PEANUT SCIENCE

Volume 3 | Fall 1976 | Number 2

Interactions Among Peanut Cultivars, Herbicide Sequences, and A Systemic Insecticide[1]

E. W. Hauser, G. A. Buchanan, W. J. Ethredge, M. D. Jellum, and S. R. Cecil[2]

ABSTRACT

Soil type and weather conditions influenced interactions among peanut cultivars (Florunner, GK 3, and Tifspan), herbicide sequences, and a systemic insecticide (disulfoton). Disulfoton interacted more frequently with cultivars than did herbicides. More interactions occurred in 1974 than in 1973. When peanut yields from the eight studies (on four soil series) were averaged, disulfoton significantly increased peanut yields, especially on Greenville sandy clay loam. On all soil types, except Dothan sandy loam, an insecticide x cultivar interaction occurred at least once accompanied by consistent and significant increases in the yield of Florunner treated with disulfoton. Disulfoton increased yields of Tifspan twice but did not change significantly the yields of GK 3. When compared to a hand-weeded check, herbicides did not decrease average yields significantly unless the sequence terminated with multiple postemergence treatments. Herbicides interacted with cultivars in two of eight experiments, once on Greenville sandy clay loam and once on Tifton sandy loam. In general, GK 3 reacted more to herbicide sequences than did Florunner. Least affected by herbicides was the cultivar Tifspan. An herbicide x insecticide interaction occurred only once (on Dothan sandy loam) when disulfoton increased yields with either the no herbicide treatment or when benefin-vernolate was applied. In general, genetic and environmental factors influenced organoleptic quality and the fatty acid composition of peanut oil much more than did the herbicide or insecticide treatments.

Additional keywords: **Arachis hypogaea,** benefin, 2,4-DB, dinoseb, naptalam, pesticide interactions, vernolate.

During recent years, the intensity of herbicide usage on peanuts (*Arachis hypogaea* L.) has greatly increased. Introduction of new peanut cultivars and the attainment of higher yields accompanied the increase in herbicide use. Many researchers and extension specialists are concerned about genetic vulnerability of crops to intensified pesticide treatments. However, previous research with oilseed crops has been limited, has included only one cultivar, or has uncovered no significant interactions. Typical of this research is the work of Ivy and Pfrimmer (7) who found no herbicide-insecticide interaction on cotton seedling survival and yield. Likewise, Johnson (8) found with soybeans that neither chloramben (3-amino-2,5-dichlorobenzoic acid) alone nor in combination with either disulfoton (O,O-diethyl-S-[2-(ethylthio)ethyl] phosphorodiathioate or methomyl (S - methyl - N - ((methylcarbamoyl) oxy) thioacetimidate) significantly influenced several parameters including yield. In 1971, Cargill and Santelmann (1) detected no significant interactions between chloramben or vernolate applied with other pesticides on peanuts.

Genetic and environmental factors are important in determining fatty acid composition of peanut oil (5, 6, 9, 10). Worthington and Smith (11, 12) reported small, but significant, changes in oil composition due to various fungicide and growth-regulator treatments. Little information is available concerning the possible influence of herbicides or insecticides on fatty acid composition of peanut oil.

We hypothesized that differences in genetic vulnerability exist among peanut cultivars in respect to (a) herbicide sequences, (b) insecticide response, and (c) herbicide-insecticide combinations. To test our hypothesis, we conducted research on three cultivars grown on four different soil types in Alabama and Georgia. Preliminary results were reported in abstract form[3].

Materials and Methods

Eight experiments were conducted in 1973 and 1974 on Dothan sandy loam (Headland, AL), on Greenville sandy clay loam (Plains, GA), and on Ocilla sandy loam and Tifton sandy loam (Tifton, GA). The peanut cultivars were Florunner, GK 3, and Tifspan which represented the Runner, Virginia, and Spanish types, respectively. Seed from common lots were used for all experiments. Seed of Florunner and GK 3 were supplied by Goldkist, Inc., Ashburn, GA. Tifspan seed was furnished by the Southwest Branch Station, Plains, GA[4]. The peanuts were planted about 7 cm deep. Although dates varied among locations, all plantings were made during the traditional planting season from April 5 to May 25 with the execption of the June 5, 1974 planting date on Tifton sandy loam.

The experimental design (identical at all locations) was a split, split plot with four replicates. Either two- or four-row plots were used. Cultivars were whole plots and herbicide sequences were split plots. A description of herbicide sequences follows: Treatment 1 was vernolate (S-

[1]Received for publication______. Cooperative investigations of the Agr. Res. Serv., U. S. Dep. of Agr., and the Agric. Expt. Stations of Alabama and Georgia.

[2]Respectively, Supv. Res. Agron., Agr. Res. Serv., U. S. Dep. of Agr., Coastal Plain Station, Tifton, GA 31794; Alumni Professor, Auburn University, Auburn, AL 36830, former Ass't. Supt., Southwest Branch Station, Plains, GA 31780; and Professors, Georgia Station, Experiment, GA 30212.

[3]Hauser, Ellis W. and Gale A. Buchanan. 1974. Progress report: Interaction of an insecticide, herbicides and peanut varieties. Proc. So. Weed Sci. Soc. 27:136.

propyl dipropylthiocarbamate) at 2.80 kg/ha applied as a preplant incorporated treatment; Treatment 2 was vernolate + benefin (N-butyl-N-ethyl-α,α,α - trifluoro - 2,6 - dinitro-p-toluidine) at 1.68 kg/ha applied as a preplant incorporated treatment; Treatment 3 was vernolate + benefin followed by a mixture of naptalam (N-1-naphthylphthalamic acid) at 3.36 kg/ha plus dinoseb (2-sec-butyl-4,6-dinitrophenol) at 1.68 kg/ha applied at the "cracking" stage; Treatment 4 was vernolate + benefin, naptalam + dinoseb followed by dinoseb at 0.63 kg/ha applied as repeated postemergence treatments begun 2 weeks after "cracking" and continued for 4 weeks at weekly intervals; Treatment 5 was vernolate + benefin, naptalam + dinoseb, repeated dinoseb, then 2,4-DB (4- (2,4-dichlorophenoxy) butyric acid) at 0.45 kg/ha applied about 2 weeks after the dinoseb treatments were terminated. Peanuts in the "no herbicide" check treatment were cultivated and hand-weeded as needed to eliminate competition from weeds. Plots treated with heribcides were cultivated at the same time as the checks and were also hand-weeded when needed. Split, split plots were disulfoton at 1.12 kg/ha versus none. Disulfoton, as a 10% granular, was applied in the drill with the peanut seed. Other production practices followed the recommendations of the Cooperative Extension Service.

Each cultivar was harvested separately at maturity. The peanuts were dug with a commercial digger-shaker, windrowed, and combined within five days. Yield data were subjected to analyses of variance and to Duncan's multiple range test using comparisons at the 1 and 5% probability levels.

Fatty acid composition of the oil was determined for peanuts from three locations (all except Headland, AL). Based on 1973 analytical results, in 1974 the insecticide versus no insecticide treatments were combined; all herbicide treated peanuts were combined and compared to the check treatment; but cultivars and locations were kept separate as in 1973. After pressing the oil from the various samples, methyl esters of the fatty acids were obtained by the methanol-sulfuric acid procedure and measured with standard gas-liquid chromatographic procedures on a Varian Model 1200-2[4] gas chromatograph and an Infotronics Model CRS-208[4] automatic digital integrator. Methyl esters were separated on a 1.80 m by 3.18 mm stainless steel column packed with 10% EGSS-X on 100/120 mesh Gas-Chrom Q (preconditioned packing from Applied Science Laboratories, Inc.)[4].

General procedures for processing and grading of peanut samples for organoleptic testing were the same as previously described (2, 3). The samples analyzed from each cultivar (from Tifton soil only) were: (a) Treatment 5 + disulfoton; (b) Treatment 5, no disulfoton; (c) check, no herbicide, disulfoton; (d) check, no herbicide and no disulfoton. Previous Duo-Trio and Paired Comparison Tests of treatments vs control samples were replaced by 10-judge scoring of two reps of salted peanuts from each treatment of each cultivar on a 9 to 1 quality scale for appearance-color, aroma, texture and flavor.

Rainfall at Headland. In 1973 almost 5 cm of rain fell within two weeks after planting; whereas, less than 0.1 cm was recorded for the comparable period in 1974. In 1973, during May, June, July, and August, 26.4, 8.9, 10.2, and 8.9 cm, respectively, of rain fell. Total rainfall for the comparable period in 1974 was similar, with particularly heavy rainfall in July and August.

Rainfall at Plains. In 1973, 20.5 cm of rain fell in April with 14.3 cm during the last week. Peanuts were planted on April 15. Monthly rainfall for May, June and July was 16.3, 12.9 and 9.6 cm, respectively. Rainfall was supplemented by irrigation of 2.5 cm on May 21. The August rainfall (10.2 cm) was supplemented with 3.8 cm of irrigation on August 28. In 1974, we planted peanuts on April 18 after 4.60 cm of rain during the first half of April. No further rain fell in April, so we irrigated on April 26 with 1.9 cm. In May, June, July and August, respectively, 7.9, 9.5, 12.8 and 10.3 cm of well distributed rain fell.

Rainfall at Tifton. In 1973, rainfall was excessive during the month of April (totalling 25.4 cm) with 11.1 cm during the last week. Peanuts were planted on May 4 (Tifton sandy loam) and on May 22 (Ocilla sandy loam). Near normal rainfall occurred during May, June, and July with monthly totals of 8.2, 11.5, and 14.0 cm, respectively. August and September were dry with a total of only 8.4 cm of rainfall for the two months. Only 1.4 cm of rain fell from April 10 to May 11, 1974, followed by 5.5 cm on May 12. On May 16, we planted peanuts on Ocilla sandy loam. Total rainfall for May was slightly below normal. Rainfall was high in June and July with totals of 15.2 and 15.4 cm, respectively. Peanuts were planted June 5 on Tifton sandy loam. August rainfall averaged near normal, but September was wet with a total of 17.3 cm.

Results and Discussion

Yield of peanut cultivars. The averages for the two-year period showed that Florunner and GK 3 were similar in yield and higher than Tifspan (Table 1). However, some exceptions to the average trend occurred within locations. For example, GK 3 consistently outyielded the other two cultivars on the Dothan soil. On the other soil types, Florunner yielded highest in three of five experiments, with GK 3 highest in the other two studies.

Effects of herbicides on yields. The mean yields in Table 1 (averaged over cultivars) for 1973 show that highest yields on the Dothan soil followed either no herbicide treatment or the mixture of vernolate-benefin (Treatment 2). In 1974, the only significant yield reductions seemed associated with repeated applications of dinoseb (Treatments 4 and 5).

In 1973, on the Greenville soil, vernolate-benefin (Treatment 2) produced significantly higher yields than the herbicide sequences which included repeated applications of dinoseb. Other treatments produced intermediate yields. Herbicides did not significantly affect yields on Greenville soil in 1974.

On the Ocilla soil in 1973, significantly lower yields resulted from herbicide sequences which included repeated dinoseb treatments (Treatments 4 and 5). No significant yield differences occurred among herbicide treatments on the Ocilla soil in 1974.

Average yields were highest with no herbicides (Treatment 6) on the Tifton soil in 1973 (Table 1). With vernolate (Treatment 1) yields were almost as much as the check but with all other herbicide treatments yields decreased significantly. Lowest yields followed one of the most intensive herbicide sequences (Treatment 4). In 1974, no herbicides (Treatment 6) and vernolate-benefin (Treatment 2) produced highest yields. Average yields were lowest for the two most intensive herbicide sequences.

In summary, herbicides changed yields significantly in six of the eight experiments. Usually, yield depressions were associated with the two most intensive herbicide sequences. However, in one study, vernolate alone significantly depressed yields.

[4]Mention of a trade name is for identification only and does not constitute a guarantee or warranty of the product and does not imply its approval to the exclusion of other products that may be suitable.

Table 1. Summary of peanut yields (kg/ha) from pesticide interaction studies on four soil types in Alabama and Georgia, 1973-74[a].

Source of variation	1973 Dothan	1973 Greenville	1973 Ocilla	1973 Tifton	1974 Dothan	1974 Greenville	1974 Ocilla	1974 Tifton	Average
Cultivar	Cultivars averaged over herbicide and insecticide treatments								
Florunner	3052 b	4585 a	5942 a	4811 b	4482 b	2867 b	5349 a	4734 a	4478 a
GK 3	3648 a	4085 b	6119 a	5562 a	5149 a	3617 a	4338 b	4208 b	4591 a
Tifspan	2406 c	3754 b	5167 b	4141 c	2542 c	2867 b	3284 c	3144 c	3413 b
Herbicide Treatment	Herbicides averaged over cultivar and insecticide treatments								
1	2851 c	4141 ab	5917 a	5045 ab	4383 a	2988 NS	4269 NS	4143 ab	4217 a
2	3275 a	4254 a	5885 ab	4650 cd	4293 a	3222	4342	4237 a	4270 a
3	2896 bc	4165 ab	5667 ab	4892 bc	4360 a	3185	4479	3975 b	4202 a
4	3071 ab	4020 b	5554 b	4400 d	3703 b	3183	4254	3692 d	3984 b
5	2870 bc	4085 b	5546 b	4731 bcd	3595 b	3148	4126	3765 cd	3983 b
None	3243 a	4174 ab	5885 ab	5320 a	4110 a	3107	4469	4358 a	4333 a
Insecticide	Insecticide averaged over cultivar and herbicide treatments								
Disulfoton	3040 a	4166 a	5675 a	4908 a	4109 a	3263 a	4342 a	4052 a	4194 a
None	3030 a	4117 a	5812 a	4771 b	4027 a	3015 b	4308 a	4003 a	4135 b

a/ Any two means in a group (cultivar, herbicide, or insecticide) within the same column not followed by the same letter are significantly different at the 5% level. NS means no significance.

Table 2. Interaction in yields (kg/ha of in-shell peanuts) between herbicide treatments and peanut cultivars on two soil types, 1974[a].

Herbicide treatment	1974 Florunner	1974 GK 3	1974 Tifspan
	Greenville sandy clay loam		
1	2656 de	3519 b	2785 cde
2	2958 cd	3560 ab	3148 c
3	3007 cd	3592 ab	2955 cd
4	3124 c	3519 b	2906 cd
5	2995 cd	3629 ab	2830 cd
None	2462 e	3887 a	2971 d
	Tifton sandy loam		
1	4854 abc	4277 de	3297 hi
2	5060 a	4564 bcde	3087 i
3	4669 abcd	4194 ef	3111 hi
4	4374 de	3519 gh	3184 hi
5	4439 cde	3846 fg	3010 i
None	5004 a	4899 ab	3172 hi

a/ Any two means in a soil type not followed by the same letter are significantly different at the 5% level.

Effect of disulfoton on yield. On the average, disulfoton-treated peanuts yielded significantly higher than the non-treated (Table 1). The difference of 59 kg/ha, although probably of limited economic significance, indicates that use of a systemic insecticide can produce statistically significant yield differences. The greatest difference due to disulfoton occurred on the Tifton soil in 1973 and on the Greenville soil in 1974. In previous studies, another organophosphate material (with insecticidal properties) substantially increased the pod yield of peanuts (4).

Interactions among herbicides and peanut cultivars. No significant herbicide x cultivar interactions occurred in 1973. Significant interactions among herbicides and cultivars occurred on the Greenville and Tifton soils in 1974 (Table 2). In neither case did herbicide treatment significantly modify the yield pattern of Tifspan peanuts; however, herbicides changed yields of the Florunner and GK 3 cultivars. On the Greenville soil in 1974, the lowest yield of Florunner followed no herbicide treatment (Table 2). All herbicide treatments, except vernolate alone (Treatment 1), significantly increased the yield of Florunner peanuts. Highest yield resulted from a herbicide sequence terminated with repeated dinoseb treatments (Treatment 4). In contrast to Florunner, GK 3 yield with no herbicides was highest with a concurrent slight to moderate reduction in yield from all herbicide treatments.

At the Tifton location in 1974, herbicides did not significantly affect Tifspan while the yields

Table 3. Interactions in yields (kg/ha of in-shell peanuts) between insecticide treatment and peanut cultivars in four soil types, 1972-74[a].

Insecticide treatment	1973 Flo-runner	1973 GK 3	1973 Tifspan	1974 Flo-runner	1974 GK 3	1974 Tifspan	1973 Flo-runner	1973 GK 3	1973 Tifspan	1974 Flo-runner	1974 GK 3	1974 Tifspan
	Dothan sandy loam						Greenville sandy clay loam					
Disulfoton	3042a	3643a	2434a	4568a	5147a	2570a	4610a	4074a	3814a	3046b	3634a	3110b
None	3061a	3650a	2377a	4397a	5144a	2506a	4549a	4101a	3692a	2687c	3599a	2757c
	Ocilla sandy loam						Tifton sandy loam					
Disulfoton	5925a	6058a	5033a	5525a	4269c	5525a	4981b	5643a	4101d	4839a	4170c	3156d
None	5964a	6173a	5297a	5174b	4407c	5174b	4650c	5481a	4190d	4628b	4246c	3136d

a/ Duncan's multiple range comparisons may be used to compare values only in columns occurring within a given year and soil type. Any two means within a set of data not followed by the same letter are significantly different.

Table 4. Average number of thrip damaged leaflets following disulfoton treatment on three peanut cultivars grown on two soil types, 1973.

Insecticide treatment	Flo-runner leaflets	Reduction in damage	GK 3 leaflets	Reduction in damage	Tifspan leaflets	Reduction in damage
	Greenville sandy clay loam					
	No.	%	No.	%	No.	%
Disulfoton	23	37	29	22	22	29
None	36	--	37	--	31	--
	Tifton loamy sand					
Disulfoton	15	60	22	42	10	69
None	36	--	38	--	32	--
Average reduction in damage for cultivar		48		25		49

Table 5. Interactions in yields (kg/ha) of in-shell peanuts between insecticide treatment and herbicide sequences on Dothan sandy loam, 1974[a].

Herbicide treatment	Insecticide treatment: disulfoton	Insecticide treatment: no disulfoton
1	4289 ab	4476 a
2	4520 a	4068 bc
3	4427 a	4293 ab
4	3729 de	3677 de
5	3464 e	3725 de
None	4258 ab	3962 cd

a/ Any two means not followed by the same letter are significantly different at the 5% level.

Table 6. Statistical summary of in-shell peanut yields from pesticide interaction experiments on four soil types, Alabama and Georgia, 1973-74.

Variable or interaction	Headland: Dothan sandy loam 1973	Headland: Dothan sandy loam 1974	Tifton: Tifton sandy loam 1973	Tifton: Tifton sandy loam 1974	Tifton: Ocilla sandy loam 1973	Tifton: Ocilla sandy loam 1974	Plains: Greenville sandy clay loam 1973	Plains: Greenville sandy clay loam 1974
Cultivar	323.37**	540.16**	37.07**	48.28**	18.91**	78.59**	12.77*	12.68**
Error (a)	12.03	4.09	1.76	1.63	0.45	5.58	1.17	0.62
Herbicides	15.34**	18.15**	3.82**	2.58**	1.10*	0.68	0.24*	0.26
Cultivar x herbicides	3.72	0.04	0.69	0.78**	0.38	0.30	0.14	0.48**
Error (b)	2.10	1.33	0.46	0.22	0.44	0.39	0.09	0.16
Insecticide vs. no insecticide	0.05	1.50	1.00*	0.14	1.08	0.06	0.16	3.43**
Cultivar x insecticide	0.36	0.66	0.81*	0.40*	0.24	1.39**	0.10	0.63**
Herbicide x insecticide	2.12	2.93**	0.41	0.17	0.42	0.07	0.05	0.10
Cultivar x Herb. x insect.	1.29	0.57	0.23	0.17	0.32	0.09	0.09	0.17
Error (c)	1.85	0.77	0.20	0.12	0.32	0.14	0.08	0.11

*, ** is significance at the 5 and 1% levels, respectively.

of Florunner and GK 3 were changed (Table 2). With Florunner, no herbicides or vernolate-benefin (Treatment 2) produced highest yields. Lowest yields were associated with the most intensive herbicide sequences. With the GK 3 cultivar, all herbicide treatments, except vernolate-benefin, significantly reduced yields below those of the untreated check.

In the other six studies, no significant herbicide x cultivar interactions occurred.

Interactions between the disulfoton and peanut cultivars. In four of the eight studies, the insecticide disulfoton significantly modified yield responses of the peanut cultivars (Table 3). The cultivar, GK 3, remained unaffected. Significant increases in yield for Florunner occurred in 1973 on Tifton soil and in 1974 on the Greenville, Ocilla and Tifton soils. Tifspan yields were increased in two studies by insecticide treatment. No significant increases in yield from disulfoton occurred on Dothan soil; therefore, soil type may influence the effects of disulfoton on different peanut cultivars.

The increased average yields due to disulfoton were probably caused by direct effects of disulfoton on the peanut plant since limited thrip counts (Table 4) were not well correlated with pod yield (Table 3).

Herbicide by disulfoton interactions. On Dothan soil, in 1974, a significant herbicide x insecticide interaction occurred (Table 5). Disulfoton increased yields with either the no-herbicide treatment or where benefin-vernolate was applied. Comparisons in the other seven studies were not significantly different.

Statistical summaries. The mean squares and statistical significance are listed by years and soil types in Table 6 and for combined analyses in Table 7.

As expected, the mean squares for cultivars (by locations and years) were quite high (Table 6). Mean squares and F values for herbicides were much higher on Dothan and Tifton soils than on the Greenville and Ocilla soils. The highest mean square and F values for insecticide were on the Greenville soil in 1974. On the Dothan soil, the mean squares and F values for cultivar x insecticide were very low as compared with the other soil types where this interaction was significant for four of the six studies. Conversely, the herbicide x insecticide interaction was significant only on the Dothan soil. Surprisingly, the combined analyses show little effect of year on herbicides (Table 7). However, the location x herbicide and the cultivar x herbicide interactions were highly significant. As stated previously, the overall difference due to disulfoton may be of limited economic practicality; however, the mean square was highly significant with an F value over seven. All two-way interactions involving disulfoton were significant except herbicide x disulfoton (Table 7).

Fatty acid composition of oil. Differences in fatty acid composition of peanut oil were observed for locations (soil types) and for cultivars in 1973 and 1974 (Table 8). Disulfoton had no effect on oil composition and herbicide treatments had only a slight effect on oleic and linoleic acids in 1973. In 1974, peanuts from herbicide-treated plots did not differ in oil composition from the check plots (Table 8). Fatty acid composition of oil from the cultivars was similar between the two years. However, year effects were considerably greater on oleic and linoleic acids of peanuts grown on the Ocilla sandy loam as compared with the other two soil types. Therefore, genetic factors (cultivars) and environmental factors (locations and years) had a greater influence on oil composition than the herbicide or insecticide treatments.

Organoleptic analyses. Taste panel results indicated that the pesticides did not significantly change the flavor of salted peanuts from the Tifton soil, the only samples used for organoleptic testing (Table 9). Yearly variations in uniformity of maturity at harvest apparently influenced quality scores, particularly for aroma and flavor of the GK 3 cultivar. Total quality scores averaged lower for the herbicide treatments of Florunner in both seasons, and for Tifspan in 1973 and GK 3 in 1974, but significant differences among individual attributes were observed only for aroma in GK 3 and appearance-color in the other cultivars. These results suggest that, while intensive treatments with herbicides may cause some decrease in uniformity for processing, seasonal and varietal differences apparently have more influence in determining the quality of processed products.

Table 7. Summary of combined analyses of in-shell peanut yields from pesticide interaction studies at four locations in Alabama and Georgia, 1973-74.

Source of variation	Mean squares and statistical significance[a/]
Location	145.86**
Year	450.37**
Cultivar	267.53**
Year x location	9.06**
Year x cultivar	11.25**
Location x cultivar	23.81**
Year x location x cultivar	15.15**
Error (a)	1.84
Herbicides	6.68**
Year x herbicides	0.47
Location x herbicides	1.46**
Cultivar x herbicides	0.84**
Error (b)	0.33
Disulfoton vs. none	1.53**
Year x disulfoton	0.83*
Location x disulfoton	0.82*
Cultivar x disulfoton	1.59**
Herbicides x disulfoton	0.44
Error (c)	0.22

a/ *, ** is significance at the 5 and 1% levels, respectively.

Table 8. Fatty acid composition of oil from peanuts grown in 1973-74[a].

Source of sample	16:0[b]	18:0	18:1	18:2	20:0	20:1	22:0	24:0
	Fatty acid composition, %							
	1973							
Location (soil types)								
Greenville sandy clay loam	11.1 b	2.3 b	48.9 a	31.3 b	1.3 a	1.2 a	2.7 a	1.1 a
Ocilla sandy loam	11.7 a	2.6 a	48.5 a	30.7 b	1.5 a	1.2 a	2.8 a	1.1 a
Tifton sandy loam	11.4 ab	2.5 a	46.1 b	33.2 a	1.5 a	1.3 a	2.9 a	1.1 a
Cultivars								
Florunner	10.8 b	1.9 b	49.2 b	31.4 b	1.2 b	1.5 a	2.8 b	1.1 a
GK 3	10.5 c	2.8 a	51.1 a	29.4 c	1.5 a	1.2 b	2.6 c	1.1 a
Tifspan	13.0 a	2.8 a	43.2 c	34.3 a	1.5 a	1.1 b	3.0 a	1.1 a
Herbicide treatments								
1	11.4 a	2.5 a	47.8 b	31.6 ab	1.5 a	1.3 a	2.8 a	1.1 a
2	11.4 a	2.5 a	47.7 b	31.9 a	1.4 a	1.2 a	2.8 a	1.1 a
3	11.5 a	2.5 a	47.6 b	31.9 a	1.4 a	1.2 a	2.8 a	1.1 a
4	11.5 a	2.5 a	47.8 b	31.6 ab	1.4 a	1.3 a	2.8 a	1.1 a
5	11.5 a	2.5 a	47.7 b	31.9 a	1.4 a	1.2 a	2.8 a	1.1 a
None	11.3 a	2.5 a	48.3 a	31.3 b	1.4 a	1.2 a	2.8 a	1.1 a
Insecticide								
Disulfoton	11.4 a	2.5 a	47.8 a	31.8 a	1.4 a	1.2 a	2.8 a	1.1 a
None	11.4 a	2.5 a	47.9 a	31.7 a	1.4 a	1.2 a	2.8 a	1.1 a
	1974							
Location								
Greenville sandy clay loam	11.3 b	2.4 b	47.0 a	33.5 b	2.0 a[c]		2.7 b	1.0 a
Ocilla sandy loam	11.0 b	2.3 c	44.8 c	35.7 a	2.1 a		3.0 a	1.1 a
Tifton sandy loam	11.7 a	2.8 a	46.1 b	33.8 b	1.9 a		2.7 b	1.1 a
Cultivars								
Florunner	10.7 b	2.0 c	47.8 a	33.5 b	2.3 a		2.7 b	1.0 a
GK 3	10.5 b	2.6 b	48.1 a	33.3 b	2.0 b		2.5 c	1.0 a
Tifspan	12.8 a	3.0 a	42.0 b	36.3 a	1.8 c		3.2 a	1.1 a
Herbicide treatments								
Herbicides (combined)	11.3 a	2.6 a	46.2 a	34.1 a	2.0 a		2.8 a	1.0 a
Check	11.3 a	2.5 a	45.7 a	34.6 a	2.0 a		2.8 a	1.1 a

a/ Any two means in a group (location, cultivar, etc.) within the same column not followed by the same letter are significantly different.
b/ Carbon chain length: number of double bonds.
c/ The column used in 1974 did not separate arachidic (20:0) and eicosenoic (20:1) acids.

Table 9. Taste panel scores for salted peanuts from cultivars grown in Tifton soil with herbicide treatment 5 (H) disulfoton insecticide (I), or no treatment (Ck). (Scale 9 - excellent to 1 - very poor.)[a]

Treat-ments	1973 Flo-runner	1973 GK 3 (Va)	1973 Tif-span	1973 mean	1974 Flo-runner	1974 GK 3 (Va)	1974 Tif-span	1974 mean	Average Flo-runner	Average GK 3 (Va)	Average Tif-span	Average mean
	Appearance-color:											
H+I	7.68bc	8.03ab	7.48bc	7.73b	7.40c	7.53bc	8.10ab	7.68a	7.54bc	7.78bc	7.79bc	7.70ab
H	7.60bc	7.90ab	7.33c	7.61b	7.20c	7.30c	8.05ab	7.52a	7.40c	7.60bc	7.69bc	7.56b
I	8.33a	7.93ab	7.95ab	8.07a	8.20a	7.55bc	7.40c	7.72a	8.26a	7.74bc	7.68bc	7.89a
Ck	7.90ab	7.70bc	7.68bc	7.78b	7.75abc	7.68abc	7.55bc	7.66a	7.83b	7.69bc	7.61bc	7.72ab
mean	7.88a	7.89a	7.61b	7.80a	7.64a	7.51a	7.78a	7.64b	7.76a	7.70a	7.69a	7.72
	Aroma:											
H+I	7.35b	7.90ab	7.50ab	7.58b	7.40ab	6.70c	7.80a	7.30a	7.38ab	7.30b	7.65ab	7.44b
H	7.85ab	8.15a	7.95ab	7.98a	7.65a	6.90bc	7.80a	7.45a	7.75ab	7.53ab	7.88a	7.72a
I	7.85ab	7.95ab	7.95ab	7.92ab	7.60a	7.35ab	7.80a	7.58a	7.73ab	7.65ab	7.88a	7.75a
Ck	7.60ab	7.70ab	7.90ab	7.73ab	7.45ab	7.50ab	7.80a	7.58a	7.53ab	7.60ab	7.85a	7.66ab
mean	7.66a	7.93a	7.83a	7.80a	7.53a	7.11b	7.80a	7.48b	7.59b	7.52b	7.81a	7.64
	Flavor:											
H+I	7.30ab	6.95ab	7.10ab	7.12a	7.10ab	5.75c	7.90a	6.92a	7.20ab	6.35c	7.50ab	7.02a
H	7.00ab	7.05ab	7.15ab	7.07a	7.40ab	5.70c	7.65ab	6.92a	7.20ab	6.38c	7.40ab	6.99a
I	7.80a	6.95ab	7.80a	7.52a	7.50ab	6.50bc	7.30ab	7.10a	7.65a	6.73bc	7.55a	7.31a
Ck	7.95a	6.70b	7.75ab	7.47a	7.45ab	6.75bc	7.40ab	7.20a	7.70a	6.73bc	7.58a	7.33a
mean	7.51a	6.91b	7.45a	7.29a	7.36a	6.17b	7.56a	7.03a	7.44a	6.54b	7.51a	7.16
	Total Quality Average (includes Texture):											
H+I	7.47c	7.70bc	7.43c	7.53b	7.44c	6.96d	7.95a	7.45a	7.45cd	7.33d	7.69bc	7.49b
H	7.58bc	7.73abc	7.49c	7.60b	7.47c	6.94d	7.91a	7.44a	7.53bcd	7.34d	7.70bc	7.52b
I	8.07a	7.68bc	7.93ab	7.89a	7.87ab	7.29cd	7.51bc	7.56a	7.97a	7.49bcd	7.72abc	7.73a
Ck	7.87ab	7.41c	7.75abc	7.68b	7.61abc	7.42c	7.68abc	7.57a	7.74ab	7.41d	7.71abc	7.62ab
mean	7.75a	7.63a	7.65a	7.68a	7.60a	7.15b	7.76a	7.50b	7.67a	7.39b	7.71a	7.59

a/ Yearly group means, and the three levels of means within groups, having no common postscript letter are significantly different at the 5% level of probability.

Literature Cited

1. Cargill, Roland L., and P. W. Santelmann. 1971. Response of peanuts to combinations of herbicides with other pesticides. Weed Sci. 19:24-27.

2. Hauser, Ellis W., M. D. Jellum, Clyde C. Dowler, and W. H. Marchant. 1972. Systems of weed control for soybeans in the Coastal Plain. Weed Sci. 20:592-598.

3. Hauser, Ellis W., S. R. Cecil, and C. C. Dowler. Systems of weed control for peanuts. 1973. Weed Sci. 21:176-180.

4. Hauser, Ellis W. The influence of DMPA on peanut yields. 1967. Weeds 15:84-85.

5. Holaday, Charles E. and Jack L. Pearson. 1974. Effects of genotype and production area on the fatty acid composition, total oil and total protein in peanuts. J. Food Sci. 39:1206-1209.

6. Holley, K. T. and Ray O. Hammons. 1968. Strain and seasonal effects on peanut characteristics, GA Agri. Exp. Sta. Res. Bul. 32, 27 pp.

7. Ivy, H. W. and T. F. Pfrimmer. 1969. Effect of combinations of preemergence herbicides and systemic insecticides on cotton stands and yields. Proc. SWSS 22:94.

8. Johnson, B. J. Combinations of herbicides and other pesticides on soybeans. 1970. Weed Sci. 18:128-131.

9. Tai, Y. P. and Clyde T. Young. 1975. Genetic studies of peanut proteins in oils. J. of Am. Oil Scientists Soc. 52:377-385.

10. Worthington, R. E., Ray O. Hammons, and John R. Allison. 1972. Varietal differences and seasonal effects on fatty acid composition and stability of oil from 82 peanut genotypes. J. Agr. Food Chem. 20:727-730.

11. Worthington, R. E. and D. H. Smith. 1973. Effects of several foliar fungicides on the fatty acid composition and stability of peanut oil. J. Agr. Food Chem. 21:619-621.

12. Worthington, R. E. and D. H. Smith. 1974. Modification of peanut oil fatty acid composition by foliar applications of 3, 2'-dimethylsuccinohydrazide (Kylar). J. Agr. Food Chem. 22:507-508.