



SYSTEM HERBICIDE TESTING ON SESAME IN 2007

June 2, 2008

The American Sesame Growers Association (ASGA) sponsored system (SYS) herbicide research in two locations in 2007:

1. Lorenzo, TX, conducted by Peter Dotray of Texas Tech University, Texas AgriLife Research, and Texas AgriLife Extension Service, Lubbock, TX.
2. Uvalde, TX, conducted by James Grichar of Texas AgriLife Research, Beeville, TX.

The herbicides and rates were the same for both experiments with the exception being for linuron, Linex was used at Lorenzo while Lorox was used at Uvalde. The experiment consisted of preemergence (PRE) and postemergence-directed (POST DIR) applications of the following herbicides at 1x rates: PRE applications of: s-metolachlor (Dual Magnum), linuron (Lorox and Linex), and diuron (Direx), linuron + diuron (Layby Pro); POST DIR applications of: flumioxazin (Valor), linuron + diuron, diuron, and linuron at 1x rates. Originally, the experiment was to use POST over the top (POST OTT) herbicides, but after severe damage in Uvalde, the herbicides were changed to POST DIR. S-metolachlor, linuron, and diuron are presently used PRE in commercial sesame in other countries. Layby Pro premixes linuron and diuron in a 50/50 ratio. Diuron is presently used as a POST over the top (OTT) and POST DIR in commercial sesame in other countries.

Overall conclusions.

- The 1x PRE treatments using Dual Magnum, Linuron, Diuron, and Layby Pro did not reduce yields of sesame. The 1x POST DIR treatments of Linuron, Diuron, Layby Pro, and Valor did not substantially reduce yields with Valor causing a bit more injury.

Lorenzo experiment. Thirty units of nitrogen were applied in the spring. Prior to planting, glyphosate (Roundup) was sprayed to control the existing weeds. There was an adequate planting rain. Sesame (Sesaco 32) was planted on June 18 using a commercial 8 row planter on 40 in. beds. The PRE herbicides were applied the day after planting on the 2 center rows in a 24 ft. 4-row plot. There was a 0.7 in. rain two days after planting. The field was under a pivot. The POST DIR herbicides were applied 28 days after the PREs using a research hooded sprayer behind a plot tractor. Herbicides were sprayed 2 in. up the sesame stem on both sides of the plant and in the furrow of the two beds. There were 4 irrigations with 0.8 in. water each, and 3.7 in. of rain between planting and physiological maturity. About 5 units of nitrogen were added with each pass of the pivot. The following data was taken:

- 28 days after application (DAA), 42DAA, 55DAA, and 70DAA – Injury ratings were taken at specified days after application. 0% = no damage and 100% = sesame death. The 28 DDA rating reflects injury from the PRE herbicide while the rest reflect the additive effect with the POST DIR.
- Yield samples were taken 127 days after application. The yield sample was 1/1280 ac and was taken at the time that the field was dry enough that it could have been combined. When taking the yield samples, the plant stand counts were also taken. The stands were taken on 9.6 ft. and converted to plants per 1 ft.
- There was very little weed pressure in the field, and thus it was decided to make the whole experiment a weed free experiment and just be concerned about the effects of the chemicals on the sesame.

Herbicide	Rate	Injury (%)				Stand	Yield
	Product/ac	28DAA	42DAA	55DAA	70DDA	plants/ft	lbs/ac
Weed free check	-	0	0	0	0	6.4	1,178 a [†]
Dual Magnum + Valor	1.33 pt + 3.0 oz	0	0	3	2	7.5	1,200 a
Dual Magnum + Layby Pro	1.33 pt + 2.0 pt	2	5	5	5	7.0	1,173 a
Linex + Valor	2.0 pt + 3.0 oz	15	15	12	10	5.3	1,014 a
Linex + Layby Pro	2.0 pt + 2.0 pt	21	17	7	6	6.4	1,168 a
Direx + Valor	2.0 pt + 3.0 oz	2	0	0	0	5.8	1,152 a
Direx + Layby Pro	2.0 pt + 2.0 pt	8	12	11	7	5.8	1,187 a
Layby Pro + Valor	2.0 pt + 3.0 oz	3	2	5	3	6.6	1,183 a
Layby Pro + Layby Pro	2.0 pt + 2.0 pt	6	3	5	6	6.1	1,205 a
Dual Magnum + Direx	1.33 pt + 2.0 pt	2	0	3	3	6.6	1,114 a
Dual Magnum + Linex	1.33 pt + 2.0 pt	3	0	2	3	5.8	1,238 a
Linex + Direx	2.0 pt + 2.0 pt	12	10	3	3	5.2	1,138 a
Linex + Linex	2.0 pt + 2.0 pt	8	5	2	2	6.7	1,073 a
Direx + Direx	2.0 pt + 2.0 pt	2	8	3	3	6.9	1,180 a
Direx + Linex	2.0 pt + 2.0 pt	4	5	8	3	6.6	1,165 a
Layby Pro + Direx	2.0 pt + 2.0 pt	0	3	2	2	5.5	1,202 a
Layby Pro + Linex	2.0 pt + 2.0 pt	0	3	5	3	5.9	1,180 a
Average		5	5	4	3	6.2	1,164

[†]Means followed by same letter do not significantly differ (P=.10, Duncan's New MRT)

- The only PRE herbicide that caused any injury was the Linex. However, the sesame plants recovered and the yields at the end were statistically equal at the end.
- Upon application of the POST DIR herbicides there was no perceptible injury due to the overall appearance of the plants. The herbicides did hit the lower leaves, and there was visible damage. The Direx sprayed leaves had yellow splotches but the leaves stayed on the plants. The Valor sprayed leaves curled and dropped prematurely. There was no visible damage to the leaves from the Layby Pro or Linex.
- All of the PRE herbicides were tested at a 1x rate in a separate PRE test. Results of the PRE study showed that when using the 1x rate of each herbicide, there was no appreciable loss in yield (see PRE experiment). In the PRE and SYS experiments, the final average plant stand (6.1 and 6.2) and yields (1,110 and 1,164) were virtually identical.
- Linex, Direx, and Layby Pro were tested at a 1x rate in a separate POST DIR test with the herbicides applied the same day. Valor was used in combination with glyphosate (Roundup).

Uvalde experiment. In the previous fall, 40 units of nitrogen were applied. Two weeks prior to the pre-irrigation, glyphosate (Roundup) was applied to control pre-existing weeds. After pre-irrigation, the beds were harrowed, which further controlled weeds. Sesame (Sesaco 32) was planted on June 2 using a

commercial 10 row planter on 30 in. beds. Herbicides were applied two days after planting to the 2nd and 3rd rows in a 30 ft. 5-row plot. There was a 0.3 in. rain three days after planting. The field was under furrow irrigation. The field was cultivated 36 days after planting, and 30 units of nitrogen were added. There were 35.3 in. of rain from planting until physiological maturity. This unusual amount of rain set back the sesame and made it chlorotic, but once the rains diminished, the sesame recovered its healthy color. There was no significant weed pressure throughout all of the herbicide area. POST DIR herbicides were applied 35 days after the PREs using a manual research sprayer. Herbicides were applied as in the Lorenzo study (herbicides sprayed 2 in. up the sesame stem on both sides of the plants and in the furrow of the two beds). The following data was taken:

- WC – Weed control ratings were taken, 0 = no control and 100 = total control. All the herbicides effectively controlled grasses and *Amaranthus* with the only weed being hophornbean copperleaf - locally known as t-weed (*Acalypha ostryifolia*). The t-weed was at the seedling stage at 30 days after planting and the S32 canopied over, and the weeds were not a factor in the PRE or POST DIR experiments. However, all 4 POST DIR herbicides killed the t-weed seedlings in the furrow between the two rows.
- Leaf damage – Lower leaves were affected by the POST DIR herbicides. However, sesame experienced accelerated growth, and therefore these leaves were soon below the canopy, and thus the loss of photosynthesis was not severe. The 0-8 ratings were taken 11 days after the POST DIR was applied with 0 = total damage and 8 = no damage. Only the leaves at the bottom of the plant were evaluated.
- 14DAA, 28DAA, 53DAA, and 65DAA – Injury ratings were taken at specified days after application. 0 = no damage and 100 = sesame death. The first two ratings reflected any injury from the PRE herbicides while the last two ratings reflect sesame injury from the combination of PRE and POST DIR herbicides.
- Yield samples were taken 134 days after application. The yield sample was 1/1280 ac and was taken at the time that the field was dry enough that it could have been combined. The stands were taken on 12.8 ft. and converted to plants per 1 ft. There was some glyphosate drift from a commercial sorghum field to the north and thus the yield data on some treatments had to be disregarded. As a result, no statistical comparison was made.

Herbicide	Rate	WC (%)	Lf dam	Injury (%)				Stand	Yield
	Prod/ac	28DAA	39DAA	14DAA	28DAA	53DAA	65DAA	plants/ft	lbs/ac
Weed free check	-	0	0	0	0	0	0	8.5	1,441
Dual Magnum + Valor	1.33 pt + 3.0 oz	78	6.7	0	0	23	4	9.1	1,404
Linex + Valor	2.0 pt + 3.0 oz	67	6.7	0	0	12	1	8.1	1,240
Direx + Valor	2.0 pt + 3.0 oz	85	6.3	0	0	13	3	9.1	1,188
Layby Pro + Valor	2.0 pt + 3.0 oz	81	6.0	0	0	27	10	7.0	1,236
Average Valor		78	6.4	0	0	19	5	8.4	1,267
Dual Magnum + Layby Pro	1.33 pt + 2.0 pt	70	7.3	0	0	27	5	9.0	1,410
Linex + Layby Pro	2.0 pt + 2.0 pt	68	7.3	0	0	3	1	10.5	1,476
Direx + Layby Pro	2.0 pt + 2.0 pt	89	7.0	0	0	15	1	8.8	1,354
Layby Pro + Layby Pro	2.0 pt + 2.0 pt	83	7.7	0	0	13	1	8.5	1,298
Average Layby Pro		78	7.3	0	0	15	2	9.3	1,385
Dual Magnum + Direx	1.33 pt + 2.0 pt	73	8.0	0	0	10	1	8.5	1,248

	Rate	WC (%)	Lf dam	Injury (%)				Stand	Yield
Herbicide	Prod/ac	28DAA	39DAA	14DAA	28DAA	53DAA	65DAA	plants/ft	lbs/ac
Linex + Direx	2.0 pt + 2.0 pt	77	7.3	0	0	3	2	10.8	1,352
Direx + Direx	2.0 pt + 2.0 pt	98	7.7	0	0	17	1	9.6	1,166
Layby Pro + Direx	2.0 pt = 2.0 pt	87	7.3	0	0	10	1	9.4	1,428
Average Direx		84	7.6	0	0	10	1	9.6	1,299
Dual Magnum + Linex	1.33 pt + 2.0 pt	72	7.0	0	0	18	0	6.4	1,306
Linex + Linex	2.0 pt + 2.0 pt	63	7.7	0	0	7	1	8.7	1,228
Direx + Linex	2.0 pt + 2.0 pt	89	7.0	0	0	20	1	8.4	1,350
Layby Pro + Linex	2.0 pt + 2.0 pt	66	7.7	0	0	10	2	9.6	1,359
Average Linex		73	7.4	0	0	14	1	8.2	1,311
Average all		78	7.3	0	0	13	2	8.8	1,323

- There were no significant differences in weed control.
- There was more leaf damage on the Valor than the other chemicals, and this may have led to a slight reduction in yield. Although there was leaf burn, the leaves did not drop, and there was no visible damage to the stem.
- In both the PRE experiment and this SYS experiment the final stands averaged 8.8 plants/ft. As usual, the sesame thins itself down from planting to harvest. S32 is a branching type where the branches compensate for lower stands. Thus, at the end there was no difference in terms of final stand or on visual injury with the exception of the higher rate of the PRE Layby Pro and POST DIR Valor.
- In general the weed free check had a higher yield than the chemical treatments, but most of the yields were comparable statistically with only the POST DIR Valor treatment lower than the rest.
- One interesting result is that the double use of the double herbicides (Layby Pro/Layby Pro, Direx/Direx, and Linex/Linex) had the lowest yields of the group of 4 with the POST DIR.
- All of the PRE herbicides were tested at the 1x rate in a separate PRE test. Results of the PRE study showed that at the 1x rate there was no appreciable loss in stand or injury. (See PRE results) The final average plant stand (58 and 58) in the two experiments were identical.
- The Linex, Direx, and Layby Pro were tested at a 1x rate in a separate POST DIR test with the herbicides applied the same day. The Valor was used in combination with glyphosate (Roundup).

SYS herbicide work in 2008

The systems testing will not be repeated in 2008. There were no discernable differences between the treatments. The work will be resumed when there is a suitable postemergence over the top herbicide for sesame.