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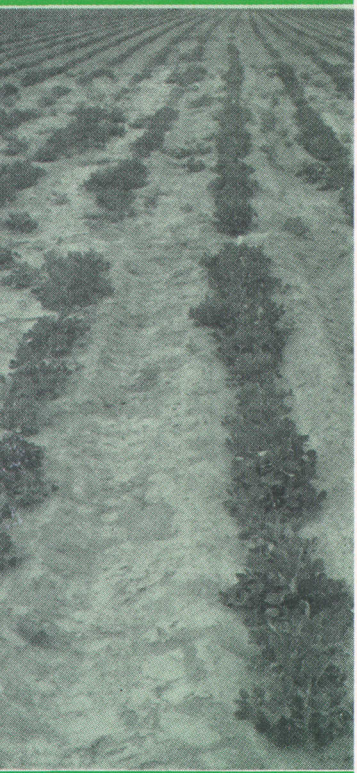

PERFORMANCE of HERBICIDES for WEED CONTROL in PEANUTS

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Performance of Herbicides for Weed Control in Peanuts

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EVALUATION OF HERBICIDES for weed control in peanuts began in Alabama in the early 1950's. This early research led to the recommendation of dinoseb (dinitro) in 1960. Application was made at "cracking time" of the peanuts. Further experimentation led to the inclusion of 2,4-DEP and sesone to the list of herbicides recommended the following year. From 1961 until 1966 there were no revisions or additions in the recommendations of herbicides for peanut weed control in Alabama.

Under optimum conditions, the recommended herbicides controlled many of the weeds, such as crabgrass and Florida purslane, that plagued peanut growers during the early part of the growing season. However, such weeds as sicklepod, nutsedge, Florida beggarweed, cocklebur, Texas panicum, and tall and smallflower morningglory were not adequately controlled. Another impetus to expanded research was that considerably lower rates of herbicides were recommended in Florida and Georgia than in Alabama. This caused some degree of confusion for producers living near the borders of these adjoining states.

In 1966 a greatly expanded research program on weed control in peanuts was initiated. The objectives were to evaluate both experimental and currently recommended herbicides at various rates of application and to study several methods and times of application. Various experiments included preplant incorporation, preemergence, cracking-time, and postemergence treatments.

MATERIALS AND METHODS

Experiments were conducted on Dothan loamy sand at the Wiregrass Substation, Headland, Alabama. Natural weed infestations were predominantly crabgrass, goosegrass, crowfootgrass, Florida beggarweed, sicklepod, morningglory, and Florida purslane. Other weeds occurring in the experimental areas included Texas panicum, nutsedge, lambsquarters, and pigweed. Major peanut weeds are listed below, and most are illustrated on pages 12-13.

WEEDS IN PEANUTS

Crabgrass	*Digitaria sanguinalis* (L.) Scop.
Goosegrass	*Eleusine indica* (L.) Gaertn.
Crowfootgrass	*Dactyloctenium aegyptium* (L.) Richter
Sicklepod (coffeeweed)	*Cassia obtusifolia* (L.)
Tall morningglory	*Ipomoea purpurea* (L.) Roth
Smallflower morningglory	*Jacquemontia tamnifolia* (L.) Griseb.
Florida beggarweed	*Desmodium tortuosum* (SW.) DC.
Carpetweed	*Mollugo verticillata* (L.)
Bristly starbur (Texas spur)	*Acanthospermum hispidum* DC.
Texas panicum	*Panicum texanum* Buckl.
Cocklebur	*Xanthium pensylvanicum* Wallr.
Florida purslane	*Richardia scabra* (L.)
Nutsedge purple	*Cyperus rotundus* (L.)
Nutsedge yellow	*Cyperus esculentus* (L.)
Pigweed, redroot	*Amaranthus retroflexus* (L.)
Lambsquarters	*Chenopodium album* (L.)

Soil in the experimental areas was turned each winter and seedbeds prepared in March or early April by disking and leveling. Treatments were randomized in a complete block design with four replications. Plots were four rows wide and 20 feet long. Alleys 20 feet wide separated the replications.

Herbicides were applied broadcast in 16-19 gallons of water per acre at a spraying pressure of 30 psi, using a tractor-mounted, compressed air sprayer. Treatments involving preplant incorporation of herbicide were applied first, incorporated with either a double section disk harrow or a power driven rotary hoe, and then peanuts were planted on all plots. After planting, preemergence applications were sprayed on the appropriate plots, followed later by postemergence and cracking-time applications. Check plots without herbicide treatment were included in each replicate.

Early runner peanuts were planted in all experiments. Two of the four rows in each plot were mechanically cultivated to control weeds. The other two rows were left uncultivated to observe the number, species, and competitive effects of weeds surviving the herbicide treatment. Peanut yields were taken on the cultivated rows only, to permit measuring possible injury from the chemical treatment where weed competition was not a factor.

Counts of grass, broadleaf weeds, and peanut plants were made 4-6 weeks after application of the herbicides. Weeds were counted in a 12-inch band 20 feet long over each row, except where weed populations were uniformly high only 2 feet of band was counted. Peanut injury and control of grass and broadleaf weeds were rated visually periodically throughout the growing season. Peanut yields were measured as pounds of unshelled pods per acre.

During the past 4 years, over 50 different herbicides (not including combination treatments) were evaluated for weed control in peanuts. Many of the herbicides showed some potential. Severe crop injury by some herbicides eliminated them from further consideration. The herbicides discussed in this bulletin have been found promising with respect to weed control and minimal crop injury.

RESULTS

Vernolate

Early grass control with vernolate was consistently good at rates of 2 pounds per acre and above, Table 1. However, 2.5-3.0 pounds were required for full-season grass control. Control of Texas panicum, a large-seeded grass, was poor at rates that controlled other grass species. Considerable variation in broadleaf weed control from year to year was obtained with vernolate. This yearly variation was not related to rate of vernolate as much as to the predominant broadleaf weed species in the experimental areas used each year. Florida purslane, carpetweed, and redroot pigweed were controlled well by vernolate, while morningglory, sicklepod, and Florida beggarweed were not, especially late in the growing season. One of the major advantages of vernolate for peanut weed control is its activity against nutsedge. Although complete control can seldom be achieved, vernolate is the most effective herbicide available for suppressing this weed in peanuts.

TABLE 1. INFLUENCE OF VERNOLATE APPLIED PREPLANT INCORPORATED ON WEED CONTROL, INJURY, AND YIELD OF PEANUTS

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
1966										
Vernolate, 1.0 lb.	168	155	284	51	0	26	0	5	0	----
Vernolate, 2.0 lb.	159	66	335	76	0	28	0	18	0	----
Vernolate, 3.0 lb.	157	5	344	94	91	33	0	38	0	----
Vernolate, 4.0 lb.	157	13	196	84	88	35	0	25	0	----
Vernolate, 5.0 lb.	159	3	175	99	93	50	5	44	0	----
Check	162	651	329	0	0	0	0	0	0	----
1967										
Vernolate, 2.0 lb.	180	44	29	90	58	88	30	0	0	2,268
Vernolate, 3.0 lb.	186	1	14	99	98	93	15	5	0	2,395
Check	200	167	342	0	0	0	0	0	0	1,801
1968										
Vernolate, 2.0 lb.	124	25	327	83	22	91	0	2	0	1,949
Vernolate, 2.5 lb.	134	0	221	92	87	96	0	5	0	2,294
Vernolate, 3.0 lb.	128	9	176	98	73	100	0	10	0	2,312
Vernolate, 4.0 lb.	142	0	183	98	91	100	0	23	0	2,359
Check	131	1,819	358	0	0	0	0	0	0	1,871
1969										
Vernolate, 2.0 lb.	92	109	10	95	99	97	94	7	0	----
Vernolate, 2.5 lb.	108	28	13	92	97	97	69	5	2	----
Vernolate, 3.0 lb.	85	137	11	93	96	96	67	1	2	----
Vernolate, 4.0 lb.	106	1	11	99	99	99	91	10	2	----
Check	109	279	704	12	0	12	0	0	0	----

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.

Some injury to peanut seedlings by vernolate occurred each year. Stands were not affected, but injury was expressed as leaf seal or sticking together of the margins of the leaflets and general stunting. In all cases this injury was slight at rates below 3 pounds per acre and there were no yield reductions with rates as high as 4 pounds.

Benefin

Benefin was highly consistent when applied at 0.75-1.5 pounds per acre and incorporated into the soil prior to planting. In all instances, 0.75 pound provided acceptable grass control throughout the season, Table 2. Lower rates were adequate for grass control in only 2 of the 4 years. At rates giving good control of grass weeds, the degree of broadleaf weed control varied with density of particular species. Although pigweed, Florida purslane, carpetweed, and other small-seeded weeds were controlled, such large-seeded species as morningglory, sicklepod, cocklebur, and Florida beggarweed were not controlled. Benefin does control Texas panicum, which is usually not adequately controlled by many other common peanut herbicides. Peanuts were not significantly injured by benefin at rates considerably above those required for weed control.

Herbicides applied preplant are incorporated with any one of various implements that mix the herbicide into the soil to various depths. Experiments in 1968 and 1969 to determine if depth of incorporation would be a factor causing injury to peanuts with high rates of benefin showed depth of incorporation had no effect on stands, peanut injury, yields, or weight of seedling peanuts, Table 3. Apparently peanuts germinate and root in benefin-treated soil without injury. Weed control was excellent with all depths of incorporation at rates tested.

Another factor that may vary is the delay between application of the herbicide and incorporation into the soil. In a 1969 experiment with benefin, however, there was no effect on weed control from delaying incorporation up to 24 hours, Table 4. Only slight losses in efficiency were noted from 48 hours' delay. If lower rates of herbicide had been used (1.15 pounds per acre in test), the effects of delayed incorporation probably would have been greater. Other research has shown that volatilization of benefin from the soil to the atmosphere is a major process causing loss.

TABLE 2. INFLUENCE OF BENEFIN APPLIED PREPLANT INCORPORATED ON WEED CONTROL, INJURY, AND YIELD OF PEANUTS

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
1966										
Benefin, 0.37 lb.	146	27	237	74	0	26	0	0	0	-------
Benefin, 0.75 lb.	159	14	116	90	80	45	3	0	0	-------
Benefin, 1.00 lb.	154	16	87	94	80	64	3	0	0	-------
Benefin, 1.50 lb.	157	2	60	96	98	78	3	0	0	-------
Benefin, 3.00 lb.	138	1	23	95	96	73	5	4	0	-------
Check	161	651	328	0	0	0	0	0	0	-------
1967										
Benefin, 0.25 lb.	189	58	79	80	26	71	0	0	0	2,005
Benefin, 0.37 lb.	180	36	189	63	61	48	17	0	0	1,506
Benefin, 0.50 lb.	192	32	97	62	67	58	15	0	0	2,078
Benefin, 0.75 lb.	192	12	69	87	70	82	38	0	0	2,695
Benefin, 1.00 lb.	194	14	48	96	96	92	65	41	0	2,123
Benefin, 2.00 lb.	182	1	10	99	98	95	69	0	0	2,187
Check	199	166	342	0	0	0	0	0	0	1,801
1968										
Benefin, 0.25 lb.	118	1	200	97	92	100	0	0	0	2,123
Benefin, 0.50 lb.	130	1	173	97	96	100	0	0	0	1,822
Benefin, 0.75 lb.	135	0	165	96	95	98	10	0	0	2,366
Benefin, 1.00 lb.	117	0	57	100	98	100	10	0	0	1,876
Check	131	1,819	358	0	0	0	0	0	0	1,871
1969										
Benefin, 0.25 lb.	103	217	83	84	55	87	17	0	0	-------
Benefin, 0.50 lb.	110	17	174	93	92	75	30	5	0	-------
Benefin, 0.75 lb.	101	3	43	98	94	96	74	0	2	-------
Benefin, 1.00 lb.	108	3	6	94	96	92	96	0	2	-------
Benefin, 2.00 lb.	92	2	18	100	96	97	85	10	9	-------
Check	109	279	704	12	0	12	0	0	0	-------

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.

TABLE 3. INFLUENCE OF DEPTH OF INCORPORATION OF BENEFIN ON WEED CONTROL, PHYTOTOXICITY, AND YIELD OF PEANUTS, 1968-69

Incorporation depth, benefin rate/acre	Stand count[1]						Weed control and injury ratings						Yield, pounds[5]	
	Peanuts		Weeds				Grass control[2]		Injury[3]		Seedling wt., grams[4]			
			Grasses		Broadleaf[1]									
	'68	'69	'68	'69	'68	'69	'68	'69	'68	'69	'68	'69	'68	'69
0-2 in., 1 lb.	208	240	1	0	3	0	100	100	5	0	76	79	----	2,759
0-2 in., 2 lb.	242	236	0	0	0	0	100	100	3	0	62	87	----	2,931
0-2 in., 4 lb.	226	219	0	0	1	0	100	100	7	0	67	86	----	2,650
0-4 in., 1 lb.	211	224	0	0	6	0	100	100	0	0	82	100	----	2,986
0-4 in., 2 lb.	213	195	0	0	3	0	100	100	7	0	66	97	----	2,523
0-4 in., 4 lb.	226	226	0	0	2	1	100	100	5	0	70	80	----	2,541
0-8 in., 1 lb.	222	233	0	0	2	0	100	100	0	0	68	70	----	2,895
0-8 in., 2 lb.	235	205	0	0	4	0	100	100	2	0	73	77	----	2,487
0-8 in., 4 lb.	204	208	0	0	0	0	100	100	2	0	73	73	----	2,487
Check	204	220	405	60	11	3	0	0	0	0	70	77	----	1,770

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Taken from 2 feet of row approximately 60 days after planting.
[5] Pod weight of unshelled peanuts per acre.

TABLE 4. INFLUENCE OF TIME OF INCORPORATION AFTER APPLICATION OF 1.15 POUNDS OF BENEFIN ON WEED CONTROL, PHYTOTOXICITY, AND YIELD OF PEANUTS, 1969

Time from application to incorporation, hours	Stand count[1]			Weed control and injury ratings				
	Peanuts	Weeds		Grass control[2]	Broadleaf control[2]	Crop injury[3]	Seedling wt., grams[4]	Yield, pounds[5]
		Grass	Broadleaf					
0	186	0	0	98	100	0	79	3,122
3	193	0	0	100	100	0	90	2,904
5	203	2	1	100	97	0	90	3,095
10	182	2	4	100	99	0	96	3,104
24	194	0	1	100	96	0	87	2,922
48	168	1	1	90	75	0	84	2,859
120 (rain)	202	24	2	31	7	0	81	2,575
Check	195	12	12	0	0	0	89	2,949

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Taken from 2 feet of row approximately 60 days after planting.
[5] Pod weight of unshelled peanuts per acre.

TABLE 5. WEED CONTROL AND CROP INJURY WITH VARIOUS HERBICIDE COMBINATIONS OF BENEFIN WITH VERNOLATE AND 2,4-DEP, 1968

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings					
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Injury[3]	
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late
Benefin + vernolate, 0.75 + 1.5 lb.	300	0	4	97	86	91	26	0	0
Benefin + vernolate, 1.0 + 2.0 lb.	260	1	15	100	90	97	62	0	0
Benefin + vernolate, 1.0 + 3.0 lb.	326	2	19	100	97	83	25	2	0
Benefin + 2,4-DEP, 0.5 + 2.0 lb.	262	0	2	100	96	100	65	5	0
Benefin + 2,4-DEP, 0.5 + 3.0 lb.	278	7	9	96	----	97	60	2	0
Benefin + 2,4-DEP, 1.0 + 3.0 lb.	254	1	3	100	98	97	53	5	2
Check	319	215	361	0	0	0	0	0	0

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.

Incorporation of the herbicide increases its contact with the soil and aids its retention.

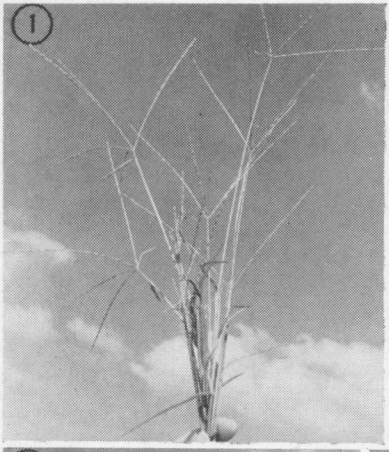
Benefin Combination

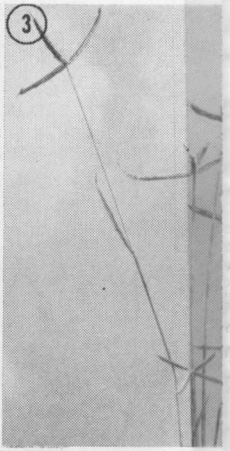
Under some conditions the use of two herbicides concurrently will give better weed control. An example is where nutsedge and Texas panicum are problem weeds in peanuts. In these areas, a combination of vernolate (having nutsedge activity) and benefin (having Texas panicum activity) probably would be advantageous. When weed species present are poorly controlled by the individual herbicides, however, using a combination of the herbicides probably will not improve weed control, Table 5.

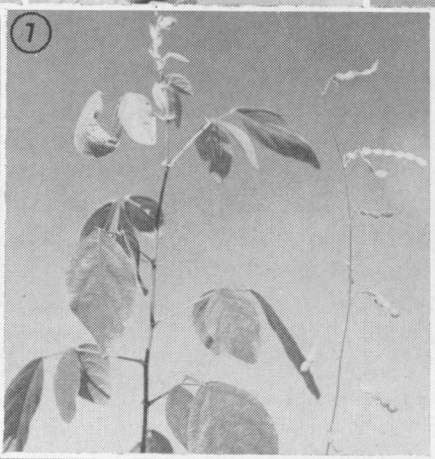
Dinoseb

Application of dinoseb at cracking time of peanuts has long been a standard weed control practice, but recommended rates of application have ranged from 1.5-4.5 pounds per acre. Dinoseb may act as a preemergence herbicide in some instances, killing seedling weeds as it is absorbed through the roots, and it may act as a contact herbicide and kill weeds after absorption through the foliage. This herbicide is excellent for use on newly emerged weeds, with rates as low as 1.5 pounds per acre giving excellent contact kill of small grass and broadleaf weeds in 1967 and 1968, Table 6. Dinoseb at rates above 3 pounds exhibits some preemergence activity against weeds that germinate after the herbicide is applied. Duration of this preemergence activity increases with increasing rates of application, as shown by the late season ratings for grass and broadleaf weed control, Table 6.

Weather conditions should be considered when choosing a rate of dinoseb. At temperatures less than 60°F the amine salts of dinoseb have little contact activity, but at 85°F or higher they are extremely toxic to plant foliage. High humidity, dew, or a light shower tend to increase plant absorption of dinoseb, increasing its phytotoxicity. Another factor that has great influence on effect of dinoseb is size of weeds at time of herbicide application. Weeds are most susceptible when they are just emerging. (Some seedling weeds, especially grasses, are very tiny at emergence. They are not noticeable during midday, but show up readily in the early morning after a heavy dew. If examination must be made at midday, detection can be improved merely by extremely close observation.)







1. Crabgra
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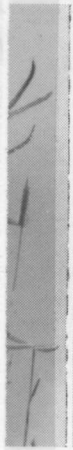
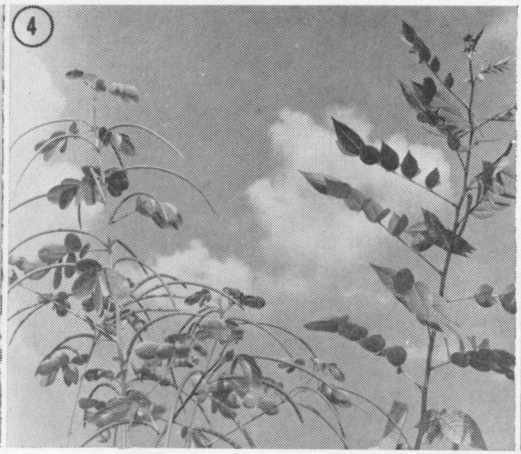
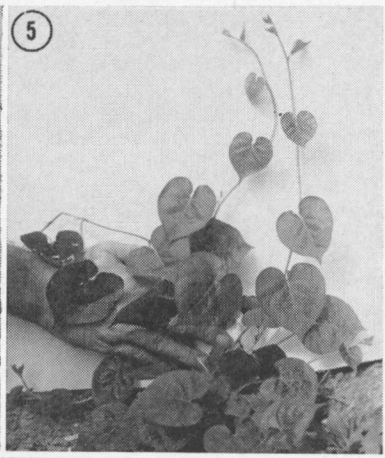
4. Sicklepo senna (
5. Tall mo
6. Smallflo glory
7. Florida
8. Texas p
9. Cockleb
10. Florida
11. Purple
12. Yellow
13. Pigweed







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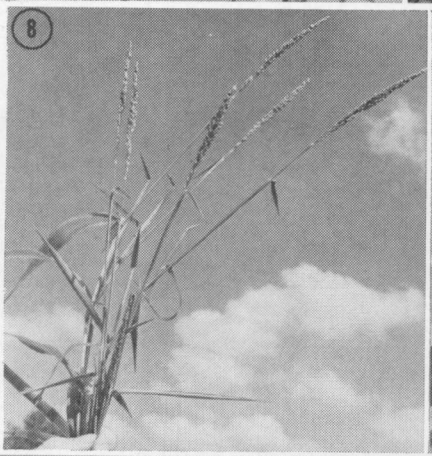


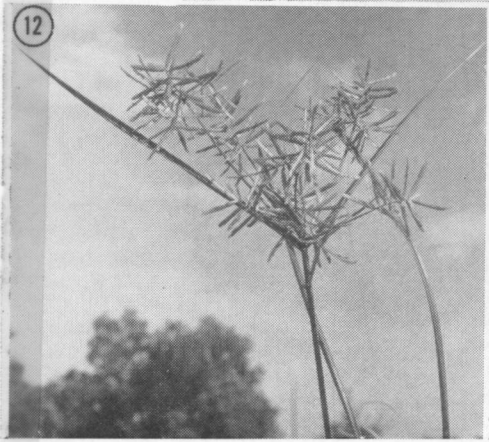


TABLE 6. INFLUENCE OF DINOSEB APPLIED AT CRACKING TIME AND POSTEMERGENCE ON WEED CONTROL, INJURY, AND YIELD OF PEANUTS

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
1967										
Dinoseb (cracking), 1.5 lb.	163	8	11	87	20	86	15	0	0	1,742
Dinoseb (cracking), 3.0 lb.	168	1	3	97	76	96	58	0	0	1,896
Dinoseb (cracking), 6.0 lb.	171	4	0	96	62	97	60	0	0	1,624
Dinoseb (cracking), 9.0 lb.	155	0	1	100	96	100	90	0	0	1,878
Dinoseb + dinoseb + dinoseb[5], 6.0 + 1.5 + 1.5 lb.	171	0	3	100	96	98	95	0	0	1,878
Check	162	25	378	0	0	0	0	0	0	1,385
1968										
Dinoseb (cracking), 1.0 lb.	199	1,174	457	83	0	80	0	0	0	1,894
Dinoseb (cracking), 2.0 lb.	195	1,540	671	85	0	87	0	0	0	2,167
Dinoseb (cracking), 3.0 lb.	163	2,900	59	81	0	86	17	5	0	1,622
Check	198	2,029	559	0	0	0	0	0	0	1,854
1969										
Dinoseb (cracking), 1.5 lb.	121	1,500	196	10	0	68	17	0	5	1,325
Dinoseb (cracking), 3.0 lb.	130	1,182	19	52	15	99	12	0	0	1,879
Dinoseb (cracking), 9.0 lb.	121	279	27	72	44	93	45	0	0	1,779
Check	105	1,068	970	0	0	0	0	0	0	1,520

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.
[5] Six pounds applied preemergence followed by 1.5 pounds at cracking and 1.5 pounds postemergence.

Another factor that may account for erratic results with dinoseb is the rainfall pattern. If weeds and grasses are sprayed when they are small with 2 pounds per acre or more, overall control will probably be excellent if the soil surface remains dry. On the other hand, abundant rainfall soon after application of a low rate encourages germination and establishment of another population of weeds following those killed by the first contact. The optimum time for application of dinoseb is after the most rapid emergence of weed seedlings and before their increased size and resistance.

Of all the herbicides used in peanuts, dinoseb is by far the most toxic. It is very toxic not only to plants but to livestock and humans. (The acute oral LD_{50} for rats is about 40 mg. per kg. of body weight.) Dinoseb can be safely applied if sound procedures are followed during application. Thorough washing of exposed body areas and changing clothing if one becomes contaminated will lessen the possibility of injury from dinoseb.

Diphenamid, 2,4-DEP, Naptalam, and Sesone

Diphenamid (Enide, Dymid), 2,4-DEP (Falone), sesone, and naptalam (Alanap) are often used in combination with dinoseb to give more preemergence control and extend the length of weed control. Diphenamid is available under the brand names of Enide and Dymid, and a 1966 comparison showed the two formulations to be equal in herbicidal activity when applied with dinoseb at cracking, Table 7. Diphenamid has good activity against annual grasses and some broadleaf weeds, such as carpetweed, pigweed, and Florida purslane. It will not control Florida beggarweed, cocklebur, or sicklepod. In general, rates greater than 2 pounds per acre have been required to give acceptable late season control. In 1968, per acre rates as high as 6 pounds dinoseb plus 8 pounds diphenamid did not cause injury to peanuts.

Falone (2,4-DEP) and sesone are phenoxy-type herbicides that have preemergence activity resulting from their transformation to 2,4-D in the soil after a period of microbiological activity. Soil moisture is often a critical factor in performance of these herbicides. Once converted to 2,4-D the herbicides are active against weeds, but they are also subject to leaching or further breakdown in the soil. This accounts for the relatively short period of weed control they provide. Falone and sesone have activity against both grass and broadleaf weeds, but because of

TABLE 7. COMPARISON OF FORMULATIONS AND RATES OF DIPHENAMID IN COMBINATION WITH DINOSEB FOR WEED CONTROL IN PEANUTS

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
1966										
Dinoseb + dymid, 1.5 + 2.0 lb.	105	11	17	85	98	92	35	0	0	2,142
Dinoseb + dymid, 3.0 + 4.0 lb.	97	9	4	94	96	96	70	0	0	2,024
Dinoseb + enide, 1.5 + 2.0 lb.	99	11	26	92	96	91	30	0	0	1,797
Dinoseb + enide, 3.0 + 4.0 lb.	101	3	4	95	96	95	75	0	0	2,161
Check	89	65	116	0	0	0	0	0	0	1,543
1967										
Dinoseb + enide, 1.5 + 2.0 lb.	154	13	11	85	36	81	25	0	0	1,206
Dinoseb + enide, 1.5 + 4.0 lb.	182	2	15	96	95	87	57	0	0	1,506
Dinoseb + enide, 3.0 + 2.0 lb.	159	2	20	100	90	81	56	0	0	1,315
Dinoseb + enide, 3.0 + 4.0 lb.	147	6	9	95	95	80	67	0	0	1,488
Check	162	25	379	0	0	0	0	0	0	1,089
Dinoseb + enide, 1.5 + 2.0 lb.	194	12	90	100	0	100	0	2	0	----
Dinoseb + enide, 3.0 + 4.0 lb.	189	5	25	100	70	100	42	3	0	2,050
Check	207	142	427	0	0	0	0	0	0	1,942
1968										
Dinoseb + enide, 1.5 + 2.0 lb.	118	130	74	45	----	50	----	0	--	----
Dinoseb + enide, 3.0 + 4.0 lb.	108	76	14	95	----	80	----	0	--	----
Dinoseb + enide, 4.5 + 6.0 lb.	156	10	9	100	----	100	----	0	0	----
Dinoseb + enide, 6.0 + 8.0 lb.	166	1	3	100	----	100	----	0	--	----
Check	184	947	134	0	----	0	----	0	--	----
1969										
Dinoseb + enide, 1.5 + 2.0 lb.	116	132	37	72	30	92	41	0	0	----
Dinoseb + enide, 3.0 + 4.0 lb.	129	169	18	76	29	97	32	7	2	----
Dinoseb + enide, 4.5 + 6.0 lb.	107	115	25	60	0	97	32	15	0	----
Check	105	1,068	970	0	0	0	0	0	0	----

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.

TABLE 8. COMPARISON OF 2,4-DEP AND SESONE IN COMBINATION WITH DINOSEB AT CRACKING TIME FOR WEED CONTROL IN PEANUTS

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
1966										
Dinoseb + 2,4-DEP, 1.5 + 3.0 lb.	95	25	5	76	33	93	53	0	0	1,416
Dinoseb + 2,4-DEP, 4.5 + 3.0 lb.	108	12	1	89	48	95	48	0	0	1,779
Check	88	64	116	0	0	0	0	0	0	1,543
1967										
Dinoseb + 2,4-DEP, 1.5 + 2.0 lb.	199	10	17	100	20	100	32	25	0	1,270
Dinoseb + 2,4-DEP, 1.5 + 3.0 lb.	186	5	9	100	30	100	43	40	0	1,896
Dinoseb + 2,4-DEP, 3.0 + 2.0 lb.	200	2	2	100	35	100	60	30	0	2,695
Dinoseb + 2,4-DEP, 3.0 + 3.0 lb.	180	0	2	100	72	100	83	40	0	1,506
Check	207	142	426	0	0	0	0	0	0	1,942
1968										
Dinoseb + sesone, 1.5 + 3.0 lb.	100	13	3	87	40	95	45	0	0	1,861
Dinoseb + sesone, 4.5 + 3.0 lb.	106	11	3	87	58	96	66	0	0	1,761
Check	88	64	116	0	0	0	0	0	0	1,543
1969										
Dinoseb + 2,4-DEP, 1.5 + 2.0 lb.	126	150	18	82	59	99	42	0	0	1,875
Dinoseb + 2,4-DEP, 1.5 + 3.0 lb.	100	109	54	54	27	92	40	30	5	1,752
Check	105	1,068	970	0	0	0	0	0	0	1,520
Dinoseb + sesone, 1.5 + 2.0 lb.	----	----	----	----	40	----	0	0	--	--------
Dinoseb + sesone, 3.0 + 4.0 lb.	----	----	----	----	40	----	0	0	--	--------
Dinoseb + sesone, 4.5 + 6.0 lb.	----	----	----	----	40	----	0	0	--	--------
Check	----	----	----	----	0	----	0	0	--	--------

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.

short residual only the highest rate of dinoseb plus 2,4-DEP showed appreciable control late in the 1966 and 1967 seasons, Table 8.

Naptalam has in some experiments extended the length of weed control when applied with dinoseb.

Although these herbicides (diphenamid, 2,4-DEP, naptalam, and sesone) are usually applied in combination with dinoseb, there are some conditions where application of one of these alone might be used. Under dry conditions where there are no weed seedlings present, the producer wanting to use the residual herbicide can apply it without the dinoseb. However, with these current residual herbicides, if moisture is limited to the point of inhibiting weed germination, then in all probability there would be too little moisture for best results with sesone, 2,4-DEP, naptalam, or diphenamid.

Nitralin

In 1968, season-long grass control was obtained with nitralin applied at rates as low as 0.25 pound per acre, Table 9. However, in the same year broadleaf weed control was poor with rates as high as 1 pound. A 1.5 or 3.0 pound per acre rate of dinoseb applied at cracking time over 1 pound of nitralin preplant considerably improved late season control of broadleaf weeds. In 1967, nitralin gave only fair grass control at the lower rates, but 1 pound per acre gave good grass control throughout the growing season. A cracking-time application of dinoseb did not improve the final grass or broadleaf weed control rating.

Alachlor

Alachlor (Lasso) has given acceptable control of such annual grasses as crabgrass, goosegrass, and crowfootgrass, Table 10. Grass control was essentially complete for the entire 1967 season at rates as low as 1 pound per acre. In 1968, however, plots receiving up to 2 pounds per acre were grassy, and only fair season-long control was obtained with as much as 4 pounds. Alachlor failed to control broadleaf weeds such as tall morningglory, sicklepod, and Florida beggarweed at rates that were adequate for grass control. Effective against Florida purslane and pigweed, alachlor provides some control during the early part of the season of resistant weeds such as Florida beggarweed.

Experiments in 1969 substantiated those of 1967 and 1968. Grass control was acceptable at all rates, and there was consider-

TABLE 9. INFLUENCE OF NITRALIN AND VARIOUS COMBINATIONS OF NITRALIN + DINOSEB ON WEED CONTROL, INJURY, AND YIELD OF PEANUTS

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
1967										
Nitralin (PPI), 0.25 lb.	193	44	81	81	37	82	17	0	0	2,323
Nitralin (PPI), 0.37 lb.	180	37	63	74	40	71	15	0	0	1,815
Nitralin (PPI), 0.50 lb.	178	20	60	92	70	83	52	0	0	1,787
Nitralin (PPI), 0.75 lb.	191	17	36	92	72	83	30	0	0	2,123
Nitralin (PPI), 1.00 lb.	190	5	15	96	97	93	75	0	0	2,686
Nitralin (PPI) + dinoseb (CR), 0.5 + 1.5 lb.	183	31	64	86	4,790	91	53	17	0	2,314
Nitralin (PPI) + dinoseb (CR), 0.5 + 3.0 lb.	187	23	15	88	62	88	68	27	0	2,141
Check	199	166	342	0	0	0	0	0	0	1,801
1968										
Nitralin (PPI), 0.25 lb.	130	13	64	97	90	100	10	0	0	2,159
Nitralin (PPI), 0.50 lb.	140	4	71	97	98	97	26	0	0	2,032
Nitralin (PPI), 0.75 lb.	118	1	18	98	95	100	52	0	0	1,422
Nitralin (PPI), 1.00 lb.	120	1	46	99	97	100	30	0	0	2,268
Nitralin (PPI) + dinoseb (CR), 1.0 + 1.50 lb.	113	0	24	100	98	100	70	22	0	2,105
Nitralin (PPI) + dinoseb (CR), 1.0 + 3.00 lb.	129	2	20	100	98	100	72	0	0	2,221
Check	131	1,819	358	0	0	0	0	0	0	1,871
1969										
Nitralin, 0.25 lb.	123	5	11	99	95	97	86	0	2	----
Nitralin, 0.50 lb.	112	3	14	99	95	97	74	7	0	----
Nitralin, 0.75 lb.	91	20	42	99	93	96	74	15	10	----
Nitralin, 1.00 lb.	79	13	6	99	96	99	92	15	7	----
Nitralin, 2.00 lb.	97	7	13	99	99	99	90	30	7	----
Check	109	279	704	12	0	12	0	0	0	

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.

TABLE 10. INFLUENCE OF ALACHLOR ON WEED CONTROL, INJURY, AND YIELD OF PEANUTS

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
1967										
Alachlor(pre), 1.0 lb.	183	0	29	100	100	56	27	0	0	1,497
Alachlor(pre), 1.5 lb.	180	0	30	100	98	66	52	0	0	1,325
Alachlor(pre), 2.0 lb.	166	0	21	100	100	75	62	0	0	1,606
Alachlor(pre), 3.0 lb.	161	0	7	100	100	88	71	0	0	1,606
Alachlor(pre), 4.0 lb.	166	1	8	100	98	96	81	2	0	1,569
Check	187	41	384	0	0	0	0	0	0	1,436
1968										
Alachlor, 1.0 lb.	187	474	218	100	20	95	0	0	0	1,767
Alachlor, 1.5 lb.	164	582	172	100	0	97	0	0	0	1,713
Alachlor, 2.0 lb.	214	588	68	100	0	100	0	0	0	1,695
Alachlor, 3.0 lb.	173	17	30	100	20	100	0	0	0	1,851
Alachlor, 4.0 lb.	148	1	38	100	76	100	10	0	0	1,996
Check	161	2,658	691	0	0	0	0	0	0	1,871
1969										
Alachlor(pre), 2.0 lb.	107	42	208	73	69	73	52	0	0	----
Alachlor(pre), 3.0 lb.	119	5	9	96	95	97	85	0	0	----
Alachlor(pre), 4.0 lb.	121	12	6	91	99	97	92	0	0	----
Check	109	279	704	12	0	12	0	0	0	----
1969										
Alachlor[5], 2.0 lb.	74	22	39	91	86	91	45	2	0	----
Alachlor, 3.0 lb.	93	65	59	96	91	98	65	2	0	----
Alachlor, 4.0 lb.	62	22	37	95	92	95	52	25	0	----
Check	109	279	704	12	0	12	0	0	0	----

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.
[5] Applied preplant and incorporated with a disk harrow.

able broadleaf control. The broadleaf weeds in the 1969 experimental area were predominantly the susceptible ones, Florida purslane, and pigweed.

Comparison of preemergence with preplant incorporated applications of alachlor in 1969 indicated either no effect or slight reductions in control with incorporation. Similar control of annual grasses was obtained with 3 and 4 pounds per acre of alachlor. Two pounds per acre applied preemergence appeared slightly less effective than the same amount applied preplant. Late season broadleaf control with the preplant applications was inferior to that obtained with preemergence applications. In experiments involving other crops, preplant applications of alachlor have been slightly less effective than preemergence applications.

Although stands of Texas panicum were not uniform in the experimental areas, available evidence indicates somewhat less than commercial control of this annual grass.

Combinations of alachlor and dinoseb applied at cracking time have also looked promising, Table 11. Excellent season-long control of grasses and broadleaf weeds was obtained with this combination of herbicides at rates of 3 pounds each per acre.

DCPA

DCPA is a relatively old herbicide and has been widely used in cotton, gardens, and lawns. Evaluations made in 1967 and 1969 indicate that peanuts have considerable tolerance to DCPA, Table 12. Early season control of annual grasses have been acceptable with rates as low as 4 pounds per acre, but 8 pounds were required for late season grass control. DCPA has poor activity against many of the most troublesome broadleaf weeds in peanuts.

SUMMARY

Although herbicides are used on over 80 per cent of the peanut acreage in Alabama, many weed control problems remain to be solved. The preplant incorporated herbicides benefin and vernolate are excellent grass herbicides. Vernolate is weak on Texas panicum. Nutsedge is not controlled at all with benefin or nitralin, but they control most of the annual grasses.

Herbicides such as diphenamid, naptalam, 2,4-DEP, or sesone, applied either preemergence, postemergence, or cracking time,

TABLE 11. COMPARISON OF COMBINATIONS OF ALACHLOR AND DINOSEB AT CRACKING TIME FOR WEED CONTROL IN PEANUTS, 1969

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
Alachlor + dinoseb, 1.5 + 1.5 lb.	118	96	31	93	62	98	71	15	2	1,597
Alachlor + dinoseb, 2.0 + 2.0 lb.	116	63	25	90	72	92	61	0	2	1,551
Alachlor + dinoseb, 3.0 + 3.0 lb.	124	48	14	97	92	97	96	0	0	2,478
Check	105	1,068	970	0	0	0	0	0	0	1,520

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.

TABLE 12. RATES OF DCPA FOR PREEMERGENCE WEED CONTROL IN PEANUTS

Herbicide, rate/acre	Stand count[1]			Weed control and injury ratings						Yield, pounds[4]
	Peanuts	Weeds		Grasses[2]		Broadleaf weeds[2]		Crop injury[3]		
		Grass	Broadleaf	Early	Late	Early	Late	Early	Late	
1967										
DCPA, 4.0 lb.	210	6	260	100	60	52	21	0	0	1,751
DCPA, 8.0 lb.	180	1	130	100	95	79	37	0	0	1,615
Check	207	142	533	0	0	0	0	0	0	1,630
1969										
DCPA, 4.0 lb.	113	26	143	81	77	96	22	2	0	1,606
DCPA, 6.0 lb.	111	24	453	94	96	92	34	0	0	1,425
DCPA, 8.0 lb.	110	10	187	97	96	94	54	0	0	1,643
DCPA, 12.0 lb.	131	2	63	96	92	96	89	0	0	1,525
Check	106	133	194	0	0	0	0	0	0	1,597

[1] Number of plants per 80 feet of row on 12-inch band.
[2] 0 = no control; 100 = complete control.
[3] 0 = no injury; 100 = complete kill.
[4] Pod weight of unshelled peanuts per acre.

are used with mixed levels of success. Results are often excellent, especially if moisture conditions are favorable. Under dry conditions weed control with these compounds leaves a great deal to be desired.

Dinoseb is still considered a standard herbicide for weed control in peanuts. It is economical and effective if applied at the proper rate and weeds and peanuts are at the right stage of growth. Its weakness is that results are often short lived. Application in hot weather causes foliage burn, although this usually does not reduce yield. Experimental herbicides such as alachlor offer some promise of more consistent weed control when applied preemergence or at cracking time with dinoseb.

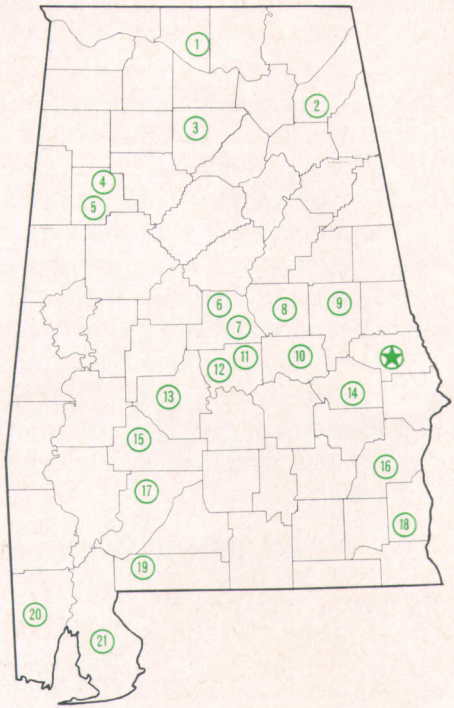
The major weed problem remaining is the control of large-seeded broadleaf weeds, such as morningglory, sicklepod, cocklebur, and Florida beggarweed. At present there are no herbicides being evaluated which offer a panacea to the peanut growers' weed problem.

LIST OF HERBICIDES MENTIONED

Common name	*Trade name*	*Chemical name*
Alachlor	Lasso	2′-chloro-2,6-diethyl-*N*-methoxy= methylacetanilide
Benefin	Balan	*N*-butyl-*N*-ethyl-*a,a,a,*-trifluoro-2,6-di= nitro-*p*-toluidine
DCPA	Dacthal	dimethyl tetrachloroterephthalate
Dinoseb	Dow Premerge or Sinox PE	2-*sec*-butyl-4,6-dinitrophenol
Diphenamid	Enide or Dymid	*N,N*-dimethyl-2,2-diphenylacetamide
Naptalam	Alanap	*N*-1-naphthylphthalamic acid
Nitralin	Planavin	4-(methylsulfonyl)-2,6-dinitro-*N,N*-dipropylanaline
Sesone	Sesone	2-(2,4-dichlorophenoxy) ethyl sodium sulfate
Vernolate	Vernam	*S*-propyl dipropylthiocarbamate
2,4-DEP	Falone	tris [2-(2,4-dichlorophenoxy)ethyl] phosphite

AGRICULTURAL EXPERIMENT STATION SYSTEM OF ALABAMA'S LAND-GRANT UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Thorsby Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. Tuskegee Experiment Field, Tuskegee.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Ornamental Horticulture Field Station, Spring Hill.
21. Gulf Coast Substation, Fairhope.