

Herbicides Evaluated For Weed Control in Sugar Beets

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In 1994 there were 22,600 acres of sugar beets harvested in Fresno County, with an estimated value of \$22.5 million. Many weed species like *Abutilon theophrasti* (velvetleaf) and *Xanthium strumarium* (cocklebur) are difficult to control in sugar beets. The currently registered pre- and postemergence herbicides are not effective on these summer annuals, therefore, cultivation and hand weeding are required for their control. In 1987, triflurosulfuron methyl (UpBeet®), a sulfonylurea herbicide, was developed for the selective postemergence control of these and other summer annual weeds found infesting sugar beets. Like most sulfonylureas, it is active at very low rates (0.25 to 0.5 oz ai/acre) and may provide effective control of velvetleaf, cocklebur, and other weeds. Betamix Progress® (Betamix® plus Nortron®) is also being investigated for weed control in sugar beets, especially where annual grasses are present.

Four studies were conducted in 1995 in Fresno and Merced Counties to determine the effects of preplant incorporated and postemergence applied herbicides on weed control in sugar beets.

Study 1

This study was conducted at the University of California West Side Research & Extension Center near Five Points, California to determine the effects of preplant incorporated and postemergence applied herbicides on weed control and selectivity in sugar beets.

There were 13 treatments arranged in a randomized complete block design, with four replicates. Plot size was four beds (30"), 50' long. Thirty-inch beds were listed and fertilized on March 10, 1995. Nortron (1.87 lbai/acre), Roneet (3.0 lbai/acre), and Pyramin (3.15 lbai/acre) were each applied to certain plots broadcast with a CO₂ back-pack sprayer at 30 gpa and incorporated to 2 1/2 inches with a four-row bed shaper. Sugar beets were planted on April 25 and furrow irrigated up. UpBeet, Betamix, and Stinger were applied in various combinations to the preplant incorporated treatments and as postemergence sequential applications when the sugar beets were in the cotyledon to one true-leaf stage of growth and again when they had two true leaves. The weeds at the time of treatment were at approximately the same stage of growth at the time the treatments were applied.

Weed control, sugar beet vigor, and injury ratings were collected for 30 days following the postemergence applications. The center two rows of the plots were harvested for yield with a plot digger and samples were analyzed to determine sugar and nitrate content.

The results of the study are shown on the following pages (Table 1 - 3). Tank mixes of UpBeet plus Betamix provided excellent control of the weeds present (barnyardgrass, purslane, and pigweed) and was not different from the preplant incorporated treatments. However, when UpBeet was used alone, weed control was reduced to 75 to 85% of the untreated. Plots treated with Stinger did not provide effective weed control. Although

there was some early injury (chlorosis and leaf deformity) and reduction in growth (vigor) associated with the postemergence treatments, it was short-lived. All plants completely recovered within 40 days of treatment. The sugar beets in this experiment were planted late, as a result, total yield was low, however, there was no significant reduction in yield or sugar content in the treated plots.

Study 2

The second study was also conducted at the West Side Research & Extension Center. There were 15 treatments arranged in a randomized complete block design, with three replicates. Plot size was two beds (30"), 20' long. Following listing and fertilization of the beds, velvetleaf and black nightshade seed was spread over the plot area by hand and incorporated with a four-row bed shaper. Sugar beets were planted on April 25 and furrow irrigated up. Various combinations of Betamix, UpBeet, and Betamix Progress were applied in sequential applications when the sugar beets were in the cotyledon and two-leaf stage of growth. The weeds present were at approximately the same stage of growth as the crop. All herbicides were applied broadcast using a CO₂ back-pack sprayer that delivered 30 gpa.

Weed control, sugar beet injury, and vigor ratings were made up to one month after the treatments were applied. The center 13' of the plots were harvested for yield on September 25 using a plot digger and samples were analyzed for sugar and nitrate content. Results of the study are on the following pages (Tables 4 - 7). UpBeet applied at 0.015 lb ai/acre in combination with Betamix or Betamix Progress provided 96 to 100% control of velvetleaf. All treated plots resulted in effective black nightshade control, regardless of treatment or rate. Velvetleaf was not controlled when Betamix or Betamix Progress were applied alone.

Sugar beet tolerance was good in all the treatments. Although there was initial injury and reduced plant growth, sugar beets were completely recovered within 30 days of treatment.

Although there was some differences in the percent of sugar obtained from the samples and in the percent of clean beets, the overall yield was not different among the treatments.

It is apparent that UpBeet, when combined with Betamix or Betamix Progress, will provide effective control of velvetleaf and should be investigated further. In addition, UpBeet should be investigated for the control of cocklebur.

Study 3

This study was conducted on a farm of Spreckels Sugar Company in Mendota, California. The treatments, plot size, and experimental design was the same for the first study. However, there were very few weeds in the field so weed control data was not collected. Sugar beets were harvested, however, and yield data was collected (Table 8). There was no significant reduction in yield in any of the treated plots.

**Table 1. Effect of Preplant Incorporated and Postemergence Applied Herbicides
On Weed Control in Sugar Beets**

West Side Research & Extension Center 95-1

Treatment	Rate ozai/A	Method	Percent Weed Control by Species on Three Dates								
			5/19/95			5/27/95			6/2/95		
			BG	P	Pw	BG	P	PW	BG	P	PW
1. UpBeet Betamix X-77	0.25 5.2 0.25%	Post Post Post	96 a	98 a	100 a	99 a	100 a	100 a	99 a	100 a	100 a
2. UpBeet Betamix X-77	0.38 5.2 0.25%	Post Post Post	97 a	95 a	98 a	97 a	99 a	100 a	98 a	99 a	100 a
3. UpBeet X-77	0.25 0.25%	Post Post	19 c	22 c	24 c	80 b	70 b	82 b	84 b	74 c	86 d
4. Nortron UpBeet Betamix	1.87 lbai 0.25 5.2	PPI Post Post	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a
5. Roneet UpBeet Betamix	3.0 lbai 0.25 5.2	PPI Post Post	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a
6. Pyramin Upbeet Betamix	3.15 lbai 0.25 5.2	PPI Post Post	100 a	100 a	100 a	99 a	100 a	100 a	99 a	100 a	100 a
7. Betamix	5.2	Post	83 ab	95 ab	89 a	80 b	95 a	98 ab	79 b	96 a	98 ab
8. Nortron Betamix	1.87 lbai 5.2	PPI Post	100 a	100 a	100 a	97 a	97 a	100 a	98 a	98 a	100 a
9. Roneet Betamix	3.0 lbai 5.2	PPI Post	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a
10. Pyramin Betamix	3.15 lbai 5.2	PPI Post	100 a	100 a	100 a	96 a	100 a	100 a	96 a	100 a	100 a
11. UpBeet Stinger Crop oil	0.25 0.09 lbai 1%	Post Post Post	63 b	90 ab	53 b	75 b	72 b	93 b	80 b	76 bc	94 bc
12. UpBeet Stinger Crop oil	0.38 0.09 lbai 1%	Post Post Post	65 b	73 b	65 b	71 b	75 b	87 c	75 b	81 b	90 c
13. Untreated			0 c	0 d	0 d	0 c	0 c	0 c	0 c	0 d	0 e
CV @ p=0.05:			22.1%	19.0%	14.4%	8.0%	5.7%	4.2%	8.8%	5.2%	3.5%

BG = barnyardgrass, P = purslane, and PW = pigweed

**Table 2. Effect of Preplant Incorporated and Postemergence Applied Herbicides
On Selectivity in Sugar Beets**

West Side Research & Extension Center 95-1

Treatment	Rate ozai/A	Method	Sugar Beet Vigor and Injury on Three Dates Following Treatment					
			5/19/95		5/27/95		6/2/95	
			Vigor	Injury	Vigor	Injury	Vigor	Injury
1. UpBeet Betamix X-77	0.25 5.2 0.25%	Post Post Post	8.7 bcd	4.5 ab	9.0 bc	2.5 abcd	9.3 bc	0.5
2. UpBeet Betamix X-77	0.38 5.2 0.25%	Post Post Post	8.7 bcd	4.7 ab	9.0 bc	3.5 a	9.0 c	0.8
3. UpBeet X-77	0.25 0.25%	Post Post	9.7 ab	1.2 de	10.0 a	0.8 ef	10.0 a	0.0
4. Nortron UpBeet Betamix	1.87 lbai 0.25 5.2	PPI Post Post	9.0 abcd	4.0 abc	9.5 ab	2.3 abcde	9.8 ab	0.8
5. Roneet UpBeet Betamix	3.0 lbai 0.25 5.2	PPI Post Post	8.2 cd	4.7 ab	9.3 ab	2.8 abc	9.5 abc	1.0
6. Pyramin Upbeet Betamix	3.15 lbai 0.25 5.2	PPI Post Post	9.5 ab	2.2 cd	9.5 ab	3.0 ab	9.5 abc	0.8
7. Betamix	5.2	Post	9.5 ab	2.5 cd	9.5 ab	1.0 def	9.8 ab	0.3
8. Nortron Betamix	1.87 lbai 5.2	PPI Post	9.2 abc	3.7 abc	9.0 bc	1.5 bcde	9.0 c	0.3
9. Roneet Betamix	3.0 lbai 5.2	PPI Post	8.0 d	5.5 a	8.3 c	2.8 abc	9.3 bc	1.0
10. Pyramin Betamix	3.15 lbai 5.2	PPI Post	9.2 abc	3.0 bcd	9.8 ab	1.3 cdef	10.0 a	0.3
11. UpBeet Stinger Crop oil	0.25 0.09 lbai 1%	Post Post Post	10.0 a	1.8 d	10.0 a	1.5 bcde	10.0 a	0.3
12. UpBeet Stinger Crop oil	0.38 0.09 lbai 1%	Post Post Post	10.0 a	2.5 cd	9.8 ab	1.8 bcde	9.8 ab	0.5
13. Untreated			10.0 a	0 e	10.0 a	0 f	10.0 a	0
CV @ p=0.05:			7.47%	35.35%	6.03%	48.71%	4.09%	NS

Vigor = 0 to 10 scale; 0 = all plants dead and 10 = vigorously growing
Injury = 0 to 10 scale; 0 = no injury and 10 = all plants killed

**Table 3. Effect of Preplant Incorporated and Postemergence Applied Herbicides
On Yield in Sugar Beets**

West Side Research & Extension Center 95-1

Treatment	Rate ozai/ A	Method	Sugar Beet Yield on 9/25/95				
			Pounds/ 45' Plot	% Sugar	Ton/ Acre Clean Beets	Ton/ Acre Sugar	Nitrates
1. UpBeet Betamix X-77	0.25 5.2 0.25%	Post Post Post	227.8 ab	10.2	20.0 abc	2.04	246.3
2. UpBeet Betamix X-77	0.38 5.2 0.25%	Post Post Post	219.3 abc	10.5	19.0 bc	2.01 bc	207.5
3. UpBeet X-77	0.25 0.25%	Post Post	207.5 bc	10.2	18.5 c	1.88 c	221.3
4. Nortron UpBeet Betamix	1.87 lbai 0.25 5.2	PPI Post Post	238.0 a	10.7	21.4 a	2.31 a	213.8
5. Roneet UpBeet Betamix	3.0 lbai 0.25 5.2	PPI Post Post	223.5 abc	10.3	19.5 abc	2.01 bc	228.8
6. Pyramin Upbeet Betamix	3.15 lbai 0.25 5.2	PPI Post Post	210.3 bc	8.0	18.6 c	1.95 bc	223.8
7. Betamix	5.2	Post	218.5 abc	11.0	19.6 abc	2.15 ab	193.8
8. Nortron Betamix	1.87 lbai 5.2	PPI Post	228.5 ab	10.8	19.9 abc	2.17 ab	198.8
9. Roneet Betamix	3.0 lbai 5.2	PPI Post	203.3 c	10.6	18.3 c	1.95 bc	208.8
10. Pyramin Betamix	3.15 lbai 5.2	PPI Post	224.3 abc	10.5	20.2 abc	2.12 ab	206.3
11. UpBeet Stinger Crop oil	0.25 0.09 lbai 1%	Post Post Post	227.0 ab	10.3	19.4 abc	1.99 bc	236.3
12. UpBeet Stinger Crop oil	0.38 0.09 lbai 1%	Post Post Post	234.0 a	10.0	20.9 ab	2.09 abc	235.0
13. Untreated			208.5 bc	10.6	18.5 c	1.96 bc	200.0
CV @ p=0.05:			6.06%	NS	6.52%	6.72%	NS

Table 4. Effect of Postemergence Applied Herbicides On Stand in Sugar Beets

West Side Research & Extension Center 95-3

Treatment	Lbai/Acre	Date	Plant Stand Count Per Foot of Bed on 5/10/95		
			# Sugar Beets	# Velvetleaf	# Black Nightshade
1. Betamix	0.25	5/13, 5/19	6.0	0.9	3.1
2. Betamix	0.25	5/13	5.7	0.8	2.4
Betamix	0.33	5/19			
3. Betamix Progress	0.25	5/13, 5/19	5.9	0.8	1.6
4. Betamix Progress	0.25	5/13	5.3	0.8	3.8
Betamix Progress	0.33	5/19			
5. Betamix Progress	0.33	5/13	5.3	0.8	2.8
Betamix Progress	0.40				
6. Betamix	0.25	5/13, 5/19	5.1	1.0	3.2
UpBeet	0.015	5/13, 5/19			
7. Betamix	0.33	5/13, 5/19	5.9	1.0	3.3
UpBeet	0.015	5/13, 5/19			
8. Betamix Progress	0.25	5/13	6.0	1.2	4.0
UpBeet	0.015	5/13, 5/19			
Betamix Progress	0.33	5/19			
9. Betamix Progress	0.33	5/13	5.4	0.8	3.3
UpBeet	0.015	5/13, 5/19			
Betamix Progress	0.40	5/13, 5/19			
10. UpBeet	0.015	5/13, 5/19	5.9	1.0	3.6
Scoil	1 qt	5/13, 5/19			
11. Betamix Progress	0.25	5/13	6.2	0.7	3.1
UpBeet	0.015	5/13			
Betamix Progress	0.33	5/19			
12. Betamix Progress	0.33	5/13	5.8	0.9	3.4
UpBeet	0.015	5/13			
Betamix Progress	0.40	5/19			
13. Betamix Progress	0.25	5/13	5.4	0.6	2.8
UpBeet	0.015	5/13, 5/19			
Scoil	1 qt	5/13, 5/19			
Betamix Progress	0.33	5/19			
14. Betamix Progress	0.33	5/13	5.8	1.0	3.8
UpBeet	0.015	5/13, 5/19			
Scoil	1 qt	5/13, 5/19			
Betamix Progress	0.40	5/19			
15. Untreated			5.6	1.4	3.6
Statistical Notation at p = 0.05 (CV):			NS	NS	NS

Table 5. Effect of Postemergence Applied Herbicides On Weed Control in Sugar Beets
West Side Research & Extension Center 95-3

Treatment	Lbai/Acre	Date	Percent Weed Control on Three Evaluation Dates					
			5/27/95		6/2/95		6/20/95	
			VL	BNI	VL	BNI	VL	BNI
1. Betamix	0.25	5/13, 5/19	0 e	88 ab	0 e	89 a	0 d	99 b
2. Betamix	0.25	5/13	0 e	96 a	0 e	96 a	0 d	100 a
Betamix	0.33	5/19						
3. Betamix Progress	0.25	5/13, 5/19	0 e	85 ab	0 e	90 a	0 d	100 a
4. Betamix Progress	0.25	5/13	0 e	99 a	0 e	99 a	0 d	100 a
Betamix Progress	0.33	5/19						
5. Betamix Progress	0.33	5/13	0 e	96 a	0 e	100 a	0 d	100 a
Betamix Progress	0.40							
6. Betamix	0.25	5/13, 5/19	50 cd	86 ab	67 c	87 a	88 c	99 b
UpBeet	0.015	5/13, 5/19						
7. Betamix	0.33	5/13, 5/19	50 cd	99 a	70 bc	99 a	92 bc	100 a
UpBeet	0.015	5/13, 5/19						
8. Betamix Progress	0.25	5/13	50 cd	97 a	63 cd	98 a	96 ab	100 b
UpBeet	0.015	5/13, 5/19						
Betamix Progress	0.33	5/19						
9. Betamix Progress	0.33	5/13	62 bc	99 a	65 cd	99 a	100 a	99 b
UpBeet	0.015	5/13, 5/19						
Betamix Progress	0.40	5/13, 5/19						
10. UpBeet	0.015	5/13, 5/19	80 a	75 b	92 a	95 a	100 a	99 b
Scoil	1 qt	5/13, 5/19						
11. Betamix Progress	0.25	5/13	60 bc	89 ab	67 c	93 a	99 ab	100 a
UpBeet	0.015	5/13						
Betamix Progress	0.33	5/19						
12. Betamix Progress	0.33	5/13	37 d	88 ab	53 d	92 a	100 a	100 a
UpBeet	0.015	5/13						
Betamix Progress	0.40	5/19						
13. Betamix Progress	0.25	5/13	75 ab	99 a	82 ab	99 a	100 a	100 a
UpBeet	0.015	5/13, 5/19						
Scoil	1 qt	5/13, 5/19						
Betamix Progress	0.33	5/19						
14. Betamix Progress	0.33	5/13	80 a	100 a	85 a	100 a	100 a	100 a
UpBeet	0.015	5/13, 5/19						
Scoil	1 qt	5/13, 5/19						
Betamix Progress	0.40	5/19						
15. Untreated			0 e	0 c	0 e	0 b	0 d	0 c
Statistical Notation at p = 0.05 (CV):			25.4%	13.0%	18.6%	9.6%	7.8%	0.6%

VL = velvetleaf and BNI = black nightshade

1 = 100% pretreated
2 = Betamix alone + 1wk
3 = velvet + 1wk
4 = 84% B + 1wk
5 =

Table 6. Effect of Postemergence Applied Herbicides On Selectivity in Sugar Beets
West Side Research & Extension Center 95-3

Treatment	Lbai/Acre	Date	Sugar Beet Vigor and Injury on Three Evaluation Dates					
			5/27/95		6/2/95		6/20/95	
			Vigor	Injury	Vigor	Injury	Vigor	Injury
1. Betamix	0.25	5/13, 5/19	10.0 a	0.0 d	10.0 a	0.0 b	10	0
2. Betamix	0.25	5/13	9.7 ab	1.0 cd	10.0 a	0.3 b	10	0
Betamix	0.33	5/19						
3. Betamix Progress	0.25	5/13, 5/19	9.0 bcd	2.3 bc	9.0 bcd	0.3 b	10	0
4. Betamix Progress	0.25	5/13	9.3 abc	0.7 cd	9.3 abc	0.3 b	10	0
Betamix Progress	0.33	5/19						
5. Betamix Progress	0.33	5/13	9.0 bcd	3.3 ab	9.3 abc	1.0 ab	10	0
Betamix Progress	0.40							
6. Betamix	0.25	5/13, 5/19	9.3 abc	0.7 cd	9.7 ab	0.3 b	10	0
UpBeet	0.015	5/13, 5/19						
7. Betamix	0.33	5/13, 5/19	8.7 cde	2.0 bc	9.0 bcd	0.3 b	10	0
UpBeet	0.015	5/13, 5/19						
8. Betamix Progress	0.25	5/13	8.0 ef	2.0 bc	8.7 cd	0.7 b	10	0
UpBeet	0.015	5/13, 5/19						
Betamix Progress	0.33	5/19						
9. Betamix Progress	0.33	5/13	8.3 def	3.0 ab	9.0 bcd	1.0 ab	10	0
UpBeet	0.015	5/13, 5/19						
Betamix Progress	0.40	5/13, 5/19						
10. UpBeet	0.015	5/13, 5/19	9.0 bcd	0.0 d	9.0 bcd	0.0 b	10	0
Scoil	1 qt	5/13, 5/19						
11. Betamix Progress	0.25	5/13	8.0 ef	3.7 ab	8.7 cd	1.0 ab	10	0
UpBeet	0.015	5/13						
Betamix Progress	0.33	5/19						
12. Betamix Progress	0.33	5/13	9.0 bcd	1.0 cd	9.3 abc	0.3 b	10	0
UpBeet	0.015	5/13						
Betamix Progress	0.40	5/19						
13. Betamix Progress	0.25	5/13	7.7 f	4.3 a	8.7 cd	2.0 a	10	0
UpBeet	0.015	5/13, 5/19						
Scoil	1 qt	5/13, 5/19						
Betamix Progress	0.33	5/19						
14. Betamix Progress	0.33	5/13	7.7 f	3.3 ab	8.3 d	1.0 ab	10	0
UpBeet	0.015	5/13, 5/19						
Scoil	1 qt	5/13, 5/19						
Betamix Progress	0.40	5/19						
15. Untreated			10.0 a	0 d	9.7 ab	0 b	10	0
Statistical Notation at p = 0.05 (CV):			6.6%	64.5%	6.2%	10.6%	NS	NS

Vigor = 0 to 10 scale; 0 = all plants dead and 10 = vigorously growing
Injury = 0 to 10 scale; 0 = no injury and 10 = all plants killed

Table 7. Effect of Postemergence Applied Herbicides On Yield in Sugar Beets

West Side Research & Extension Center 95-3

Treatment	Lbai/Acre	Date	Sugar Beet Yield on 9/25/95				
			Pounds/ 13' Plot	% Sugar	Ton/Acre Clean Beets	Ton/Acre Sugar	Nitrates
1. Betamix	0.25	5/13, 5/19	67.7	10.5 ab	20.3	2.12	272
2. Betamix	0.25	5/13	65.3	10.2 abcde	20.1	2.04	301
Betamix	0.33	5/19					
3. Betamix Progress	0.25	5/13, 5/19	67.7	10.3 abcd	19.9	2.06	308
4. Betamix Progress	0.25	5/13	63.7	10.5 ab	19.3	2.03	268
Betamix Progress	0.33	5/19					
5. Betamix Progress	0.33	5/13	67.0	10.5 ab	20.0	2.09	275
Betamix Progress	0.40						
6. Betamix	0.25	5/13, 5/19	66.7	9.7 fg	20.7	2.00	272
UpBeet	0.015	5/13, 5/19					
7. Betamix	0.33	5/13, 5/19	72.0	9.8 efg	22.0	2.15	310
UpBeet	0.015	5/13, 5/19					
8. Betamix Progress	0.25	5/13	67.3	10.4 abc	20.6	2.13	288
UpBeet	0.015	5/13, 5/19					
Betamix Progress	0.33	5/19					
9. Betamix Progress	0.33	5/13	66.7	10.0 cdef	20.1	2.01	290
UpBeet	0.015	5/13, 5/19					
Betamix Progress	0.40	5/13, 5/19					
10. UpBeet	0.015	5/13, 5/19	68.7	9.8 efg	20.5	2.01	325
Scoil	1 qt	5/13, 5/19					
11. Betamix Progress	0.25	5/13	59.7	9.9 defg	17.7	1.76	348
UpBeet	0.015	5/13					
Betamix Progress	0.33	5/19					
12. Betamix Progress	0.33	5/13	68.0	9.5 g	20.5	1.95	362
UpBeet	0.015	5/13					
Betamix Progress	0.40	5/19					
13. Betamix Progress	0.25	5/13	59.3	9.8 efg	17.6	1.72	300
UpBeet	0.015	5/13, 5/19					
Scoil	1 qt	5/13, 5/19					
Betamix Progress	0.33	5/19					
14. Betamix Progress	0.33	5/13	62.0	10.6 a	18.5	1.96	262
UpBeet	0.015	5/13, 5/19					
Scoil	1 qt	5/13, 5/19					
Betamix Progress	0.40	5/19					
15. Untreated			57.3	10.1 bcdef	17.1	1.72	282
Statistical Notation at p = 0.05 (CV):			NS	2.59%	NS	NS	NS

**Table 8. Effect of Preplant Incorporated and Postemergence Applied Herbicides
On Yield in Sugar Beets
Spreckels Sugar Company 95-2**

Treatment	Rate ozai/A	Method	Sugar Beet Yield on 10/11/95				
			Pounds/ 45' Plot	% Sugar	Ton/Acre Clean Beets	Ton/Acre Sugar	Nitrates
1. UpBeet Betamix X-77	0.25 5.2 0.25%	Post Post Post	202.5	14.0	17.9	2.50	36.0
2. UpBeet Betamix X-77	0.38 5.2 0.25%	Post Post Post	209.3	13.9	18.2	2.53	31.5
3. UpBeet X-77	0.25 0.25%	Post Post	213.3	14.1	18.5	2.59	33.4
4. Nortron UpBeet Betamix	1.87 lbai 0.25 5.2	PPI Post Post	235.3	13.6	20.9	2.85	33.8
5. Roneet UpBeet Betamix	3.0 lbai 0.25 5.2	PPI Post Post	199.8	13.7	17.7	2.43	36.8
6. Pyramin Upbeet Betamix	3.15 lbai 0.25 5.2	PPI Post Post	192.8	14.0	17.0	2.39	33.5
7. Betamix	5.2	Post	197.5	13.9	17.1	2.40	34.6
8. Nortron Betamix	1.87 lbai 5.2	PPI Post	225.8	13.6	19.4	2.64	34.6
9. Roneet Betamix	3.0 lbai 5.2	PPI Post	237.5	13.9	20.7	2.88	30.0
10. Pyramin Betamix	3.15 lbai 5.2	PPI Post	208.3	13.8	18.1	2.50	33.8
11. UpBeet Stinger Crop oil	0.25 0.09 lbai 1%	Post Post Post	182.0	13.7	15.9	2.19	36.9
12. UpBeet Stinger Crop oil	0.38 0.09 lbai 1%	Post Post Post	235.0	13.9	20.2	2.82	36.5
13. Untreated			214.8	13.5	19.0	2.58	38.9