# A TECHNIQUE FOR DETECTING CORN HYBRID SUSCEPTIBILITY TO ERADICANE

by

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Approved by:

Major Professor

Dedicated to:

My Mother, Isabel

My Father, Julian

My Wife, Prude

My Daughters, Rebeca and Alejandra.

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# INTRODUCTION

Eradicane is a herbicide of the thiocarbamate group that is a combination of EPTC (ethyl-N, N, dipropylthiocarbamate) and an antidote. Eradicane has been found effective against many common weeds in corn (*Zea mays* L.) at 3.7-5.0 kg/ha. Higher rates successfully control wildcane (*Sorghum bicolor* (L.) Moench) and johnsongrass (*Sorghum halepense* Pers.). It does not leave residue for successive susceptible crops. However, as indicated by the need of an antidote the potential of EPTC injury on corn may be serious. Although the antidote protects most corn hybrids it does not completely eliminate the problem. Climatic, edaphic, and cultural factors act together with genetic susceptibility to make a corn hybrid show or not show injury. Practically, it would be safer to plant a corn hybrid resistant to EPTC injury whenever this herbicide is to be used for weed control. The main objective of this research was to find a suitable technique for detection of corn hybrid susceptibility to eradicane which will relate to field injury.

## LITERATURE REVIEW

Since EPTC entered the market of herbicides, extensive research has been devoted to its behavior in soil and factors related to corn susceptibility and weed control effectiveness. Butylate, a compound of the same thiocarbamate group, was found to cause differential response among several commercial hybrids (45, 46). Hybrid susceptibility to butylate was a function of depth of planting, pH, and temperature. Some work has been done on the site of EPTC uptake, and translocation within plants. Prendeville et al. (35) found that wheat (*Triticum aestivum* L.), barley (*Hordeum vulgare* L.), and oats (*Avena sativa* L.) were severely injured by EPTC when treated at the coleoptilar internode. Exposure of the remaining shoot did not affect growth. Sorghum (*Sorghum bicolor* (L.) Moench) was severely injured regardless of the shoot zone exposed. Parker (33), however, found that sorghum seedlings were highly dependent upon shoot uptake for developing characteristic toxic effects. Similar results were obtained by Appleby et al. (1) with oats. EPTC at 1 ppm was extremely toxic through coleoptile uptake, but penetration of roots into treated soil resulted in little damage to the plant. Treatment of the oat seeds did not damage the plants. Dawson (13) found that exposing the roots and seeds of barnyardgrass (*Echinochloa crusgalli* (L.) Beauv.) to EPTC did not lead to injury, whereas exposing the shoots or only the coleoptile did. Gray (19) found that

EPTC vapor applied to above ground parts of corn plants did not produce injury symptoms. But exposing the plants above the coleoptilar node for 48 hr. or longer produced typical symptoms. Prendeville et al. (34) and Eshel et al. (17) found that the shoot of corn plants was the main site of EPTC uptake. Entry through the roots also occurred to a certain extent since some growth reduction was evident when the root zone was treated. Under this latter condition the roots were severely inhibited by the herbicide.

Factors that have been found to affect EPTC injury to corn may be classified as: soil factors, climatic factors, cultural factors, and genetic factors.

Organic matter content has been found to strongly affect EPTC behavior. Koren et al. (29) studied EPTC activity to barnyard grass in soils having different amounts of organic matter. They found that soils high in organic matter (muck) had the highest adsorption capacity of EPTC. Pure sand, because of lack of adsorptive forces, let EPTC escape by volatilization. Ashton and Sheets (3) found a direct relationship between the ED50 (concentration of EPTC necessary to cause 50% reduction of fresh weight) values for oats, percent of clay, and the percent of organic matter in five soils investigated. Upchurch and Mason (42) found that ED50 values for cotton (Gossypium peruvianun Cav.) were highly and positively correlated with soil organic matter, CEC, and total exchangeable bases. Jordan and Day (26) found a negative correlation between EPTC toxicity to oats and nutsedge (Cyperus rotundus

L.) and organic matter. A positive correlation was found between sand and silt content of the soil and EPTC toxicity.

Depth of incorporation may greatly affect EPTC toxicity through exposing the coleoptile to longer exposure and through a dilution effect. Ashton and Dunster (2) found that with 1.1 and 2.2 kg/ha effectiveness of EPTC on barnyard grass decreased as depth of incorporation increased indicating a dilution effect. But at 4.5 kg/ha, the effect of depth of incorporation was not apparent, maybe because the concentration of EPTC at this rate was high enough to affect growth. Knake et al. (28) found the same basic relationship working with green foxtail (Setaria viridis (L.) Beauv.). Under the conditions of this study surface placement was the least effective, and 2.5 cm depth appeared to be the best. Hanser (22) studied the concept of subsurface application against incorporation and surface placement. He found that 2.2 kg/ha of EPTC applied at 3.3 or 7.5 cm depth gave 97% control of yellow nutsedge. However, 4.5 kg/ha was required to obtain the same control if incorporated, and 9.00 kg/ha surface applied failed to control yellow nutsedge. Burt (7) found that EPTC + R-25788 severely injured 6% of corn seedlings at 14 ppm when poorly incorporated but if thoroughly incorporated, 56 ppm was necessary to cause injury. This may be due to local accumulation of EPTC because of poor mixing. Less damage was found when seeds were placed to insure rapid shoot emergence, being of prime importance depth of planting and position of the seed. Waldrep and Freeman (43) found that EPTC toxicity to corn increased as depth of incorporation increased from 1.3 to 6.3 cm although seed germination was not affected by EPTC. Surface application produced the least amount of injury. Menges and Hubbard (31) found that EPTC activity in furrow irrigation increased as depth of incorporation increased up to 7.5 cm.

Knake et al. (28) studied the effect of moisture on EPTC behavior. They found that under conditions of low moisture in the soil, incorporation improved EPTC performance. But when EPTC was moved into the soil by moderate or high water application, incorporation did not give additional benefits. Ashton and Sheets (3) found that EPTC was adsorbed to a much greater extent by dry soils than those soils having moisture content near field capacity. Gray and Weierich (21) said that the most important factor affecting the loss of EPTC from soils was moisture content. They worked with a loamy sand soil and found that 24 hr. after surface spraying the loss of EPTC from dry (1% moisture content), moist (10% moisture content), and wet (17% moisture content) soil was 23, 49, and 69%. Fang et al. (18) said that loss of EPTC from a drying soil was related to texture. So it will be greatest in light textured soils and less in heavy soils. Another important finding of this study was that EPTC loss was proportional to the amount of water vaporized. Menges (30) stated that overhead irrigation gave better weed control at either 4.5 or 6.7 kg/ha of EPTC than furrow irrigation when the herbicide was surface applied. He said that the better performance of overhead over furrow irrigation was because of a better penetration. Jordan et al. (27) effectively controlled grasses and broadleaves with EPTC when either incorporated or surface applied but sprinkler irrigated. Incorporated and furrow irrigated gave less control and surface applied and furrow irrigated gave poorest control.

Temperature and cloudiness may affect EPTC loss from soils at a rate depending on the relationship with other factors such as moisture content and texture. Gray and Weierich (20) found that increasing temperature from 0°C to 15.5°C increased the rate of EPTC vaporization from moist soil but had little effect on loss from dry soil. Burt and Akinsorotan (8) detected more growth reduction in corn at 30°C than at 20°C. The temperature before emergence of the corn coleoptile was the most critical for EPTC injury. There was an interaction between moisture content and temperature. Corn growing at 30°C was injured more at 33% moisture content than at 15% but at 20°C moisture content did not affect injury. Corn cultivars were found to differ in their EPTC susceptibility at 30°C but not at 20°C. EPTC was found to be lost faster on sunny days than in cloudy days by Gray and Weierich (21). However, after six hours the loss on the cloudy days almost equalled loss on sunny days. This may be explained by the soil drying out faster on the sunny days so that the rate of loss slowed down considerably after 2 hr. and because of the slower drying on cloudy days, the rate of EPTC loss did not slow down after 4 hrs.

Microbial breakdown plays an important role in EPTC loss from soil. Sheets (40) found that EPTC was inactivated more rapidly in unautoclaved than in autoclaved soils. This may implicate microbial breakdown as a pathway of EPTC loss from soils. Vapor loss of EPTC may affect greenhouse experiment results. Beste and Schreiber (4) found an increase of EPTC toxicity to corn when closing the tops of the pots. This observation supports the thesis that a significant loss of EPTC vapor occurs in unsealed pots. Oliver et al. (32) arrived at the same results and pointed out that, all conditions being equal, two different experimental methods at the same herbicidal concentration may yield different results. The loss of EPTC by leaching was studied by Gray and Weierich (21). They found that 20.0 cm of water failed to move EPTC beyond 7.5 cm in a peat soil with 34% organic matter. It was found that leaching was strongly influenced by clay and organic matter content of the soil.

EPTC when used alone in corn may cause toxicity of different degrees of intensity depending on environmental conditions and hybrid susceptibility. However, some compounds show antidotal effects on EPTC toxicity. Burnside et al. (6) noted that 1, 8 naphthalic anhydride as a seed treatment at 0.5% by seed weight was effective in protecting corn from EPTC injury up to 10.0 kg/ha. Heikes and Swink (23) found severely reduced stand and corn yield in Pioneer 3369A when 4.5, 6.7 or 9.0 kg/ha of EPTC were used while 1, 8 naphthalic anhydride effectively protected the corn up to 6.7 kg/ha but not at 9.0 kg/ha. Rains and Fletchall (36) found that EPTC alone caused corn stand reduction at 6.7 and 9.0 kg/ha in 1970 and at 9.0 kg/ha in 1969. But with the use of the antidote at either 0.5 or 2% effective protection resulted.

The research for an effective antidote for EPTC injury continued and a compound, R-25788, which after testing showed a high degree of effectiveness. Heikes and Swink (23) pointed out that R-25788 overcame the toxic effects of EPTC at rates of 4.5, 6.7 or 9.0 kg/ha. Chang et al. (12) found R-25788 more effective than 1, 8 naphthalic anhydride and CDAA in protecting corn. Chang et al. (11) found that R-25788 applied as a preplant incorporated treatment effectively protected corn against 10 of 22 herbicides. They were in order of decreasing effectiveness of the antidote: EPTC, barban, sulfallate, vernolate, molinate, butylate, alachlor, pebulate, linuron and di-allate. The antidote action of R-25788 was not specific for EPTC or entirely confined to the thiocarbamate group. But R-25788 seemed to be highly specific for corn and not for weeds or other crops (10). Chang et al. (10) found that R-25788 at 0.14 kg/ha effectively protected the corn from an EPTC rate of 3.14 kg/ha but more antidote was needed as the EPTC rate increased. The same authors suggested that faster degradation of the antidote may occur but there was not conclusive evidence on that. Burt (7) said that leaching of R-25788 would be equal to or less than the leaching of EPTC.

Roots appear to be the most effective site of uptake for R-25788 (19). If applied as a vapor or injected in the shoots it fails to completely protect the corn seedling from EPTC injury. Recently, some findings suggest that correlation may exist between the toxicity of EPTC and the auxin effect of growth regulators (25). Antagonistic action has been found between EPTC and 2, 4-D. Donald and Fawcett (14) and Donald et al. (15) found that $GA_3$ was effective in preventing EPTC toxicity to corn. Delaying application until coleoptile emergence caused $GA_3$ to be progressively less effective in a manner similar to the protectant R-29148.

EPTC has been found to be an effective herbicide for weed control in corn, especially against grasses. Shattercane, a troublesome weed in corn, was effectively controlled with EPTC at 6.7 kg/ha (36). However, this treatment resulted in 32% injured plants. But when EPTC was mixed with R-25788 at 0.5%, very little injury resulted. Russ et al. (39) tested EPTC and EPTC + R-25788 (Eradicane) in furrow irrigated corn getting excellent control of shattercane and no injured corn plants. However, Russ (38) found that EPTC at 3.4 kg/ha and EPTC + simazine at 2.5 and 3.4 kg/ha gave excellent control of shattercane, but produced 30% and 10% injured plants of 'Funk 96' hybrid. Burnside (5) found that a combination of EPTC and EPTC + 2.4-D plus cultivation were more effective than herbicide alone for shattercane control. Some workers report good johnson grass control with EPTC. Roeth (37) found good control with EPTC at 4.8, 7.5 and 15.0 kg/ha early in the season and at harvest. One cultivation improved control. Significant corn injury resulted in one year with

15.0 kg/ha of EPTC. Hicks and Fletchall (24) found that the best treatment for johnson grass control was 8.3 kg/ha of dalapon preplow, and 3.4 kg/ha of EPTC pre-emergence plus cultivation. EPTC alone did not provide an acceptable rhizomatous johnson grass control, although emergence was delayed. The same experiment gave erratic corn injury in two years.

Besides edaphic and climatic factors, EPTC injury to corn has been found highly dependent on genetic susceptibility. Williams et al. (44) found that the corn inbreds 'W64A' and 'OH43' were the most affected when treated with EPTC at 6.7 kg/ha. But the use of R-25788 eliminated the injury from EPTC. Carringer et al. (9) found that EPTC at 5 ppm caused injury to inbred 'OH551' but inbreds 'B37', 'Mo14W', 'C103', and 'Va35' were tolerant. Protectants themselves have been found to affect corn fresh weight at rates of 0.4 and 0.8 ppm.

Oliver Russ (Kansas State University, 1976, unpublished data) tested 189 corn hybrids for Eradicane susceptibility. It was found that at 6.7 kg/ha about 75% of the hybrids showed no injury symptoms and 25% were found with variable degrees of susceptibility. Thompson et al. (41) got 38% corn injury with EPTC at 6.7 kg/ha but when R-25788 was added at 0.6 kg/ha it resulted in 3% injured corn. Dowler (16) found that EPTC + R-25788 at 3.4 kg/ha + 0.3 kg/ha caused 15% injury in corn and EPTC at 6.7 kg/ha with the same amount of protectant injured 11% corn plants. Poneleit ("Inheritance of Tolerance to EPTAM and Eradicane in Maize", University of Kentucky, Mimeo report,

1975) tested 90 hybrids at 8 different locations with different herbicides. He found that a sensitive hybrid yielded much lower than the average of the 90 hybrids whenever eradicane was used at 3.4, 4.5 or 6.7 kg/ha, but yielded over the average if other herbicides were used. The main cause of yield reduction was reduced stand, but there was a high frequency of injured plants that produced less grain. He found differential genotype susceptibility to EPTC and eradicane in hybrids as well as in inbreds. Genetic effects were primarily additive. Inbred evaluation, therefore, could be used with a high degree of accuracy to predict hybrid sensitivity to EPTC or eradicane.

# MATERIALS AND METHODS

## Growth Chamber Experiments

Six hybrids were selected from a former study where hybrid susceptibility was tested at 6.7 kg/ha of eradicane under field conditions. The criterion used for classification as resistant or susceptible was field injury or plant deformation. Hybrids selected were: (1) G. Harvest 638 Exp., (2) Asgrow Rx58, (3) Trojan TXS102, (4) Bojac x 56, (5) Asgrow R x 90, and (6) Prairie Valley 76S. The first three were susceptibles and the other were resistants. These hybrids were used in experiments 1 through 6 in order to test the technique. Twelve hybrids and the fourteen inbreds involved were used for experiment 7 (Table 1) to correlate chamber and field susceptibility.

Corn was grown in nutrient solution in silica sand. Growth chambers were set at 16 hours light and 8 hours dark periods. Temperatures were 30°C and 21.1°C for light and dark periods, respectively.

Seeds were soaked for 24 hours or less prior to planting (except experiment number 6) in pots of approximately 1 kg capacity. Five seeds per pot were placed horizontally with embryo side facing up. Depth of planting was 4 cm for all experiments except number 7, replications 3 and 4, which were planted at 2.5 cm.

In order to prepare the desired herbicide concentration the exact amount of sand was weighed and spread over a plastic sheet. Then the required amount of herbicide was applied in water and uniformly mixed. Pots were filled to a predetermined level, seed planted as explained before and covered with the same treated sand to get the desired depth of planting. Afterwards, 50 ml of nutrient solution was added to each pot. Experiments 4, 5, 6, and 7 were wetted to field capacity (previously determined to be 17.5%) with a mixture 1:1 of water and nutrient solution. Experiments 1, 2, and 3 were uncovered for the whole growing period but experiments 4, 5, 6, and 7 were capped for 3 days from planting to emergence. All control pots were treated in the same way except herbicide was not applied.

Nutrient solution (Table 2) was applied at 50 ml every day in experiments 1, 2, and 3 and to field capacity in experiments 4, 5, 6, and 7. The nutrient solution included all essential elements except Fe which was added 3 times a week (experiments 1, 2, and 3). In experiments 4, 5, 6, and 7, Fe was sprayed once a week at 1.5% concentration as ferrous sulfate.

Experimental design was a randomized complete block with two to four replications. Pots were randomly placed into the chamber and their position changed every day.

Parameters used for evaluation of treatment effects were height, fresh weight, dry weight and twisting. Height was measured from the sand surface to the tip of the largest leaf. Fresh weight was obtained by clipping all plants at the sand surface and weighing them. Dry weight was determined by drying in the oven for 48-72 hr. Data reported are average

Table 1. Hybrids and inbreds used in field experiment and chamber experiment no. 7.

| No. | Hybrid | No. | Inbred |
|---|---|---|---|
| 1 | (FR37 x H84)Va26 | 1 | FR37 |
| 2 | Mo17 x N7A | 2 | Va26 (643TI) |
| 3 | Mo17 x N28 | 3 | Mo17 |
| 4 | (A634 x A635)Mo17 | 4 | B73 |
| 5 | FR805W x FR802W | 5 | N28 |
| 6 | B73 x Va26 | 6 | H84 |
| 7 | A632 x A619 | 7 | A632 |
| 8 | B73 x Mo17 | 8 | A635 |
| 9 | ASGROW R58 | 9 | A634 |
| 10 | FUNK G-4444 | 10 | N7A |
| 11 | PIONEER 3780 | 11 | FR802W |
| 12 | PIONEER 3386 | 12 | A619 |
|  |  | 13 | FR805W |
|  |  | 14 | Va26 (76-611) |

Table 2. Nutrient solutions used in growth chamber experiments.

| Compound | Macronutrient Solution | | |
|---|---|---|---|
| | Ml. Molar Stock Sol. Per Liter Solution | Element | PPM Final Solution |
| $KNO_3$ | 5 | N | 210 |
| | | K | 234 |
| $Ca(NO_3).4H_2O$ | 5 | Ca | 200 |
| | | P | 31 |
| $MgSO_4.7H_2O$ | 2 | S | 64 |
| $KH_2PO_4$ | 1 | Mg | 48 |
| | Micronutrient Solution | | |
| | Mg. Per Liter Stock Sol. | Element | PPM in Final Solution |
| KCl | 3728 | Cl | 1.77 |
| $H_3BO_3$ | 1546 | B | 0.27 |
| $MnSO_4.H_2O$ | 845 | Mn | 0.27 |
| $ZnSO_4.7H_2O$ | 575 | Zn | 0.13 |
| $CuSO_4.5H_2O$ | 125 | Cu | 0.03 |
| $(NH_4)_6Mo_7O_{24}.4H_2O$ | 18.4 | Mo | 0.01 |

height and fresh and dry weight of 5 plants and these variables as percent of the control. Harvest age was 13-14 days after planting. Data in absolute values are given in the appendix.

In experiments 1 through 6, only plants that emerged were recorded but in experiment 7, plants that germinated but died or failed to emerge were counted, too. Seeds that failed to germinate were considered as missing values. Herbicides rates for the 7 experiments are given in Table 3.

Table 3. Herbicide rates used for experiment in ppm (ai)

| Experiment No. | Eradicane | EPTC | R-25788 |
|---|---|---|---|
| 1 | 50,100 | 18 | 4.18 |
| 2 | 25,50 | 9,18 | - |
| 3 | 5,10,25,50 | - | - |
| 4 | 5,10,25,50 | - | - |
| 5 | 5,10 | - | - |
| 6 | 5,10 | - | - |
| 7 | 5,10 | - | - |

## Field Experiment

The same hybrids and inbreds used in growth chamber experiment 7 were planted on a fine loamy sand in Rossville, Kansas. Eradicane plus atrazine at 6.7 + 1.7 kg/ha and lasso plus atrazine at 3.4 + 1.7 kg/ha were preplant incorporated at 5.0 - 7.5 cm depth. Planting followed on the day of herbicide application.

Experimental design was a split plot with two replications and herbicides as main plots. Hybrids and inbreds were randomized among themselves but were kept separated to avoid uneven competition given the difference in growth and vigor between hybrids and inbreds.

Subplots consisted of four rows 6.09 meters long and 76 cm apart. Two seeds were planted per hill and thinned to one after germination to make a population of 44,537 plants/ha. Only the central two rows were harvested.

Parameters studied were germination, twisting, final population, ear number, ear weight, moisture percent and grain yield.

## RESULTS

### Growth Chamber Experiments

Experiment 1. The hybrid x treatment interaction was significant at 1% level for height but not for fresh or dry weight (Table 4). Hybrids 4, 5, and 6 treated with 50 ppm Eradicane were not significantly different ($P = .05$) from the control. At 18 ppm EPTC hybrids 2, 4, and 6 were equal and more resistant than 1 and 3. Hybrid 5 gave conflicting results at this rate. At 100 ppm Eradicane hybrid 5 was more susceptible than 4 and 6 which were equal to the rest.

Observation of twisting (Table 5) were significant at 5% level. Eradicane at 50 ppm caused the least injury. Hybrids 1, 4, 5, and 6 were more resistant than 2 and 3 and this rate. At 18 ppm EPTC hybrids 5 and 6 were the most resistant. Eradicane at 100 ppm caused a higher degree of injury, and hybrid 5 sharply increased in susceptibility from 50 ppm to 100 ppm.

Experiments 2 and 3. There was not significant hybrid x treatment interaction for any of the factors studied (Tables 6 and 7). In experiment 2 (Table 6) all hybrids were greatly reduced in height, fresh weight and dry weight, and showed a high degree of twisting. With EPTC at either 9 or 18 ppm twisting was severe for all hybrids. With Eradicane at either 25 or 50 ppm, corn injury scores were higher for hybrids 1, 2, and 3 although they did not reach significance (Table 8).

Combined analysis of experiments 1, 2, and 3 for the

Table 4. Height, fresh weight and dry weight of six corn hybrids (Expt. 1) as affected by EPTC, Eradicane and R-25788 expressed as percentage of control.

| Hybrid | EPTC 18 ppm | | | Eradicane 50 ppm | | | Eradicane 100 ppm | | | R-25788 4.18 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ht.** | F. Wt. | D. Wt. | Ht.** | F. Wt. | D. Wt. | Ht.** | F. Wt. | D. Wt. | Ht.** | F. Wt. | D. Wt. |
| 1 | 46.3 | 47.2 | 49.1 | 74.6 | 56.7 | 63.1 | 41.6 | 27.9 | 33.3 | 96.5 | 95.6 | 105.1 |
| 2 | 70.5 | 67.1 | 66.6 | 71.5 | 47.8 | 50.6 | 37.8 | 32.5 | 34.0 | 88.0 | 72.5 | 72.0 |
| 3 | 46.9 | 42.9 | 42.5 | 62.9 | 44.5 | 45.1 | 43.9 | 35.1 | 35.7 | 90.1 | 84.5 | 79.2 |
| 4 | 74.2 | 81.2 | 97.1 | 88.8 | 68.1 | 103.2 | 60.4 | 38.0 | 55.6 | 95.9 | 74.4 | 101.6 |
| 5 | 124.4 | 100.0 | 124.6 | 94.6 | 63.8 | 85.1 | 32.2 | 33.7 | 38.8 | 104.9 | 82.3 | 96.6 |
| 6 | 71.7 | 67.0 | 66.5 | 90.4 | 64.4 | 83.7 | 59.3 | 37.0 | 44.6 | 96.3 | 64.1 | 73.0 |

L.S.D.: 23.2

CV%: 14.3 17.9 25.3

**Significant at 1% level.

Table 5. Corn injury due to EPTC and Eradicane in a scale from 0-10. Experiment 1.

| Treatment (ppm) | Hybrids | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| EPTC 18 | 8.8 | 7.5 | 7.5 | 5.0 | 1.3 | 3.8 |
| Eradicane 50 | 2.5 | 5.0 | 5.0 | 0.0 | 1.3 | 0.0 |
| Eradicane 100 | 8.8 | 10.0 | 8.8 | 5.0 | 10.0 | 6.3 |
| R-25788 4.18 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

L.S.D. 0.05 3.2

CV% 49.0

Table 6. Height, fresh weight and dry weight of six corn hybrids (Expt. 2) at two rates of EPTC and Eradicane as percentage of control.

| Hybrid | EPTC 9 ppm | | | EPTC 18 ppm | | | Eradicane 25 ppm | | | Eradicane 50 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. |
| 1 | 11.9 | 13.0 | 16.2 | 9.2 | 13.3 | 16.4 | 30.0 | 36.9 | 37.5 | 20.9 | 19.2 | 25.7 |
| 2 | 17.9 | 27.1 | 27.1 | 15.5 | 32.0 | 31.9 | 35.4 | 45.3 | 43.3 | 22.1 | 22.9 | 25.4 |
| 3 | 21.0 | 32.2 | 37.8 | 20.2 | 34.3 | 40.6 | 39.1 | 54.8 | 58.3 | 27.0 | 31.8 | 38.6 |
| 4 | 13.5 | 13.8 | 17.4 | 14.4 | 20.2 | 22.1 | 46.0 | 40.4 | 49.4 | 36.0 | 32.4 | 38.2 |
| 5 | 32.1 | 37.4 | 38.2 | 17.4 | 23.8 | 23.8 | 49.6 | 46.4 | 53.6 | 31.7 | 27.5 | 31.1 |
| 6 | 26.1 | 25.5 | 28.8 | 11.1 | 11.1 | 14.0 | 45.8 | 40.2 | 48.4 | 38.3 | 35.7 | 43.2 |
| CV% | 12.5 | 19.3 | 16.5 | | | | | | | | | |

Table 7. Height, fresh weight and dry weight of six corn hybrids (Expt. 3) at four rates of Eradicane as percentage of control.

| Hybrid | Eradicane 5 ppm | | | Eradicane 10 ppm | | | Eradicane 25 ppm | | | Eradicane 50 ppm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. |
| 1 | 80.7 | 88.9 | 77.9 | 59.3 | 59.9 | 59.2 | 39.8 | 40.1 | 43.7 | 18.5 | 19.6 | 22.6 |
| 2 | 81.1 | 95.0 | 88.6 | 62.8 | 78.5 | 74.9 | 35.1 | 43.6 | 44.7 | 23.4 | 22.7 | 26.4 |
| 3 | 87.3 | 93.2 | 100.3 | 63.8 | 66.4 | 66.9 | 47.7 | 54.9 | 57.6 | 27.5 | 26.9 | 30.1 |
| 4 | 86.0 | 87.2 | 80.8 | 74.0 | 76.1 | 77.8 | 47.4 | 46.9 | 53.5 | 28.4 | 22.6 | 25.1 |
| 5 | 87.2 | 80.2 | 75.7 | 63.2 | 63.1 | 69.1 | 36.1 | 29.2 | 37.1 | 24.1 | 19.7 | 24.6 |
| 6 | 93.9 | 84.4 | 86.6 | 69.0 | 74.0 | 75.6 | 45.6 | 43.6 | 52.0 | 31.2 | 24.3 | 29.2 |
| CV% | 7.3 | 11.7 | 14.4 | | | | | | | | | |

Table 8. Corn injury due to EPTC and Eradicane in a scale from 0 to 10. Experiment No. 2.

| Treatment (ppm) | Hybrids | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| EPTC 9 | 10.0 | 10.0 | 10.0 | 10.0 | 9.0 | 10.0 |
| EPTC 18 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Eradicane 25 | 6.0 | 6.0 | 5.0 | 2.5 | 3.5 | 3.0 |
| Eradicane 50 | 7.0 | 7.0 | 5.5 | 4.5 | 5.0 | 3.5 |
| CV% | 17.2 | | | | | |

common rate of 50 ppm Eradicane gave significant interaction for height, fresh weight and dry weight (Table 9). Regarding height, hybrids 4, 5, and 6 were significantly more resistant than 1, 2, and 3. For fresh weight, hybrids 4, 5, and 6 were equal but only 4 and 6 were significantly more resistant than 1, 2, and 3. For dry weight, hybrids 4, 5, and 6 were more resistant than 1, 2, and 3. It is noted that hybrid 5 increased susceptibility from 50 to 100 ppm Eradicane (Experiment 1) and from 25 to 50 ppm (Experiments 2 and 3) as compared to hybrids 4 and 6.

In experiments 1, 2, and 3, iron was applied in the solution 3 times a week as $FeSO_4.H_2SO_4$ or as $FeSO_4$ tartrate. However, none avoided iron deficiency. Therefore, iron was applied as a spray of 1.5% ferrous sulfate once a week in

Table 9. Height, fresh weight and dry weight in percent of the control for experiments 1, 2, and 3 at 50 ppm Eradicane.

| Hybrid | Ht. | F. Wt. | D. Wt. |
|---|---|---|---|
| 1 | 38.0 | 31.8 | 37.1 |
| 2 | 38.9 | 31.1 | 34.1 |
| 3 | 39.1 | 34.4 | 38.0 |
| 4 | 51.1 | 41.0 | 55.5 |
| 5 | 50.1 | 37.0 | 46.9 |
| 6 | 53.3 | 41.5 | 52.1 |
| L.S.D. .05 | 6.6 | 5.5 | 8.2 |
| CV% | 7.7 | 6.7 | 9.7 |

succeeding experiments. The deficiency was corrected.

In experiments 4, 5, and 6, pots were capped for 3 days after planting to avoid Eradicane losses by volatilization. Because they were capped and they were wet enough for germination, no watering was performed during these 3 days and no leaching occurred beyond the coleoptilar zone. Coleoptile has been found to be the main site of Eradicane activity in corn seedlings. After lids were removed, the pots were watered to near field capacity every day.

Experiment 4. There was a significant hybrid x treatment interaction for height but not for fresh weight, dry weight or twisting (Tables 10 and 11). Capping the pots, as expected, avoided volatilization and increased the corn injury. Eradicane at 25 ppm killed all plants. Eradicane at 5 ppm showed hybrids 4 and 6 were equal and more resistant than 1, 2, and 3. Hybrid 5 was equal to 4 and superior only to 1 and 2. At 10 ppm hybrids 4 and 6 were equal and more resistant than 1, 2, 3, and 5. Again the hybrid 5 increased in susceptibility from 5 ppm to 10 ppm Eradicane as compared to hybrids 4 and 6.

Fresh and dry weight differences were not significant, however, at 5 ppm. Hybrids 4, 5, and 6 consistently yielded more than 1, 2, and 3, and at 10 ppm 4 and 6 yielded more than 1, 2, 3, and 5.

Experiments 5 and 6. There was not significant interaction for any of the parameters studied except twisting (Tables 12 and 13). Eradicane at 5 ppm caused only a little twisting injury in all hybrids (Table 11). However, hybrids 2 and 3 in Experiment 5 were significantly more injured than the rest which were unaffected. Eradicane at 10 ppm caused more injury and in both experiments, hybrids 4, 5, and 6 were significantly more resistant than hybrids 1, 2, and 3.

Combined analysis for experiments 4, 5, and 6 (Table 14) showed significant interactions for height and dry weight but not for fresh weight. Height of hybrids 4, 5, and 6 treated with 5 ppm Eradicane were equal but only 6 was more resistant than 1, 2, and 3. Hybrids 4, and 5 were more resistant than 2 and 3 but equal to 1. Regarding to dry weight at the same Eradicane rate, hybrids 6, 1, 5, and 4 were equal and

Table 10. Height, fresh weight and dry weight of six hybrids (expt. 4) at 5 and 10 ppm Eradicane as percent of the control.

| Hybrid | 5 ppm | | | 10 ppm | | |
|---|---|---|---|---|---|---|
| | Ht.** | F. Wt. | D. Wt. | Ht.** | F. Wt. | D. Wt. |
| 1 | 55.1 | 72.4 | 61.2 | 36.5 | 36.6 | 27.3 |
| 2 | 50.3 | 51.9 | 45.3 | 27.2 | 32.6 | 28.5 |
| 3 | 66.2 | 65.7 | 60.7 | 36.7 | 42.9 | 40.0 |
| 4 | 81.8 | 83.5 | 79.6 | 53.1 | 50.1 | 48.9 |
| 5 | 75.5 | 81.8 | 70.2 | 34.0 | 28.4 | 22.6 |
| 6 | 87.6 | 93.5 | 89.2 | 53.7 | 54.1 | 50.3 |
| L.S.D. 0.05 | 10.9 | | | | | |
| CV% | 7.4 | 15.8 | 14.3 | | | |

Table 11. Corn injury due to 5 and 10 ppm Eradicane using a scale of 0-10, experiments 4, 5, and 6.

| Hybrid | Expt. 4 | | Expt. 5** | | Expt. 6** | |
|---|---|---|---|---|---|---|
| | 5 | 10 | 5 | 10 | 5 | 10 |
| 1 | 3.5 | 5.5 | 0.0 | 4.0 | 0.0 | 4.0 |
| 2 | 3.0 | 6.0 | 1.5 | 4.0 | 0.5 | 3.5 |
| 3 | 1.0 | 6.5 | 1.0 | 4.0 | 0.0 | 3.5 |
| 4 | 0.0 | 4.5 | 0.0 | 0.5 | 0.0 | 0.5 |
| 5 | 1.0 | 6.5 | 0.0 | 2.5 | 0.0 | 0.0 |
| 6 | 0.0 | 5.0 | 0.0 | 2.0 | 0.0 | 0.5 |
| L.S.D. 0.01 | - | | 0.85 | | 1.11 | |
| CV% | 41.4 | | 27.1 | | 54.9 | |

**Significant at 1% level.

Table 12. Height, fresh weight and dry weight of six hybrids (Expt. 5) at 5 and 10 ppm Eradicane as percent of control.

| Hybrid | 5 ppm | | | 10 ppm | | |
|---|---|---|---|---|---|---|
| | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. |
| 1 | 87.6 | 106.3 | 103.6 | 39.5 | 48.3 | 42.7 |
| 2 | 61.7 | 75.0 | 66.7 | 36.1 | 44.7 | 43.3 |
| 3 | 72.5 | 84.8 | 72.4 | 44.5 | 50.4 | 44.3 |
| 4 | 89.2 | 96.7 | 88.2 | 56.1 | 47.5 | 44.2 |
| 5 | 87.5 | 87.8 | 83.7 | 47.4 | 36.8 | 34.2 |
| 6 | 80.8 | 86.6 | 80.8 | 54.1 | 44.4 | 45.1 |
| CV% | 10.2 | 15.4 | 15.9 | | | |

Table 13. Height, fresh weight and dry weight of six hybrids (Expt. 6) at 5 and 10 ppm Eradicane as percentage of control.

| Hybrid | Eradicane 5 ppm | | | Eradicane 10 ppm | | |
|---|---|---|---|---|---|---|
| | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. |
| 1 | 90.3 | 106.3 | 100.8 | 52.4 | 64.1 | 59.2 |
| 2 | 76.1 | 79.1 | 70.5 | 46.8 | 53.4 | 48.7 |
| 3 | 79.8 | 80.2 | 71.2 | 51.4 | 63.2 | 58.3 |
| 4 | 79.8 | 76.3 | 74.1 | 62.8 | 54.6 | 56.2 |
| 5 | 80.5 | 92.2 | 90.6 | 26.8 | 26.1 | 26.2 |
| 6 | 89.9 | 100.7 | 96.2 | 65.9 | 66.2 | 67.7 |
| CV% | 14.5 | 16.9 | 15.4 | | | |

Table 14. Height, fresh weight and dry weight in percent of the control for experiments 4, 5, and 6 at 5 and 10 ppm Eradicane.

| Hybrid | 5 ppm | | | 10 ppm | | |
|---|---|---|---|---|---|---|
| | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. |
| 1 | 77.7 | 95.0 | 88.5 | 42.8 | 49.7 | 43.1 |
| 2 | 62.7 | 68.6 | 60.8 | 36.7 | 43.6 | 40.2 |
| 3 | 72.8 | 76.9 | 68.1 | 44.2 | 52.2 | 47.5 |
| 4 | 83.6 | 85.5 | 80.6 | 57.3 | 50.7 | 49.8 |
| 5 | 81.2 | 87.2 | 81.5 | 43.9 | 38.7 | 35.8 |
| 6 | 86.1 | 93.6 | 88.7 | 57.9 | 54.9 | 54.4 |
| L.S.D. .05 | 7.8 | - | 11.7 | | | |
| CV% | 9.0 | 14.5 | 13.5 | | | |

significantly more resistant than 3 and 2. At 10 ppm Eradicane for height, hybrids 4 and 6 were more resistant than 3, 5, 1, and 2. For dry weight, hybrids 6, 4, 3, and 1 were equal. Hybrid 5 was the most susceptible at 10 ppm.

Experiment 7. This experiment was designed to screen inbreds and hybrids for susceptibility and correlate chamber and field susceptibility. Regarding hybrids (Table 15), there was not significant interaction for any of the parameters studied except injury (Table 16). Final plant count was not significant and seemed to indicate that germination was not

Table 15. Height, fresh weight and dry weight of 12 hybrids (Expt. 7) at 5 and 10 ppm Eradicane as percentage of control.

| Hybrid | Hybrid Name | Eradicane 5 ppm |  |  | Eradicane 10 ppm |  |  |
|---|---|---|---|---|---|---|---|
|  |  | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. |
| 1 | (FR37 x H84)Va26 | 70.4 | 79.0 | 72.8 | 45.7 | 56.6 | 46.7 |
| 2 | Mo17 x N7A | 89.7 | 98.9 | 90.0 | 52.9 | 58.1 | 56.2 |
| 3 | Mo17 x N28 | 85.7 | 98.0 | 94.1 | 53.0 | 57.2 | 54.8 |
| 4 | (A634 x A635)Mo17 | 74.0 | 87.2 | 82.6 | 45.9 | 50.6 | 49.3 |
| 5 | FR805W x FR802W | 78.7 | 79.1 | 74.5 | 46.6 | 45.3 | 40.6 |
| 6 | B73 x Va26 | 78.7 | 84.5 | 78.6 | 59.6 | 66.4 | 60.1 |
| 7 | A632 x A619 | 57.6 | 74.5 | 78.5 | 39.0 | 54.0 | 49.1 |
| 8 | B73 x Mo17 | 89.9 | 101.6 | 100.3 | 54.0 | 59.5 | 55.6 |
| 9 | ASGROW R58 | 73.3 | 100.6 | 93.5 | 38.6 | 53.9 | 50.6 |
| 10 | FUNK G-4444 | 63.9 | 82.1 | 72.6 | 35.0 | 52.7 | 47.5 |
| 11 | PIONEER 3780 | 87.6 | 104.7 | 100.6 | 47.6 | 58.1 | 53.5 |
| 12 | PIONEER 3386 | 92.9 | 103.1 | 94.3 | 65.7 | 76.7 | 68.9 |
| CV% |  | 16.4 | 21.7 | 22.8 |  |  |  |

Table 16. Final plant count and injury (Expt. 7) at 5 and 10 ppm of Eradicane (injury 0-10).

| Hybrid | Hybrid Name | Injury |  | Final Plant Count |  |  |
|---|---|---|---|---|---|---|
|  |  | 5 ppm | 10 ppm | Control | 5 ppm | 10 ppm |
| 1 | (FR37 x H84)Va26 | 0.0 | 3.3 | 4.3 | 4.3 | 3.8 |
| 2 | Mo17 x N7A | 0.0 | 1.0 | 4.8 | 5.0 | 4.5 |
| 3 | Mo17 x N28 | 0.0 | 2.0 | 3.3 | 4.8 | 4.0 |
| 4 | (A634 x A635)Mo17 | 0.0 | 2.0 | 4.3 | 2.0 | 1.8 |
| 5 | FR805W x FR802W | 0.3 | 4.0 | 4.5 | 3.8 | 4.3 |
| 6 | B73 x Va26 | 0.0 | 0.5 | 5.0 | 4.3 | 5.0 |
| 7 | A632 x A619 | 0.0 | 4.0 | 4.8 | 3.8 | 4.5 |
| 8 | B73 x Mo17 | 0.0 | 1.8 | 4.8 | 4.5 | 4.8 |
| 9 | ASGROW R58 | 0.3 | 3.8 | 5.0 | 5.0 | 4.5 |
| 10 | FUNK G-4444 | 0.5 | 4.8 | 4.5 | 4.3 | 4.5 |
| 11 | PIONEER 3780 | 0.0 | 3.8 | 4.8 | 5.0 | 3.8 |
| 12 | PIONEER 3386 | 0.0 | 0.3 | 4.3 | 4.5 | 4.0 |
| L.S.D. 0.05 |  | 1.6 |  |  | - |  |
| CV% |  | 127.6 |  |  | 22.2 |  |

affected by either rate of Eradicane.

For the inbreds, the genotype x treatment interaction was significant for all parameters except final plant count. At 5 ppm Eradicane (Table 17) inbreds 3, 14, and 12 were not different from the control regarding height; 3, 14, 12, 7, 2, and 8 for fresh weight; and 3, 14, 12, 7, and 2 for dry weight. At 10 ppm Eradicane some inbreds changed position. For height inbreds 11, 4, and 12; for fresh weight 11, 12, 4, 2, 3, and 7; and for dry weight 12, 11, 4, 2, 3, 7, and 14 were the most resistant. But even with this change in inbreds the consistency among parameters within a rate and the same parameter between rates was good.

For twisting, inbreds 8, 4, 11, 12, 2, 10, and 14 (Table 18) were not different from the control at 10 ppm Eradicane. With the exception of inbred 10, all of them were ranked as resistant for one or all of the parameters studied which seem to indicate good correlation between twisting ranking, and measurement of height, fresh weight, and dry weight.

## Field Experiment

The same hybrids and inbreds of chamber experiment 7 were tested for Eradicane susceptibility under field conditions. The hybrid x herbicide interaction was found to be not significant for percentage emergence, percentage survival, plants/ha, ears per plant, weight per ear or grain yield (Table 19). The inbred x treatment interaction was found to be statistically

Table 17. Height, fresh weight and dry weight of 14 inbreds (Expt. 7) at 5 and 10 ppm Eradicane as percentage of control.

| Inbred | Inbred Name | Eradicane 5 ppm |  |  | Eradicane 10 ppm |  |  |
|---|---|---|---|---|---|---|---|
|  |  | Ht. | F. Wt. | D. Wt. | Ht. | F. Wt. | D. Wt. |
| 1 | FR37 | 62.9 | 75.8 | 75.3 | 28.3 | 38.4 | 36.3 |
| 2 | Va26 (643TI) | 82.3 | 84.4 | 82.1 | 57.3 | 59.6 | 61.9 |
| 3 | Mo17 | 88.3 | 113.7 | 114.6 | 47.2 | 57.0 | 56.8 |
| 4 | B73 | 76.2 | 73.6 | 70.5 | 68.6 | 70.2 | 67.4 |
| 5 | N28 | 64.9 | 68.0 | 66.2 | 44.2 | 48.0 | 47.2 |
| 6 | H84 | 64.5 | 65.9 | 62.5 | 32.6 | 37.6 | 33.3 |
| 7 | A632 | 78.7 | 86.1 | 80.8 | 44.2 | 53.5 | 52.5 |
| 8 | A635 | 74.1 | 80.4 | 76.8 | 44.6 | 42.9 | 42.8 |
| 9 | A634 | 69.9 | 58.6 | 54.4 | 57.4 | 43.1 | 39.2 |
| 10 | N7A | 64.3 | 52.8 | 49.3 | 45.4 | 38.0 | 35.3 |
| 11 | FR802W | 75.5 | 70.7 | 66.9 | 74.6 | 73.9 | 67.7 |
| 12 | A619 | 86.3 | 88.8 | 81.1 | 65.6 | 72.4 | 68.9 |
| 13 | FR805W | 74.1 | 72.0 | 69.6 | 49.6 | 49.3 | 43.4 |
| 14 | Va26 (76-611) | 86.9 | 96.7 | 92.2 | 53.2 | 50.5 | 48.1 |
| L.S.D. 0.05 |  | 16.5 | 22.6 | 21.4 | 16.5 | 22.6 | 21.4 |
| CV% |  | 15.6 | 21.0 | 20.4 |  |  |  |

Table 18. Final plant count and injury (Expt. 7) at 5 and 10 ppm of Eradicane (injury 0-10).

| Inbred | Inbred Name | Injury | | Final Plant Count | | |
|---|---|---|---|---|---|---|
| | | 5 ppm | 10 ppm | Control | 5 ppm | 10 ppm |
| 1 | FR37 | 0.5 | 6.3 | 5.0 | 5.0 | 4.5 |
| 2 | Va26 (643TI) | 0.0 | 1.0 | 4.5 | 4.0 | 2.8 |
| 3 | Mo17 | 0.0 | 2.5 | 3.3 | 2.8 | 2.8 |
| 4 | B73 | 0.5 | 0.3 | 4.8 | 4.3 | 5.0 |
| 5 | N28 | 0.0 | 2.3 | 3.8 | 3.5 | 4.0 |
| 6 | H84 | 0.0 | 4.8 | 2.8 | 2.8 | 2.5 |
| 7 | A632 | 0.0 | 3.0 | 3.5 | 3.3 | 3.5 |
| 8 | B73 x Mo17 | 0.0 | 0.0 | 3.8 | 2.5 | 1.0 |
| 9 | A634 | 0.0 | 1.8 | 4.5 | 2.5 | 4.0 |
| 10 | N7A | 0.0 | 1.3 | 4.5 | 4.3 | 3.0 |
| 11 | FR802W | 0.0 | 0.3 | 4.0 | 4.5 | 4.5 |
| 12 | A619 | 0.3 | 0.8 | 4.8 | 2.5 | 3.8 |
| 13 | FR805W | 0.0 | 2.5 | 3.8 | 3.0 | 2.8 |
| 14 | Va26 (76-611) | 0.0 | 1.5 | 4.3 | 4.8 | 4.0 |
| L.S.D. 0.05 | | 1.5 | | | - | |
| CV% | | 169.5 | | | 29.0 | |

Table 19. Yield in kg/ha, percentage emergence (E) and percentage survival (S) of twelve hybrids.

| Hybrid | Hybrid Name | Atrazine + Lasso 1.7 + 3.4 kg/ha | | | Eradicane + Atrazine 6.7 + 1.7 kg/ha | | |
|---|---|---|---|---|---|---|---|
| | | Yield | % E | % S | Yield | % E | % S |
| 1 | (FR37 x H84)Va26 | 4143 | 76.8 | 90.8 | 3877 | 83.9 | 98.7 |
| 2 | Mo17 x N7A | 4370 | 92.9 | 94.7 | 6267 | 85.1 | 97.4 |
| 3 | Mo17 x N28 | 4330 | 88.7 | 94.7 | 5085 | 85.7 | 96.1 |
| 4 | (A634 x A635)Mo17 | 4401 | 79.2 | 96.1 | 3792 | 83.3 | 102.6 |
| 5 | FR805W x FR802W | 4319 | 86.3 | 94.7 | 3752 | 88.1 | 106.6 |
| 6 | B73 x Va26 | 4671 | 85.7 | 93.4 | 4556 | 80.4 | 98.7 |
| 7 | A632 x A619 | 2798 | 76.2 | 89.5 | 2986 | 66.7 | 81.6 |
| 8 | B73 x Mo17 | 4054 | 85.7 | 92.1 | 5777 | 86.9 | 90.8 |
| 9 | ASGROW R58 | 4288 | 76.2 | 92.1 | 3983 | 85.1 | 94.7 |
| 10 | FUNK G-4444 | 3705 | 87.5 | 88.2 | 4246 | 83.3 | 84.2 |
| 11 | PIONEER 3780 | 4621 | 83.3 | 88.2 | 4247 | 84.5 | 86.8 |
| 12 | PIONEER 3386 | 5429 | 82.1 | 89.5 | 5180 | 79.2 | 88.2 |
| CV% | | 18.5 | 9.8 | 3.9 | | | |

significant for percent emergence, percent survival, plants per ha, but not for ear per plant, weight per ear or grain yield (Table 20). No field injury was found in any of the hybrids or inbreds in the form of twisting. Eradicane losses by leaching probably occurred because heavy rain was recorded after planting and the soil was 80% sand in the first 15-30 cm. In fact, heavy weed investation (both grasses and broad leaves) occurred shortly after planting indicating ineffectiveness of the herbicide treatments.

A high coefficient of variation was obtained for yield in inbreds and relatively high for hybrids indicated great variability in this parameter. However, CV's for emergence and percent survival were within acceptable values.

Because of the lack of significance for yield and high variability in the field study, it was not possible to correlate field results with chamber results.

Table 20. Yield in kg/ha, percentage emergence (E), and percentage survival (S) of fifteen inbreds.

| Inbred | Inbred Name | Atrazine + Lasso 1.7 + 3.4 kg/ha | | | Eradicane + Atrazine 6.7 + 1.7 kg/ha | | |
|---|---|---|---|---|---|---|---|
| | | Yield | % Emergence | % Survival | Yield | % Emergence | % Survival |
| 1 | FR37 | 171 | 87.5 | 94.7 | 167 | 75.0 | 82.9 |
| 2 | Va26 (643TI) | 578 | 42.9 | 59.2 | 947 | 63.1 | 82.9 |
| 3 | Mo17 | 893 | 69.6 | 76.3 | 983 | 65.5 | 89.5 |
| 4 | B73 | 1397 | 41.7 | 63.2 | 1461 | 58.3 | 82.9 |
| 5 | N28 | 1321 | 82.7 | 90.8 | 1164 | 73.8 | 93.4 |
| 6 | H84 | 198 | 67.3 | 88.2 | 50 | 36.3 | 59.2 |
| 7 | A632 | 413 | 42.9 | 53.9 | 1033 | 79.2 | 86.8 |
| 8 | A635 | 79 | 32.1 | 46.1 | 495 | 68.5 | 84.2 |
| 9 | A634 | 887 | 79.2 | 92.1 | 1364 | 75.6 | 82.9 |
| 10 | N7A | 1233 | 77.4 | 93.4 | 1178 | 76.8 | 94.7 |
| 11 | FR802W | 148 | 78.6 | 81.6 | 74 | 79.2 | 84.2 |
| 12 | A619 | 189 | 61.3 | 68.4 | 206 | 52.4 | 68.4 |
| 13 | FR805W | 622 | 67.9 | 80.3 | 592 | 78.0 | 92.1 |
| 14 | Va26 (76-611) | 877 | 58.9 | 69.7 | 582 | 78.6 | 86.8 |
| 15 | Mo17 | 608 | 73.8 | 85.5 | 1300 | 64.9 | 80.3 |
| L.S.D. 0.05 | | - | 19.2 | 18.6 | | | |
| CV% | | 58.0 | 14.2 | 11.4 | | | |

*Inbred 15 is the same as 3.

## SUMMARY

Six chamber experiments were conducted to find a technique which could be used for screening corn hybrid susceptibility to Eradicane. In one experiment, 8 hybrids and the 14 inbreds involved were tested for Eradicane susceptibility in chamber and field conditions to correlate both chamber and field injury.

EPTC was found to cause severe damage to all hybrids. Higher rates of Eradicane were tolerated but degree of injury was dependent upon preventing volatilization losses. With pots capped for 3 days after planting 25 ppm Eradicane completely killed all plants, but with pots uncovered 100 ppm Eradicane was not enough to prevent growth. Factors affecting Eradicane volatilization and speed of corn emergence should influence the degree of damage but the particular role of each of these factors was not studied although the literature is abundant. When pots were capped 5 and 10 ppm Eradicane were found to be needed to cause some degree of injury in most corn hybrids.

Significant differences were found in 2 out of 6 experiments with the same group of hybrids. Significance always occurred for height but not for fresh or dry weight in individual experiments. In both cases, hybrids 1, 2, and 3 appeared as susceptibles and hybrids 4, 5, and 6 appeared as resistant. However, when the combined analyses was performed for experiments 1, 2, and 3 the three parameters studied were significantly affected and hybrids were ranked as before regarding height, but for fresh and dry weight, only hybrids 4 and 6 were superior. The combined analyses of experiments 4, 5, and 6 gave significant differences for height and dry weight but not for fresh weight. Hybrids 4, 5, and 6 appear consistently more resistant and hybrid 5 showed greater susceptibility at 10 ppm. In this analyses hybrid 1 behaved differently from the previous pattern where it ranked as a susceptible one. Height was found to be the parameter with less variability in all experiments.

No correlation could be established between chamber and field injury due to lack of significant differences in the field for both hybrids and inbreds and for hybrids in the chamber study. Differential and significant responses were obtained among inbreds, however.

The technique as applied in this study has partially met the general objective. Sources of variability need to be removed before more consistent results may be obtained. These sources may involve environmental conditions, Eradicane volatilization, uniformity of germination or some factors not taken into consideration.

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# APPENDIX

Appendix Table 1. Height, fresh weight and dry weight as affected by EPTC and Eradicane (Expt. 1).

| Treatment (ppm) | Hybrids Height (cm)** | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 25.1 | 24.1 | 26.6 | 25.1 | 21.2 | 23.5 |
| EPTC 18 | 11.3 | 17.0 | 12.0 | 17.6 | 26.4 | 16.8 |
| Eradicane 50 | 18.5 | 17.0 | 16.3 | 21.8 | 20.1 | 21.2 |
| Eradicane 100 | 10.3 | 9.1 | 11.5 | 14.9 | 6.9 | 13.9 |
| R-25788 4.18 | 23.9 | 20.9 | 23.8 | 23.5 | 22.3 | 22.6 |

L.S.D. 0.05 = 5.0

CV% = 13.4

| Treatment (ppm) | Hybrids Fresh Weight (gms)** | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 17.2 | 15.5 | 17.1 | 14.7 | 12.2 | 14.1 |
| EPTC 18 | 8.2 | 10.4 | 7.4 | 11.3 | 12.2 | 9.4 |
| Eradicane 50 | 9.8 | 7.3 | 7.6 | 9.9 | 7.8 | 9.1 |
| Eradicane 100 | 4.8 | 5.0 | 6.0 | 5.5 | 4.1 | 5.2 |
| R-25778 4.18 | 16.5 | 10.9 | 14.5 | 10.5 | 10.0 | 9.0 |

L.S.D. 0.05 = 3.2

CV% = 15.5

Appendix Table 1. (Continued)

| Treatment (ppm) | Hybrids Dry Weight (gms)** | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 1.346 | 1.243 | 1.416 | 1.023 | 0.885 | 1.095 |
| EPTC 18 | 0.659 | 0.828 | 0.600 | 0.858 | 1.108 | 0.722 |
| Eradicane 50 | 0.849 | 0.622 | 0.637 | 0.995 | 0.752 | 0.920 |
| Eradicane 100 | 0.449 | 0.421 | 0.504 | 0.541 | 0.344 | 0.485 |
| R-25778 4.18 | 1.413 | 0.876 | 1.122 | 0.954 | 0.856 | 0.800 |

L.S.D. 0.05 = 0.320

CV% = 18.5

Appendix Table 2. Height, fresh weight and dry weight as affected by EPTC and Eradicane (Expt. 2).

| Treatment (ppm) | Hybrids Height (cm)* | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 50.5 | 49.2 | 46.5 | 47.6 | 44.3 | 48.7 |
| EPTC 9 | 6.0 | 8.9 | 9.8 | 6.4 | 14.2 | 12.7 |
| EPRC 18 | 4.6 | 7.8 | 9.4 | 6.8 | 7.7 | 5.4 |
| Eradicane 25 | 15.2 | 17.4 | 18.2 | 21.7 | 22.0 | 22.2 |
| Eradicane 50 | 10.6 | 10.9 | 12.6 | 17.1 | 14.1 | 18.4 |

L.S.D. 0.05 = 5.4

CV% = 13.6

| Treatment (ppm) | Hybrids Fresh Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 15.9 | 14.7 | 13.7 | 15.6 | 14.0 | 15.5 |
| EPTC 9 | 2.1 | 4.0 | 4.4 | 2.2 | 4.9 | 3.9 |
| EPTC 18 | 2.1 | 4.8 | 4.7 | 3.2 | 3.1 | 1.7 |
| Eradicane 25 | 5.9 | 6.6 | 7.5 | 6.3 | 6.5 | 6.3 |
| Eradicane 50 | 3.1 | 3.4 | 4.4 | 5.1 | 3.8 | 5.5 |

CV% = 19.5

Appendix Table 2. (Continued)

| Treatment (ppm) | Hybrids Dry Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 1.379 | 1.387 | 1.149 | 1.370 | 1.187 | 1.327 |
| EPTC 9 | 0.224 | 0.366 | 0.435 | 0.240 | 0.421 | 0.382 |
| EPTC 18 | 0.226 | 0.443 | 0.466 | 0.299 | 0.264 | 0.186 |
| Eradicane 25 | 0.516 | 0.584 | 0.673 | 0.668 | 0.631 | 0.643 |
| Eradicane 50 | 0.354 | 0.351 | 0.444 | 0.523 | 0.360 | 0.575 |

CV% = 19.8

Appendix Table 3. Height, fresh weight and dry weight as affected by Eradicane (Expt. 3).

| Treatment (ppm) | Hybrids Height (cm) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 49.7 | 52.6 | 51.6 | 53.9 | 50.6 | 50.6 |
| Eradicane 5 | 40.1 | 42.6 | 44.9 | 46.3 | 44.0 | 47.1 |
| Eradicane 10 | 29.5 | 33.1 | 32.8 | 39.9 | 31.7 | 34.7 |
| Eradicane 25 | 19.7 | 18.5 | 24.6 | 25.6 | 18.2 | 23.0 |
| Eradicane 50 | 9.2 | 12.3 | 14.1 | 15.3 | 12.2 | 15.7 |

CV% = 7.1

| Treatment (ppm) | Hybrids Fresh Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 15.8 | 12.8 | 15.2 | 15.3 | 13.7 | 14.0 |
| Eradicane 5 | 14.0 | 12.1 | 13.8 | 13.3 | 11.0 | 11.8 |
| Eradicane 10 | 9.5 | 10.0 | 10.0 | 11.6 | 8.7 | 10.3 |
| Eradicane 25 | 6.3 | 5.6 | 8.1 | 7.2 | 4.0 | 6.2 |
| Eradicane 50 | 3.1 | 2.9 | 4.0 | 3.5 | 2.7 | 3.4 |

CV% = 11.6

Appendix Table 3. (Continued)

| Treatment (ppm) | Hybrids Dry Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 1.387 | 1.126 | 1.309 | 1.409 | 1.198 | 1.201 |
| Eradicane 5 | 1.067 | 0.998 | 1.255 | 1.139 | 0.906 | 1.032 |
| Eradicane 10 | 0.821 | 0.844 | 0.858 | 1.095 | 0.819 | 0.900 |
| Eradicane 25 | 0.592 | 0.503 | 0.731 | 0.753 | 0.444 | 0.620 |
| Eradicane 50 | 0.304 | 0.298 | 0.380 | 0.354 | 0.293 | 0.351 |

CV% = 14.5

Appendix Table 4. Height, fresh weight and dry weight as affected by 5 and 10 ppm Eradican (Expt. 4).

| Treatment | Hybrids Height (cms)** | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 49.4 | 52.7 | 47.8 | 49.0 | 48.6 | 45.3 |
| Eradicane 5 | 27.5 | 26.6 | 31.7 | 40.0 | 36.6 | 39.5 |
| Eradicane 10 | 18.0 | 14.4 | 17.4 | 26.0 | 16.4 | 24.3 |

L.S.D. 0.05 = 5.5

CV% = 7.7

| Treatment | Hybrids Fresh Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 15.9 | 15.6 | 15.0 | 17.3 | 16.0 | 15.2 |
| Eradicane 5 | 11.5 | 8.1 | 10.0 | 14.3 | 13.1 | 14.1 |
| Eradicane 10 | 5.8 | 5.1 | 6.4 | 8.6 | 4.5 | 8.3 |

CV% = 15.4

| Treatment | Hybrids Dry Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 1.487 | 1.528 | 1.373 | 1.573 | 1.481 | 1.330 |
| Eradicane 5 | 0.907 | 0.693 | 0.844 | 1.242 | 1.040 | 1.196 |
| Eradicane 10 | 0.461 | 0.435 | 0.543 | 0.764 | 0.333 | 0.667 |

CV% = 15.8

Appendix Table 5. Height, fresh weight and dry weight as affected by 5 and 10 ppm Eradicane (Expt. 5).

| Treatment | Hybrids Height (cms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 45.6 | 50.5 | 50.6 | 48.3 | 45.0 | 50.0 |
| Eradicane 5 | 39.3 | 31.1 | 36.6 | 43.0 | 38.9 | 40.0 |
| Eradicane 10 | 17.4 | 18.3 | 22.5 | 27.1 | 21.1 | 26.8 |

CV% = 8.2

| Treatment | Hybrids Fresh Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 13.2 | 13.4 | 14.8 | 15.3 | 14.0 | 15.5 |
| Eradicane 5 | 13.4 | 10.0 | 12.6 | 14.7 | 12.2 | 13.4 |
| Eradicane 10 | 5.9 | 6.0 | 7.5 | 7.3 | 5.1 | 6.9 |

CV% = 11.6

| Treatment | Hybrids Dry Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 1.105 | 1.120 | 1.335 | 1.285 | 1.111 | 1.270 |
| Eradicane 5 | 1.090 | 0.740 | 0.965 | 1.120 | 0.920 | 1.022 |
| Eradicane 10 | 0.435 | 0.481 | 0.590 | 0.565 | 0.370 | 0.570 |

CV% = 13.4

Appendix Table 6. Height, fresh weight and dry weight as affected by 5 and 10 ppm Eradicane (Expt. 6).

| Treatment | Hybrids Height (cm) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 40.1 | 43.5 | 46.8 | 50.0 | 46.9 | 44.7 |
| 5 ppm | 36.1 | 32.7 | 37.3 | 39.9 | 37.7 | 40.1 |
| 10 ppm | 20.6 | 20.3 | 23.9 | 31.3 | 12.1 | 29.4 |

CV% = 13.5

| Treatment | Hybrids Fresh Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 10.2 | 11.4 | 12.7 | 14.7 | 11.0 | 11.9 |
| 5 ppm | 10.9 | 8.7 | 10.2 | 11.2 | 10.1 | 12.0 |
| 10 ppm | 6.5 | 6.0 | 7.9 | 8.0 | 2.9 | 7.9 |

CV% = 15.6

| Treatment | Hybrids Dry Weight (gms) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Control | 0.819 | 0.920 | 1.060 | 1.165 | 0.840 | 0.970 |
| 5 ppm | 0.825 | 0.640 | 0.755 | 0.865 | 0.763 | 0.930 |
| 10 ppm | 0.480 | 0.445 | 0.605 | 0.655 | 0.215 | 0.658 |

CV% = 14.3

Appendix Table 7. Height, fresh weight and dry weight of hybrids as affected by 5 and 10 ppm Eradicane (Expt. 7).

| | Control | | | 5 ppm | | | 10 ppm | | |
|---|---|---|---|---|---|---|---|---|---|
| Hybrid | Ht. (cm) | F. Wt. (gm) | D. Wt. (gm) | Ht. (cm) | F. Wt. (gm) | D. Wt. (gm) | Ht. (cm) | F. Wt. (gm) | D. Wt. (gm) |
| 1 | 45.5 | 15.3 | 1.334 | 31.6 | 11.6 | 0.931 | 20.3 | 8.3 | 0.599 |
| 2 | 47.4 | 15.2 | 1.368 | 42.5 | 15.0 | 1.229 | 25.0 | 8.9 | 0.766 |
| 3 | 48.5 | 17.0 | 1.461 | 41.7 | 16.4 | 1.352 | 25.8 | 9.9 | 0.826 |
| 4 | 44.8 | 13.8 | 1.149 | 32.5 | 11.1 | 0.875 | 20.3 | 6.6 | 0.531 |
| 5 | 43.9 | 14.0 | 1.201 | 34.6 | 10.9 | 0.895 | 20.4 | 6.3 | 0.492 |
| 6 | 47.1 | 16.0 | 1.355 | 37.0 | 13.5 | 1.052 | 28.1 | 10.6 | 0.806 |
| 7 | 45.2 | 12.9 | 1.083 | 25.6 | 9.1 | 0.782 | 18.1 | 7.2 | 0.540 |
| 8 | 45.3 | 16.7 | 1.356 | 40.7 | 16.8 | 1.353 | 24.5 | 9.8 | 0.743 |
| 9 | 45.1 | 11.9 | 1.036 | 33.1 | 11.9 | 0.951 | 17.2 | 6.4 | 0.511 |
| 10 | 47.9 | 13.9 | 1.204 | 31.1 | 11.6 | 0.875 | 16.6 | 7.2 | 0.550 |
| 11 | 42.3 | 13.3 | 1.113 | 36.8 | 13.7 | 1.096 | 20.3 | 7.8 | 0.597 |
| 12 | 49.0 | 19.3 | 1.619 | 45.4 | 19.7 | 1.515 | 32.4 | 14.8 | 1.118 |
| CV% | 16.4 | 22.6 | 23.2 | | | | | | |

Appendix Table 8. Height, fresh weight and dry weight of inbreds as affected by 5 and 10 ppm Eradicane (Expt. 7).

| Inbred. | Control | | | 5 ppm | | | 10 ppm | | |
|---|---|---|---|---|---|---|---|---|---|
| | Ht.* (cm) | F. Wt.* (gm) | D. Wt.** (gm) | Ht.* (cm) | F. Wt.* (gm) | D. Wt.** (gm) | Ht.* (cm) | F. Wt.* (gm) | D. Wt.** (gm) |
| 1 | 36.6 | 9.7 | 0.823 | 22.9 | 7.3 | 0.618 | 10.3 | 3.7 | 0.297 |
| 2 | 32.8 | 7.0 | 0.553 | 27.1 | 5.8 | 0.449 | 18.6 | 4.1 | 0.337 |
| 3 | 32.8 | 8.3 | 0.642 | 28.7 | 8.9 | 0.685 | 15.5 | 4.8 | 0.368 |
| 4 | 37.4 | 11.2 | 0.877 | 28.6 | 8.3 | 0.627 | 25.5 | 7.5 | 0.570 |
| 5 | 37.7 | 9.7 | 0.816 | 25.0 | 6.6 | 0.539 | 16.9 | 4.6 | 0.380 |
| 6 | 37.7 | 10.4 | 0.955 | 24.0 | 6.7 | 0.572 | 12.3 | 3.8 | 0.295 |
| 7 | 35.8 | 7.3 | 0.661 | 28.0 | 6.1 | 0.520 | 16.2 | 4.0 | 0.349 |
| 8 | 33.3 | 7.5 | 0.576 | 24.0 | 6.0 | 0.441 | 15.1 | 3.3 | 0.247 |
| 9 | 44.5 | 12.8 | 1.168 | 30.7 | 7.3 | 0.619 | 25.5 | 5.5 | 0.454 |
| 10 | 41.1 | 9.9 | 0.927 | 26.6 | 5.3 | 0.461 | 18.9 | 3.8 | 0.327 |
| 11 | 38.6 | 10.0 | 0.792 | 29.0 | 7.2 | 0.528 | 28.4 | 7.2 | 0.507 |
| 12 | 36.0 | 11.2 | 0.894 | 30.2 | 9.6 | 0.685 | 23.4 | 8.0 | 0.598 |
| 13 | 31.2 | 7.4 | 0.613 | 23.3 | 5.3 | 0.421 | 15.8 | 3.7 | 0.268 |
| 14 | 41.4 | 11.6 | 0.976 | 35.9 | 11.1 | 0.881 | 21.4 | 5.5 | 0.435 |
| L.S.D. 0.05 | 6.5 | 2.3 | 0.20 | | | | | | |
| CV% | 16.7 | 23.0 | 23.6 | | | | | | |

# A TECHNIQUE FOR DETECTING CORN HYBRID SUSCEPTIBILITY TO ERADICANE

by

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AN ABSTRACT OF A MASTER'S THESIS

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Eradicane, a thiocarbamate herbicide which is a combination of EPTC and a protectant, has been found especially effective against shattercane (sorghum bicolor (L.) Moench), and other troublesome weedy grasses in corn fields. However, hybrid susceptibility to eradicane has shown that field injury and yield reduction may occur. Little consistency in field injury has been found mainly because of effects of climatic, edaphic, and cultural factors on eradicane behavior in the soil and on the emerging corn seedling.

This research was conducted to find a growth chamber technique for detecting corn hybrid susceptibility to eradicane.

Corn was grown in silica sand and nutrient solution in growth chamber under controlled conditions of light, temperature and water supply. In six experiments, six hybrids previously classified as resistant and susceptible in a field study were used. Rates of herbicide tested were EPTC 9 and 18 ppm and eradicane at 5, 10, 25, 50, and 100 ppm. In another experiment, twelve hybrids and the fourteen inbreds involved in eight of them were screened for susceptibility at 5 and 10 ppm eradicane with the objective of studying hybrid susceptibility and the relationship to inbred susceptibility.

A field study was conducted with the same twelve hybrids and fourteen inbreds to correlate chamber and field injury. Eradicane was tested at 6.7 kg/ha, against the standard treatment of Atrazine + Lasso at 3.4 + 1.7 kg/ha, respectively.

In chamber experiments measurements of height, fresh weight, and dry weight were recorded and expressed as percent of the control. Injury ratings were made 1 week after emergence. In the field data recorded were percent emergence, percent survival, ear number, ear weight, plants/ha and grain yield.

It was found that EPTC caused too much damage to all corn hybrids to be used in the technique. Eradicane injury was dependent mostly on avoiding volatilization. Eradicane at 25 ppm completely prevented growth if pots were capped for 3 days after sowing, but 100 ppm did not if pots were uncovered. Eradicane 5 to 10 ppm with pots capped was found to be an adequate rate for the purpose of the technique. Two out of six experiments were found to yield significant differences for height but not for fresh or dry weight. In those two cases hybrids were ranked as resistant and susceptibles as expected from the field study indicating good correlation between chamber and field injury. However, lack of significance for fresh or dry weight and in the other four experiments may indicate the presence of factors preventing reproducing the technique. Height was a less variable parameter than fresh or dry weight.

Regarding the growth chamber screening of twelve hybrids and fourteen inbreds, no significant differences were found for hybrids for any of the parameters studied. For the inbreds, the genotype x treatment interaction was significant for height, fresh weight, and dry weight.

Heavy rain after planting the field study probably caused much of the eradicane to be lost by leaching. The hybrid x treatment interaction was not significant for any parameter studied. But the inbred x treatment interaction was significant for percent emergence and percent survival, but not for weight per ear or grain yield. Eradicane at the rate used failed to cause field injury in any of hybrids or inbreds.

Due to this lack of significance no correlation could be established between chamber and field study.

Key aspects of the growth chamber technique seem to be uniformity of germination, watering, and volatilization.