

**A Final Report to Syngenta  
Concerning**

**Evaluations of Envoke<sup>®</sup> and Suprend<sup>®</sup> Herbicides  
for Winter Weed Control, as Compared to Direx  
and Caparol, to Include Residual Effects on  
Subsequent Crops of Cotton, Corn and Sorghum**



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# Evaluations of Envoke and Suprend Herbicides for Winter Weed Control, as Compared to Direx or Caparol and, Their Residual Effects on Subsequent Crops of Cotton, Corn and Sorghum

## Background.

This experiment was developed to study the effectiveness of Envoke and Suprend to control henbit in South Texas. Henbit, *lamium amplexicaule*, is a cool season annual that can grow so aggressive as to dominate fallow land. In this regard, water is the “most limiting” resource for row crop production in South Texas. The presence of winter weeds preceding planting can rob planting moisture, increase weed seed, and result in needs for additional weed control. In short, a winter weed control program often provides for cleaner, more successful planting operations into seed beds free of cutworms, weed carcasses, rogue escapes and with more available planting moisture. In this study, various rates of Envoke® and Suprend® are evaluated against Direx and Caparol for winter weed control, for residual weed control and their subsequent effects on cotton, corn and sorghum. Suprend® contains Envoke and Caparol in a 1:30 ratio.

## Materials and Methods.

The study was positioned on the Texas A&M Meaney Farm Annex situated 1 mile west of the Texas A&M Research and Extension Center, in Corpus Christi. The soil is an Orelia silty-clay loam, which is very well drained and represent some of best farm land on either the TAM-CC Experiment Station or the TAM-Meaney Farm Annex. The following herbicide applications were made with a Spider self-propelled field plot sprayer using 11.5 gpa, 25 psi, 8003 XR tips at a ground speed of 5.0 mph. The plots were laid-out in RCB designs and were replicated 4X. Three sites were prepared in separate blocks, so as to allow the planting of corn ( BH 8881RR; 2/21/05), sorghum (TR 465; 3/15/05) and cotton (DP 444BGRR; 3/11/05). Plot size was four 38-inch rows, 40-feet in length.

Treatments:

1. Untreated Check (UTC)
2. 2 pt/A Caparol 4L + NIS
3. 1.2 pt/A Caparol 4L + NIS
4. 0.1 oz/A Envoke 75WG + NIS
5. 8 oz/A Suprend 80WG + NIS
6. 9.6 oz/A Suprend 80WG + NIS
7. 12.0 oz/A Suprend 80WG + NIS
8. 1.6 pt/A Direx + NIS

In accordance with the protocol, plots were rated at application, and residual weed control was rated until planting in the Spring. The protocol was expanded in May of 2005 to take these plots all the way to harvest of the corn, sorghum and cotton.

Images were taken of weed pressure on Feb 7<sup>th</sup> (preplant) and March 10<sup>th</sup> (preplant). Weed control ratings were made 21 Dec 2004 (at time of test establishment), 9 Feb 2005, and 21 Feb 2005. Although several visual checks were made of the plots following planting, no weed control ratings were made due to extremely dry weather (no rain April-early May). In fact, most of the 13.21 inches of rainfall received at this location occurred after May 7<sup>th</sup>.

## **Results and Discussion.**

**Harvesting of crops.** Sorghum was hand-harvested 7 July 2005, corn was hand-harvested 11 July 2005 and cotton was hand-picked and ginned on 15 August 2005. The results of these evaluations are shown in figures 1-3.

Both the sorghum and the corn plots, demonstrated lower yields where corn or sorghum was sprayed with the 2 pt/A or 1.2 pt/A rates of Caparol 4L. All four of these evaluations were significantly lower than the untreated checks, suggesting some kind of phyto-toxic reaction which degraded sorghum and corn yields by as much as 600 lbs/A. For the corn, the reduction was as much 1000 lbs/A. For both the sorghum and the corn, the Caparol treatments were always lower than the Direx treatment, but were significantly less than the Suprend and Envoke treatments.

**Observed henbit control.** Most impressive was the ability of Envoke® and Suprend® to hold weeds back until the corn, sorghum and cotton were established and we producing a full canopy. The holding-power of Envoke® and Suprend® far exceeds the short residual control of Caparol or Direx at labeled rates. The latter two products seldom provide residual control in excess of 3-4 weeks, although special conditions may extend suppression of susceptible weed as long as 5 weeks.

Images on pages 11-14 show some of the larger henbit present on 2/7. Also present are henbit that are in the cotyledon stages or have just one or two true leaves emerging. Images taken on 3/10 show larger henbit just before it declined as a winter annual.

Weed survey and count sheets are provided as enclosures in this report for 21 Dec 2004, 9 Feb 2005 and 21 Feb, 2005. The predominant winter weed in December-January is henbit, and this species totally dominated the test site.

**How henbit counts were made.** The procedure for determining the same place to count for each rating, was to advance 15-feet down the center of each 4-row plot and to position the PVC (½-m<sup>2</sup>) frame across the row middle. These sites were marked, and the same location was used to make subsequent counts.

Henbit weed counts were recorded as both cotyledon seedling plants (no true leaves) and those henbit plants which had one or more true leaves. From Feb 9<sup>th</sup> to Feb 21<sup>st</sup>, the henbit with true leaves in the UTC plots was nearly the same, but the number of seedling plants was greatly reduced (8.8 to 50%). Some henbit in the “cotyledon stage” died due to the residual herbicide treatment. Wind and rain would remove these, so evaluations had to be made prior to an significant rainfall events.

It is significant that so many henbit seedlings perished between 9 Feb and 21 Feb ratings. Rainfall was minimal after establishing to winter weed control test. There was virtually no rainfall > 0.17 inches received from the time the test was established (12/21) and the receipt of 1.19 inches on 2/24.

The “% Kill” column is not a true measure of how much of the 2/9 henbit population was killed, but is actually a composite of “% Kill” and any seedling henbit that emerged after 2/9 and was still alive. Because the UTC also had a henbit reduction in the absence of any herbicide, it can be noted that some henbit seed must have germinated in minimal moisture, only to shrivel and die soon afterwards.

What the “% Kill” column does tell us, is that values greater than 57.1% in the UTC are still killing henbit. The Direx appeared to have no residual activity left on 2/21 (see % Kill UTC). The Caparol appears to have some residual activity, as does the Envoke and the low rate of Suprend. What really stands out are the 9.6 and the 12.0 oz/A rates of Suprend 80WG, which are 25-29% higher in % Kill than the UTC.

Table 1. Henbit counts observed 9 Feb 2005 and 21 Feb 2005 in eight plots used in winter weed control studies, Texas Cooperative Extension, TAM-CC Meaney Farm Annex, Corpus Christi, Texas, 2005

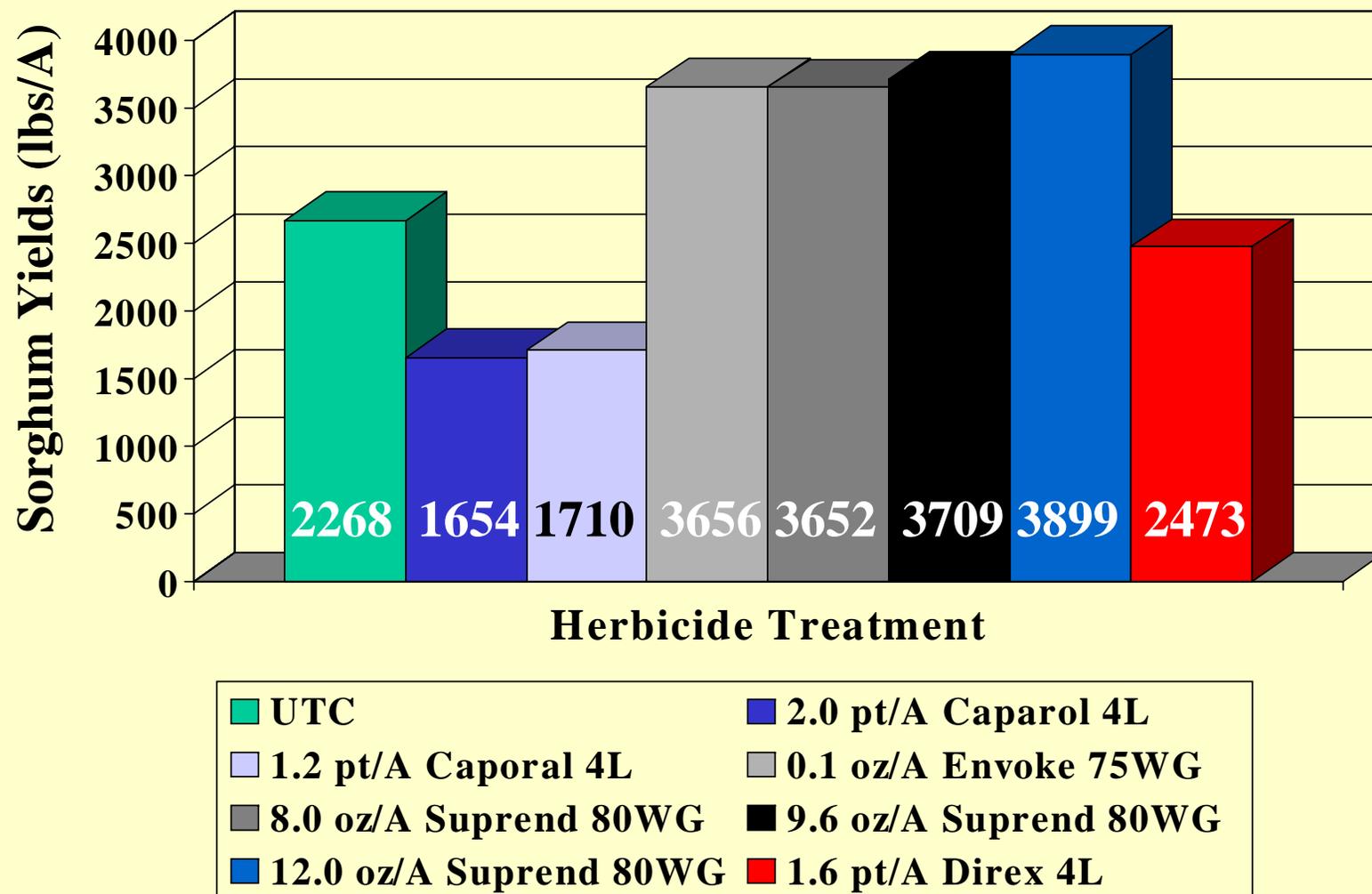
Herbicide Treatment	Total Henbit Counts/ ½-m <sup>2</sup>		% Alive	% Kill
	2/8	2/21		
UTC	289	121	42.9	57.1
2.0 pt/A Caparol 4L	47	17	36.2	63.8
1.2 pt/A Caparol 4L	18	5	27.8	72.2
0.1 oz/A Envoke 75WG	188	59	31.4	68.6
8.0 oz/A Suprend 80WG	307	118	38.5	61.5
9.6 oz/A Suprend 80WG	206	33	16.3	85.7
12.0 oz/A Suprend 80WG	141	25	17.7	82.3
1.6 pt/A Direx 4L	205	119	58.1	41.9

**Conclusions.** The following summary statements are made concerning the longevity and effectiveness of residual control of henbit during the winter of 2005 at the TAM-CC Meaney Farm Annex:

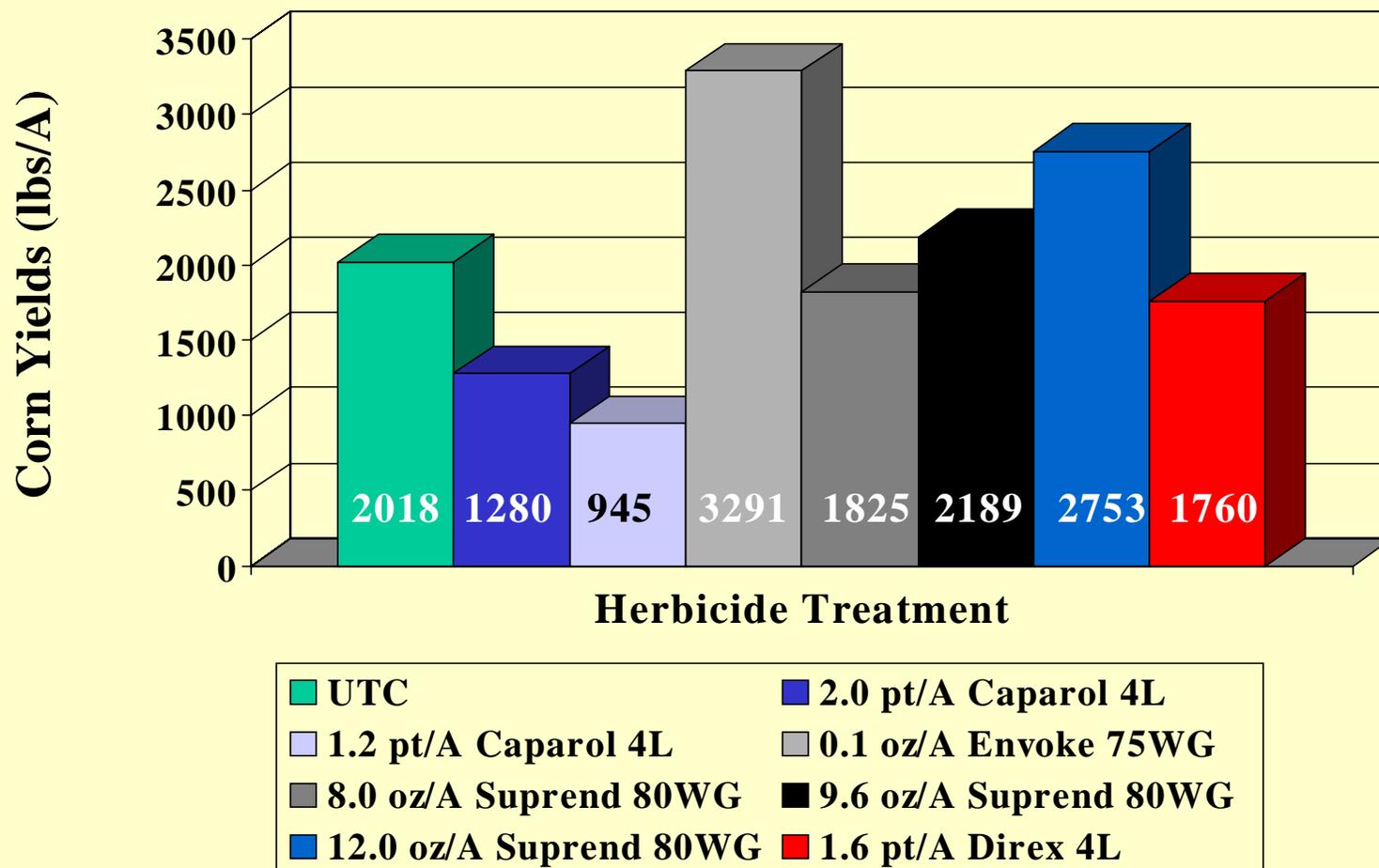
1. The effectiveness of Caparol and Direx lasted longer than normal, due to relatively dry field conditions from late December (Dec 21<sup>st</sup>) through late February (Feb 24<sup>th</sup>). However, by February 24<sup>th</sup>, both rates of Caparol were only slightly better than the UTC, and Direx had no residual control remaining.
2. Based on corn and sorghum grain yields, Caparol 4L appeared to reduce yields of these grains when used at the rates suggested in this winter weed control study. Yields of these plots were consistently lower than the UTC.
3. The crop safety for sorghum appears to be greater than for corn, if grain yields are used as an evaluation criteria. Corn may have a sensitivity to residual Caparol that cannot be visibly seen when it is growing in the field. Figure 2 clearly shows that Envoke at 0.1 oz/A had the highest yields of corn. All three rates of Suprend are lower than the Envoke. Although yields increase with increasing rates of Suprend, that effect may be due to the weed control observed in Table 1.
4. Based on this study, Envoke or Suprend can be used as winter weed control herbicide programs safely in sorghum, but further evaluations should be made when the subsequent crop is planned to be dent corn.
5. The best residual control of henbit was achieved with the 9.6 and 12 oz/A rates of Suprend. The 8.0 oz/A rate of Suprend may have been inadequate when followed by corn.

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**Figure 1. Sorghum yields from eight winter weed control options, Texas Cooperative Extension, Texas A&M Meaney Farm Annex, Corpus Christi, Texas, 2005.**



**Figure 2. Corn yields from eight winter weed control options, Texas Cooperative Extension, Texas A&M Meaney Farm Annex, Corpus Christi, Texas, 2005.**



**Figure 3. Cotton lint yields from eight winter weed control options, Texas Cooperative Extension, Texas A&M Meaney Farm Annex, Corpus Christi, Texas, 2005.**

