. Calculating your actual costs is important. Typical production costs in Virginia range from $500- $600+ per acre. This worksheet is provided for you to calculate your costs and returns in order to evaluate the peanut enterprise as a profit center for your farm.
2. The Farm Business Management agent is available to assist you. Contact Mike Roberts at (803) 733-2686 or mrob@vt.edu or Eric Eberly at (434) 292-5331 or eeberly@vt.edu.
3. You may also use this guide as a template for notes during the Extension Peanut production meetings.