SWEET POTATO (*Ipomoea batatas* 'Beauregard')   M. J. VanGessel, Q.R. Johnson, and B.A. Scott
    mixed weed species   University of Delaware, Research and Education Center
    linuron, fomesafen   16483 County Seat Hwy, Georgetown, DE 19947

Evaluation of potential herbicides for sweet potatoes.

    The experiment was conducted at the University of Delaware's Research and Education Center. Plots were established in 2015 in a field of loamy sand soil (79:12:9 sand:silt:clay), 0.7% o.m. and 6.2 pH. The experiment was conducted as a randomized complete block design with nine treatments and three replications. Irrigation was used to reduce moisture stress. Field was conventionally tilled with chisel plow and disk. Plots consisted of two 5-ft. rows, 25 ft. long. Sweet potato slips, 'Beauregard', were transplanted May 28, 2015 at 1 plant/ft. Layby nitrogen was applied. Treatments consisted of an herbicide application either 2 days before transplanting, 1, 14, or 28 days after transplanting. Fourteen and 28 days after transplanting were June 10 and June 24, respectively. Herbicide rates and timings are listed in table below. No treatment included an adjuvant. Entire area was hand-weeded to eliminate weed competition.

    Herbicide applications were made with 20 g/A spray volume, at 3 mph, and 11002 spray nozzles using CO_2 backpack sprayer set at 30 psi. Visual crop response were made based on appropriate check plots on a scale of 0 to 100. Crop response was evaluated seven times. Area of the curve (AUC) was calculated for sweet potato stunting to assess crop recovery from herbicide damage. Stand counts, percent ground cover from sweet potato vines, total length of gaps (vines not touching in the row), and number of plants with >50 or >80% stunting were recorded to assess crop response. Sweet potatoes were harvested September 22, 2015. Tubers were lifted to the soil surface with a single row potato digger and all tubers in 20 feet of row were sorted as canners, No. 1, and jumbos, and weights were recorded.

    We had intended to have a treatment of Reflex at 1 pt, but we did not get that treatment applied. Stunting was observed with all treatments. There was little difference in the two rates of Lorox applied 28 days after transplanting, but Lorox at 2 lbs applied at 14 days followed by 28 days after transplanting often had significantly more stunting than other Lorox treatments. Reflex did not cause more stunting than Valor followed by Dual (2.5 oz fb 1 pt), a standard treatment. The AUC for these three treatments had two additional observations, which increased the overall values compared to those treatments applied 14 or 28 days after transplanting. Stunting remained observable up to 8 weeks after transplanting, ranging from 7 to 30%, although there were no differences between treatments. However, pre-harvest ratings were 10% or less for all treatments, except Reflex at 2 pts which had a rating of 17% (data not presented)

Herbicide[1]	Rate/A	Timing [z]	Stunting 3WATrp	Stunting 6WATrp	AUC	gaps (ft) 7WATrp
Check			0	0	0	1.42 D
Lorox	1 lb	28 dTrplnt	--	7.6 a	196.83 d	3.66 Bcd
Lorox	2 lb	28 dTrplnt	--	18.2 a	253 d	5.71 Abc
Lorox fb Lorox	1 lb fb 1 lb	14 fb 28 dTrplnt	3.3 c	6.8 a	275.17 d	4.76 a-d
Lorox fb Lorox	2 lb fb 2 lb	14 fb 28 dTrplnt	15.7 c	29.7 a	799.33 b	9.47 A
Lorox + Select Max	2 lb + 1 pt	28 dTrplnt	--	18.3 a	304 d	5.75 Abc
Reflex	2 pt	1 dTrplnt	14 bc	10 a	462.5 cd	2.09 Cd
Valor fb Dual	2.5 oz fb 1 pt	PRE fb 1 dTrplnt	23.7 ab	13.2 a	763.17 bc	4.02 bcd
Valor fb Dual	3 oz fb 1.3 pt	PRE fb 1 dTrplnt	30.3 a	27.2 a	1134.67 a	7.48 Ab
P^x>F			0.0069	0.1207	0.0002	0.0455

[1]Lorox= linuron; Reflex= fomesafen; Select Max= clethodim; Dual= s-metolachlor
[y]Means within a column followed by the same letter are not significantly different (*p*=0.05) according to Fisher's protected LSD test.
[x]P values ≤0.05 indicate significant differences exist among treatments.
[z]dTrplnt= days after transplanting; PRE= pre-transplanting; WATrp= weeks after transplanting; -- treatments not applied at time of ratings

There was a trend towards lower total yields when the higher rate of Valor followed by Dual was used (3 oz fb 1.3 pt, respectively), but was not significant. Weight of canners did not differ among the treatments. Weight of No. 1's was lower with the higher rate of Valor followed by Dual. Weight of Jumbos in plots treated with Valor followed by Dual was similar to the check plots; all other treatments had lower tonnage of Jumbos than the check plot. Yield distribution (% canners, No. 1's and Jumbos) was consistent between No. 1's and Jumbos for most treatments (data not presented). No. 1's was reduced in lower with weed-free check and higher rate of Valor fb Dual. Check plots and both rate of Valor fb Dual had higher percentage of Jumbos than the other treatments.

Herbicide[1]	Rate/A	Timing [z]	No. plants >80% Stunt	Canners	#1	Jumbos	Total
				------------------------- tons / A -------------------------			
Check			0.3 a	2.3 a	21.6 ab	19.5 a	43.4 a
Lorox	1 lb	28 dTrplnt	1 a	2.7 a	25.6 a	11.3 c	39.6 a
Lorox	2 lb	28 dTrplnt	0.3 a	2.7 a	22.8 ab	13.7 bc	39.2 a
Lorox fb Lorox	1 lb fb 1 lb	14 fb 28 dTrplnt	1 a	3.8 a	22.3 ab	11.8 c	37.9 a
Lorox fb Lorox	2 lb fb 2 lb	14 fb 28 dTrplnt	5.3 a	2.9 a	21.8 ab	10.3 c	35 a
Lorox + Select Max	2 lb + 1 pt	28 dTrplnt	1.3 a	2.4 a	20.5 ab	14.0 bc	36.9 a
Reflex	2 pt	1 dTrplnt	2 a	3.3 a	22.2 ab	11.1 c	36.6 a
Valor fb Dual	2.5 oz fb 1 pt	PRE fb 1 dTrplnt	1.7 a	1.7 a	18.4 b	17.6 ab	37.7 a
Valor fb Dual	3 oz fb 1.3 pt	PRE fb 1 dTrplnt	3.3 a	1.7 a	11.6 c	17.4 ab	30.7 a
P[x]*>F*			0.0602	0.2985	0.0129	0.0148	0.056

[1]Lorox= linuron; Reflex= fomesafen; Select Max= clethodim; Dual= s-metolachlor
[y]Means within a column followed by the same letter are not significantly different (p=0.05) according to Fisher's protected LSD test.
[x]P values ≤0.05 indicate significant differences exist among treatments.
[z]dTrplnt= days after transplanting; PRE= pre-transplanting; WATrp= weeks after transplanting

Sweet potato injury is a concern, but for most treatments the injury was similar to what is observed with a standard treatment of Valor fb Dual.

This trial was conducted as a preliminary crop safety trial. Neither Lorox nor Reflex are labeled for use on sweet potatoes (as of November 2015).