Plant Science Pamphlet #66 December 1981

ANNUAL PROGRESS REPORT

NORTHEAST RESEARCH STATION
Watertown, South Dakota

BRIEF HISTORY

A new Agricultural Advisory Group was formed in 1981 to aid in the guidance of the Northeast Research Station. Harlan Haugen of Wallace was elected President and Robert Schurrer of Watertown Secretary. The advisors are from these counties: Clark, Codington, Day, Deuel, Grant, Hamlin, Marshall and Roberts County. This research station is located on the Korth Farms and Orrin Korth, or his designate, has been appointed as a permanent advisor.

The 1981 crop season may be noted for its below normal rainfall for all months April through September. October rainfall was 72 hundreths above normal, but did not add much to the subsoil moisture reserve.

Small grains were planted April 7th of this year, which is earlier than we normally get a chance to get into the fields. Even though the plantings were early, emergence of the small grain took about 14 days. Development of the grains were slow due to cool air and soil temperatures and lack of rainfall.

An evening crop tour was held July 9th and attendance was good. The stops on the tour were covered with excellent presentations by the speakers. The Codington County Crop Improvement Association provided refreshments after the tour.

NOTE: This is a progress report and therefore the results presented are not necessarily complete nor conclusive. Any interpretation given is strictly tentative because additional data from continuation of these experiments may produce conclusions different than those of any one year. These data reflect the 1981 growing season.

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AGRICULTURAL ADVISORY GROUP
Northeast Research Station, 1981
Watertown, South Dakota

Wayne Fletcher	Garden City	Clark County	81
Harlan Haugen	Wallace	Codington	81
John Schwab	Andover	Day	81-83
Charles Meyer	Revillo	Deuel	81-82
Lyle Kriesel	Summit	Grant	81-84
Vernon Singrey	Hazel	Hamlin	81-83
Erwin Symeins	Amherst	Marshall	81-84
Gerald Balvin	Claire City	Roberts	81-82
Orrin Korth	Watertown	Codington	Permanent
Loyal Evjen	South Shore	Ag. Technician	
Quentin Kingsley	SDSU	Station Manager	

THE COOPERATIVE EXTENSION SERVICE
Hollis D. Hall, Director

Chuck Langner	Clark	Clark County
Robert Schurrer	Watertown	Codington
Jim Wilson	Webster	Day
Dale Wiitala	Clear Lake	Deuel
Joe R. Schuch	Milbank	Grant
Donald Guthmiller	Hayti	Hamlin
George Black	Britton	Marshall
Joe E. Schuch	Sisseton	Roberts

1981 CROP YEAR HISTORY
1981 Crop Season

Total rainfall for growing season by months with this Department from long-term average on Northeast Research Station, S.D.

Rainfall	Inches	Departure*	Greatest Day	Date
April	0.48	-1.58	0.18	3
May	0.99	-1.98	0.63	28
June	2.73	-0.97	1.00	14
July	2.23	-0.44	1.04	11
August	1.20	-1.58	0.52	3
September	0.52	-1.33	0.44	6
October	1.88	+0.72	0.60	13
Total	10.03	-7.16		

Long-time average 17.19 inches April through October.
Number of days during month of 90° or above: July 7, August 3.
Last frost - Spring (May 19).
First frost - Fall (October 2) Frost free period - 136 days.

SOYBEAN VARIETY AND POPULATIONS STUDY
Northeast Research Station, 1981
Q. Kingsley and L. Evjen

OBJECTIVES:

To achieve several varieties of soybeans for maturity, yielding ability and populations in this environment.

DISCUSSION:

The soybeans were planted in 36 inch rows at 3 plant spacings in the row; 2", 3 1/4 " and 4 3/4". Yields varied with plant population and variety. The majority of the highest yields for all varieties was produced at the 3 1/4 inch plant spacing in the row. In 1982, a spacing of 1 inch between plants is to be added to find out if the spacing is feasible for this area. Only one other row spacing was tried and that was in 6 inch using a grain drill.

RESULTS:

Table 1. Soybean populations, yields and planting methods. Northeast Research Station, Watertown, SD, 1981.

Entry	Days planting-maturity*	Plant space inches**	Plant height inches	Yield Bu/A	Percent oil	Test weight
Evans	124	2	20	24.9	15.2	58.0
-4		3 1/4	18	21.2	14.4	58.1
		4 3/4	16	21.5	15.8	57.4
Swift	128	2	26	24.4	15.1	57.8
0		3 1/4	22	23.5	14.9	58.3
		4 3/4	23	22.9	16.0	57.8
Hodgson 78	134	2	22	22.4	16.5	58.9
+6		3 1/4	19	23.5	16.7	58.3
		4 3/4	21	21.4	15.5	58.9
Hardin	135	2	19	26.5	14.5	58.0
+7		3 1/4	20	27.4	14.0	58.1
		4 3/4	21	21.5	14.8	58.9
Weber	135	2	22	25.4	15.5	58.2
+7		3 1/4	23	26.0	15.0	58.8
		4 3/4	22	22.8	15.2	58.6
Corsoy	137	2	22	23.6	15.4	59.1
+9		3 1/4	24	29.2	15.9	58.6
		4 3/4	22	22.7	16.1	58.8
Corsoy 79	140	2	22	26.0	15.7	59.5
+12		3 1/4	23	26.7	14.3	59.3
		4 3/4	20	26.7	14.9	59.4
		Drill Planted Thousand/A	Percent Dockage			
Weber	135	36,700	26.4	14.9	13.9	57.5
		53,500	33.7	22.8	13.8	56.0
		87,000	47.2	20.8	14.5	55.5

FORAGE PRODUCTION
Northeast Research Station, 1981
Q. Kingsley and L. Evjen

TITLE: Hay, Haylage and Silage Production

OBJECTIVES:

1. Compare various crops for forage production.
2. Obtain regrowth data after first harvest.

DISCUSSION:

This experiment was planted the first time June 10th and again on July 15th. This was too late for the fodder beets and grain sorghum to produce properly. The seed yields were poor and are not reported. The Serere and RMP are large stemmed foxtail millets and grow tall in areas with adequate rainfall. Some problems were encountered where Tolban, a sunflower weed control chemical, was applied in 1980.

RESULTS:

Table 2. Dry matter production for millets and sudans, Tons of Dry Matter* (DM) per acre.

Entry	Tons/A Dry Matter	Percent Protein	Plant Height Inches	Planted 6/10/81 Ton/A DM
Millet				
Cerise, Proso	2.25	10.3	30	1.73
Minsum, Proso	2.84	9.7	37	2.57
Sno-Fox, Foxtail	3.33	7.6	28	2.36
Serere, Foxtail	2.60	13.9	50	4.37
RMP, Foxtail	3.39	13.4	30	3.59
German Strain, Foxtail	2.96	11.8	31	3.86
Manta, Foxtail	2.65	11.9	28	3.24
Sudans				
Monarch II	4.19	9.0	62	3.51
HS 33	3.89	8.8	58	3.02
Trudan 8	5.04	8.2	58	3.82
HS 30105	3.60	9.6	57	2.48
HS 39005	3.92	8.8	60	3.24

Hay (88% DM); Haylage (50% DM); Silage (33% DM)

*DM. To determine yields of hay, haylage or silage: Divide tons of DM by percent DM in hay, haylage or silage. Example using Monarch II (DM of 4.19 divided by 0.33 equals 12.70 tons of 67% moisture silage, etc.) Planted: July 15; Harvested: September 9. Rainfall during this period: 4.4 inches. June 10 to Sept. 21, 5.29 inches. Planting Rates: Millet, Proso, 20#; Foxtail, 12#; Sudan, 15#/A

DATE PLANTING OF VARIOUS CROPS
Northeast Research Station, 1981
Q. Kingsley and L. Evjen

TITLE: Date planting of small grain and oil crops.

OBJECTIVES:

1. Do dates of planting have any effect on yielding ability percent protein and test weight?

2. Do weeds become a problem?

DISCUSSION:

Plantings for this experiment were started April 8th and continued on 1 week intervals with last planting June 10th. The land area worked up was enough to cover the crops to be planted. The problem encountered was for weed control. By having these different crops side by side made control difficult. In 1982, the field arrangement will be changed to take care of weeds in these crops. This year, it took approximately 3 weeks for the first planting to emerge and this period decreased to 5 days for the June 10th planting. The weeds in flax reduced yields to a point where it would not be profitable for a farmer to harvest. Safflower and sunflowers suffered the same fate as flax. Later plantings of sunflowers did produce well.

RESULTS:

Table 3. Date planting of small grain and oil crops Northeast Research Station, Watertown, SD, 1981.

Date Planted	Barley			Oats			HRS Wheat			Durum			Flax		
	Bu/A	% Protein	Test Wt.	Bu/A	% Protein	Test Wt.	Bu/A	% Protein	Test Wt.	Bu/A	% Protein	Test Wt.	Bu/A	% Protein	Test Wt.
4/8	21.5	13.2	46.5	48.6	15.1	39.5	41.3	15.5	57.5	37.1	16.1	59.5	6.8	32.8	52.5
4/16	32.0	15.8	42.5	64.8	14.9	36.5	24.5	18.1	54.0	26.7	16.4	57.5	2.7	33.9	53.5
4/23	25.5	14.6	39.5	39.7	16.5	35.0	19.7	17.4	55.0	20.1	14.9	59.5	4.1	30.3	52.5
4/30	29.8	16.0	39.5	38.9	15.3	34.0	23.9	16.4	55.5	21.0	14.1	61.0	5.0	31.4	52.5
5/7	25.8	13.4	40.5	30.2	15.2	32.0	21.0	15.3	56.5	13.7	14.5	59.5	2.6	35.0	53.0
5/14	11.1	13.9	37.2	28.5	14.4	34.0	11.3	16.3	54.5	10.6	15.3	58.0			
5/21	6.0	14.2	33.5	15.1	16.1	33.0	11.3	16.3	57.0	7.6	15.0	57.5			

Date Planted	Sunflowers		
	lbs/A	% Oil	% H_2O
6/11	1770	41.6	14.2
6/18	1497	40.0	14.2
6/23	1198	39.6	17.2

Harvest dates were at maturity of each small grain crop. Sunflowers were harvested October 23rd.

Varieties:

Barley - Primus II
Oats - Lancer
HRS Wheat - James
Durum - Vic
Flax - Culbert
Sunflowers-Inter State 3100

Table 4. 1981 Sunflower Variety Trial
Northeast Research Station, Watertown, SD
Quentin Kingsley and Loyal Evjen, Investigators
Waller-Duncan K-Ratio T Test for Variable Yield
Means With The Same Letter Are Not Significantly Different

Treatment	Grouping	Mean Lbs/Acre 10% H_2O	% Oil	Test Wt. Lbs/Bu
Imperial 673	A	2019.2	36.9	28.4
Golden Harvest 10	B A	1943.7	39.8	28.8
Seed Tec 349	B A	1935.7	40.6	28.5
Pfizer 620	B A	1934.5	40.0	29.1
Northrup King 254	B A	1920.7	39.5	29.8
Northrup King 265	B C	1860.2	38.9	30.1
Sokota 4000	B C D	1833.0	38.2	28.9
Dahlgren 705	B E C D	1822.5	40.8	27.9
Growers Seed 380A	B E C D	1822.5	40.2	28.7
Kraig 903	F E C D	1767.5	37.9	28.9
Seed Tec 315	G F E C D	1762.0	39.4	28.8
Interstate 7775S	G F E C D H	1743.2	40.0	28.5
Northrup King 212	G F E C I D H	1708.7	41.4	29.5
Jacques 503	G F E I D H	1692.5	39.3	29.5
Cal/West 64P	G F E J I D H	1686.2	40.7	27.1
Kraig, Golden Glo	G F E J I K H	1679.0	40.3	29.8
Growers Seed 378	G F E J I K H	1672.5	40.0	30.3
Sokota 6000	G F L J I K H	1653.2	39.1	29.0
Cal/West 54K	G F L J I K H	1649.0	40.1	29.1
Cal/West 42L	G F L J I K H	1648.7	39.4	29.5
Interstate 7116	G F L J I K H	1648.7	39.7	29.9
Dahlgren 164	G F L J I K H	1640.7	39.0	28.5
Growers Seed 372A	G F L J I K H	1633.7	40.4	29.9
Sokota 5000	G F L J I K H	1618.2	39.8	30.1
Dahlgren 704XL	G M L J I K H	1611.2	41.1	29.6
Cal/West 894	N M L J I K H	1603.2	40.8	30.5
Red River Com 897	N M L O J I K H	1595.5	41.0	28.6
Sigco 448	N M L O J I K H	1595.5	38.1	30.0
Sigco 472	N M L O J I K H	1592.5	40.4	30.0
Cal/West 57K	N M L O J I K	1573.0	41.0	29.8
RBA 3101	N M L O J K	1539.5	42.1	28.0
Cenex 7101	N M L O K	1527.5	40.1	28.3
Seed Tec 327	N M L O	1512.5	40.3	29.2
Dahlgren 844	N M O P	1459.7	41.2	30.5
Interstate 907E	N O P	1452.0	39.6	27.7
RBA 300G	N O P	1452.0	42.2	28.5
Sigco 449	O P	1444.0	39.8	29.1
RBA 303	Q P	1353.5	40.7	29.4
Red River Com 675	Q P	1315.7	38.7	27.8
Red River Com 672	Q	1248.2	41.1	28.4
Average		1654.3		
Peredovik		1617.8	36.7	26.5

LSD 152.6 #/A; C.V. 7.05%; Rainfall: 6/11 - 10/22 = 7.82 inches.
First frost September 17; Planted: June 11, 1981; Harvested: October 22, 1981
Population: 16,000/A in 36 inch rows

CHEMICAL CONTROL OF STALK-BORING INSECTS IN SUNFLOWERS

Dr. David Walgenbach, Terril Heilman, and Joe Gednalske

Stalk-boring insects and associated stalk-rot diseases appear to be common in sunflowers and may reduce potential seed yields. During the 1980 and 1981 growing seasons, the larvae of four insect species were commonly found in sunflower stems in South Dakota. This complex of stalk boring insects includes two stem weevils, Apion occidentale and Cylindrocopterus adspersus; one long-horned beetle, Dectes texanus; and one tumbling flower beetle, Mordellistena sp.

Little research has been done on the effect of these insects on sunflower seed yields or the potential for chemical control of insect larvae in the stem. An investigation was initiated at Redfield and other locations in 1981.

Three granular, systemic insecticides were applied at planting time: Furadan 10G, Counter 15G, and Temik 15G. Each of these was applied at several rates and with different placements i.e., (a) band over the seed furrow, (b) seed furrow, (c) subseed . An application of Counter 15G at first cultivation was also made.

The effectiveness of each insecticide, rate, and placement was determined by hand splitting of twenty sunflower stems (5 from each of 4 replications) from each of the chemical treatments. The species of insects present and a subjective rating of the severity of stalk-rotting (fungal infection) were recorded for each stem. Ratings of stalk-rot were as follows: 0 for stems with no fungal growth (no infection), 1 for stems with a light fungal growth in the pith only (light infection), 2 for stems with a fungal growth throughout the pith in one area of the stem (moderate infection), and 3 for stems with a complete destruction of the pith and partial destruction of vascular tissue by fungus in one area of the stem (severe infection). All stems were split and the above information recorded during the full bloom stage of the sunflowers.

The following Table 5 summarizes the results from tests at Brookings, Watertown, Redfield, and Highmore.

Table 5. Effect of Insecticide Treatments on the Percent of Sunflower Stems Infested (by any Insect Species) on the Severity of Stalk-Rots (Fungal Infection Rating), and on the Percent of Stalks Infested by Each of the Four Insect Species.

Treatment	Rate	Placement	% Stems Infested	Stalk Rot Rating	% of Stalks Infested by Species			
					Apion	Cylindrocopterus	Dectes	Mordellistena
Untreated	--		97	2.28	45	65	33	50
Furadan 10G	1.0 lb.	Furrow	85	1.55*	40	23*	20	43
Furadan 10G	1.5 lb.	Furrow	70*	1.38*	38	13*	10*	23*
Furadan 10G	2.0 lb.	Furrow	67*	1.18*	45	8*	20	13*
Furadan 10G	2.0 lb.	Band	70*	1.28*	50	13*	15	20*
Furadan 10G	1.0 lb.	Subseed	85	1.65	45	8*	30	33
Counter 15G	1.0 lb.	Band	72*	1.60*	50	23*	18	23*
Counter 15G	1.0 lb.	Furrow	75	1.75*	58	28*	12*	23*
Counter 15G	1.0 lb.	Cultivation	83	1.30*	63	10*	13	30
Counter 15G	1.0 lb.	Subseed	65*	1.00*	45	5*	10*	28*
Counter 15G	2.0 lb.	Band	72*	1.65*	58	40*	5*	33
Counter 15G	2.0 lb.	Furrow	60*	1.63*	38	23*	5*	20*
Counter 15G	2.0 lb.	Cultivation	57*	1.30*	33	13*	3*	17*
Counter 15G	2.0 lb.	Subseed	30*	0.83*	15*	8*	8*	5*
Temik 15G	1.0 lb.	Furrow	97	1.95	52	30*	33	38
Temik 15G	0.5 lb.	Furrow	97	2.05	33	40*	45	33

Most stalks were infested by more than one insect species.

* Means followed by an asterisk were significantly different from the untreated mean in the same column of the table at the .05 probability level.

Few of the chemical treatments had a major effect on the percentage of stalks infested (by any insect) or on the percentage of stalks infested by the stem weevil, Apion occidentale. The only exception to this was Counter 2 lb. subseed, which gave excellent control of all insects. Several of the treatments significantly reduced the percentage of stalks infested by the other insect species, particularly the stem weevil, Cylindrocopterus adspersus and the long-horned beetle, Dectes texanus. The same treatments were also effective in reducing the severity of stalk rots in the stem. The placement of the chemical appeared to be more important than the rate. Generally, subseed placement of Counter and first cultivation application of Counter were the most effective treatments at the lower rates. At higher rates, Counter subseed, Counter cultivation, and Furadan in furrow produced equal or greater control of most insects and somewhat less stalk-rot. It should be noted that Furadan was not applied subseed at higher rates. Also, the difference in insect control or severity of stalk-rot between the lower and higher rates of the insecticides may not be economically important.

No significant differences in seed yield were found at Watertown, where there was a light infestation of stalk-boring insects. The test crops at other locations, including Redfield, were damaged by high winds, other insects and or birds prior to harvest, so differences in seed yield could not be measured. Yield tests will be repeated in 1982.

Some recent research done by C.E. Rogers on sunflowers in Texas indicates that heavy infestations of the stem weevil, Cylindrocopterus adspersus can reduce seed yields by stunting plant growth and or through lodging of the plants before harvest. Other research done by J.H. Hatchett, et al. on the long-horned beetle, Dectes texanus, indicates that this insect uses both sunflowers and soybeans for host plants, and it has caused significant soybean yield losses in Missouri. Soybean yield losses have resulted from lodging of the plants before harvest or from harvesting losses when stalks break off too easily to properly feed into a combine. Crop losses have not yet been attributed to either the stem weevil, Apion occidentale, or the tumbling flower beetle, Mordellistena sp.

Since all four of these insects are natural pests of wild sunflowers and do overwinter in South Dakota, one or more these species may increase in number with continued cultivation of domestic sunflowers. Future research on these insects in South Dakota will help determine their effect on sunflower seed yields and what control measures are the most effective. Despite the loss of yield information in 1981, two important discoveries were made toward those goals. First, it is now evident that these stalk-boring insects are associated closely with stalk-rot diseases. Second, granular insecticides can be used effectively to control these insects and to reduce the occurance of stalk-rot diseases.

THE CHEMICALS USED IN THIS STUDY ARE NOT REGISTERED FOR USE ON SUNFLOWERS IN SOUTH DAKOTA. REGISTRATION OF FURADAN AND COUNTER MAY OCCUR WITHIN THE NEXT TWO OR THREE YEARS.

SMALL GRAIN VARIETY TRIALS
Northeast Research Station, 1981
J. Bonnemann

Table 6. 1981 Standard Variety Oat Trials and Available Averages.

	WATERTOWN					
Variety	1979	1980	1981	Ave.	1981	3-yr
	Bushels Per Acre				Test Weight	
Burnett	59.6	105.5	56.3	73.8	32	31
Nodaway 70	61.9	97.9	52.3	70.7	31	32
Chief	78.7	110.5	52.6	80.6	32	32
Otee	63.8	89.2	45.5	66.2	32	32
Dal	60.9	104.3	60.0	75.1	33	32
Noble	67.9	107.9	53.6	76.5	32	33
Lyon	90.1	108.9	a			
Bates	74.4	102.3	51.0	75.9	32	34
Wright	43.3	103.5	54.1	67.0	35	33
Otana	37.0	113.4	a			
Lancer	75.7	114.0	62.8	84.2	32	33
Lang	57.8	105.2	56.2	73.1	32	31
Benson	77.9	117.2	62.0	85.7	30	31
Moore	90.9	120.7	62.4	91.3	32	33
Marathon	65.6	119.9	a			
Larry	55.7	104.8	54.0	71.5	32	31
Ogle	68.5	107.8	55.3	77.2	31	30
Stout	81.4	104.6	55.9	80.6	32	31
Means			55.8		32	
LSD (.05)			7.4			
CV - %			7.7			

a - late varieties swathed by mistake

Table 7. 1981 Standard Variety Barley Trials and Available Averages.

	WATERTOWN					
Variety	1979	1980	1981	3-yr	1981	3-yr
	Bushels Per Acre				Test Weight	
Firlbecks III	51.8	77.0	39.9	56.2	46	46
Larker	57.3	74.8	46.5	59.5	49	47
Primus II	54.6	76.3	38.6	56.5	49	45
Klages		76.4	38.3		43	
Glenn	65.0	94.4	43.6	67.7	45	44
Morex	52.4	80.2	52.0	61.5	47	44
Clark			46.1		44	
Bumper			45.7		44	
Onda			44.1		43	
Means			44.9		46	
LSD (.05)			5.3			
CV - %			8.2			

Table 8. 1981 Standard Variety Spring Wheat Trials and Available Averages.

Variety	WATERTOWN					
	1979	1980	1981	Ave.	1981	3-yr
	Bushels Per Acre				Test Weight	
Standard/mid-tall						
Fortuna	30.4	47.2	33.1	36.9	58	57
Chris	30.1	43.6	32.8	35.5	59	57
Waldron	33.5	46.8	36.1	38.8	57	56
Alex (ND 550)		53.4	35.0		59	
Lew		45.9	37.2		58	
Butte	45.5	56.9	39.6	47.3	61	60
Eureka	36.5	50.8	34.8	40.7	56	56
Coteau	36.4	53.1	24.4	38.0	58	58
James	37.2	53.6	35.8	42.2	59	57
Pondera		51.3	40.0		60	
MPV-2			35.4		58	
MPV-3			34.9		59	
Semi-dwarfs						
Era	29.0	52.8	39.1	40.3	59	56
Olaf	34.8	51.2	35.8	40.6	57	56
Prodax	21.2	51.3	30.5	34.3	56	53
Protor	35.5	54.6	32.4	40.8	58	57
Angus	42.1	54.2	34.8	43.7	60	59
Len	38.8	47.7	36.4	41.0	57	56
715			38.0		58	
Walera			38.4		57	
Solar	29.5	52.3	39.4	40.4	59	55
711		46.0	31.6		59	
Oslo		51.4	36.3		56	
Aim	36.7	54.5	34.2	41.8	57	56
906R	34.2	48.3	32.9	38.5	58	56
Means			35.5		58	
LSD (.05)			5.0			
CV - %			9.9			

Table 9. 1981 Standard Variety Durum Wheat Trials and Available Averages.

Variety	WATERTOWN					
	1979	1980	1981	3-yr	1981	3-yr
	Bushels Per Acre				Test Weight	
Rolette	36.2	61.0	29.1	42.1	60	59
Ward	38.2	64.1	30.4	44.2	60	60
Crosby	42.4	64.6	29.9	45.6	59	59
Rugby	42.4	57.1	29.7	43.1	59	59
Botno	39.0	59.8	28.4	40.4	59	59
Edmore	36.3	64.0	29.6	43.3	60	60
Vic	46.9	62.0	34.2	47.7	60	60
Cando*	30.4	54.8	35.0	40.1	59	54
Calvin*	26.2	59.4	30.2	38.6	59	56
Means			30.7		59	
LSD (.05)			3.5			
CV - %			7.8			

RAINFALL STUDIES IN SUNFLOWERS

Northeast Research Station, Watertown, SD
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OBJECTIVE:

To study rainfall effects on broadleaf weed control with potential postemergence herbicides in sunflowers.

EXPERIMENTAL PLAN:

1. An experiment consisting of various time intervals between chemical application and simulated rainfall.

2. A washoff experiment looking at the amount of immediate rainfall necessary to reduce weed control.

METHODS:

Sokota Hybrid 600 sunflowers were planted in 36" rows with 4 replications. Betanal and Betanex were the two experimental herbicides used as a tank mix for postemergence control of broadleaf weeds. Weeds present were redroot pigweed, common lambsquarters and wild mustard. For the time study, a simulated rainfall of 0.5 inch was applied to plots sprayed with herbicide 0, 1/4, 1/2, 1, 4 and 8 hours prior to the rain. For the amount study, various amounts (0, 0.01, 0.10, 0.20 and 0.50 inch) of rainfall were applied immediately after the herbicides were applied.

DISCUSSION:

The time study revealed no weed control with an immediate rainfall of 0.5 inch. Weed control increased with increasing time intervals between chemical application and rainfall, but didn't reach the maximum control attained by the check treatment even after the 8 hour time interval. A longer time period was necessary to achieve optimum weed control.

In the amount of rainfall study, 0.10 inch or more of immediate rainfall washed the herbicide off the weeds and reduced weed control to minimum levels.

With the use of these experimental herbicides for postemergence broadleaf weed control in sunflowers, time of early rainfall and amount of rainfall received had definite effects on weed control performance.