EVALUATION OF A 20G FORMULATION OF COUNTER FOR SUGARBEET ROOT MAGGOT CONTROL

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Introduction:

Counter 15G is a granular insecticide formulation with a 15% concentration of the active ingredient terbufos. The insecticide has a long history of providing good control of sugarbeet root maggot (SBRM), *Tetanops myopaeformis* (Röder) and other soil insect pests of sugarbeet in the Red River Valley. Recently, an experimental formulation of Counter, containing 20% active ingredient, has been developed. This granule, which contains 33% more active ingredient per pound of product than the currently labeled 15G formulation, would allow for a reduction in volume of insecticide product needed while maintaining the same amount of active ingredient applied per acre. One obvious benefit of such a formulation would be that more acres could be planted between stops to reload the planter with insecticide. However, it is not known whether the decrease in density of granules applied per unit soil volume will affect SBRM control. This trial was carried out to compare the performance of Counter 20G for SBRM control with that of the standard labeled 15G formulation of counter.

Materials and Methods:

This experiment was established on May 20 near St. Thomas, ND. Counter treatments included 15G and 20G formulations, and each was applied at 1.05, 1.5, and 1.8 lb (a.i.)/ac using spoon (S) placement. Other treatments included for comparative purposes were Poncho Beta (68 grams a.i./unit of seed) and an untreated check. The experiment was arranged in a randomized block design with four replications of the treatments. Each plot was 35 feet long, and 25-foot tilled alleys were maintained between replicates throughout the growing season. The "spoon" consists of a galvanized metal spoon-shaped device that is attached at the terminal end of each planter-mounted in-furrow application tube. A number 10 bolt is inserted through the center of the spoon's terminal end, and it is fastened with a pair of hexagonal nuts, which laterally deflect granules to the outside edge of the seed furrow and minimize the amount that fall into the furrow.

Root injury: Root maggot feeding injury was assessed on August 6, by randomly collecting ten beet roots per plot (five from each of the outer two treated rows), hand-washing them, and scoring them in accordance with the 0 to 9 root injury rating scale (0 = no scarring, and 9 = over ¾ of the root surface blackened by scarring or dead beet) of Campbell et al. (2000). Treatment performance was also compared on the basis of sugarbeet yield parameters.

Harvest: On September 17, all foliage was removed from plots immediately before harvest by using a commercial-grade mechanical defoliator. Shortly thereafter, all beets from the center 2 rows of each plot were lifted using a mechanical harvester, and weighed in the field using a digital scale. A representative subsample of 12-18 beets was collected from each plot and sent to the American Crystal Sugar Company Tare Laboratory (East Grand Forks, MN) for analysis of sugar content and quality.

All data from root injury ratings and harvest samples were subjected to analysis of variance (ANOVA) using the general linear models (GLM) procedure (SAS Institute, 1999), and treatment means were separated using Fisher's protected least significant difference (LSD) test at a 0.05 level of significance.

Results and Discussion:

Root injury rating data indicated that there were no significant differences in root maggot feeding injury between the 15G and 20G formulations of Counter (Table 1). Additionally, there were no differences in the extent of SBRM feeding injury among application rates, irrespective of which formulation was used. Poncho Beta provided marginal SBRM control in this experiment. The only Counter entry in the study that did not provide significantly better root protection from SBRM feeding injury than Poncho Beta was the Counter 20G treatment of 5.25 lb product (i.e., 1.05 lb a.i.) per acre. The Poncho Beta treatment was the only entry that did not result in a significant reduction in SBRM feeding injury when compared to that in the untreated check.

Table 1. *Larval feeding injury* in evaluation of Counter insecticide formulations for sugarbeet root maggot control, St. Thomas, ND, 2008

Treatment/form.	Placement[a]	Rate (product/ac)	Rate (lb ai/ac)	Root injury (0-9)
Counter 20G	S	7.5 lb	1.5	1.83 c
Counter 15G	S	11.9 lb	1.8	1.98 c
Counter 20G	S	9 lb	1.8	1.98 c
Counter 15G	S	10 lb	1.5	2.20 c
Counter 15G	S	7 lb	1.05	2.25 c
Counter 20G	S	5.25 lb	1.05	2.38 bc
Poncho Beta	Seed		68 g ai/ unit seed	3.10 ab
Check	---	----	---	3.73 a
LSD (0.05)				0.73

Means within a column sharing a letter are not significantly (P = 0.05) different from each other (Fisher's Protected LSD).
[a]S= Spoon; Seed = Seed treatment

Results of yield, quality, and gross economic return data from this experiment are presented in Table 2. Patterns of performance with respect to yield were consistent with those observed in the root rating data. Although there was a slight trend toward higher sucrose and root yields in plots treated with the high (1.8 lb a.i./ac) rate of Counter, the differences were not significant. Additionally, there were no statistical differences in recoverable sucrose yield or root tonnage among application rates of Counter, irrespective of whether the 15G or 20G formulation was used. Gross economic return values also followed these trends.

Table 2. *Yield parameters* from evaluation of Counter insecticide formulations for sugarbeet root maggot control, St. Thomas, ND, 2008

Treatment/ form.	Placement[a]	Rate (product/ac)	Rate (lb ai/ac)	Sucrose yield (lb/ac)	Root yield (T/ac)	Sucrose (%)	Gross return ($/ac)
Counter 15G	S	11.9 lb	1.8	6609 a	22.9 a	15.70 a	787
Counter 20G	S	9 lb	1.8	6426 a	22.1 a	15.75 a	771
Counter 20G	S	5.25 lb	1.05	6368 a	22.1 a	15.70 a	756
Counter 15G	S	10 lb	1.5	6215 ab	21.6 ab	15.43 a	737
Counter 20G	S	7.5 lb	1.5	6185 ab	21.8 a	15.60 a	724
Counter 15G	S	7 lb	1.05	6113 ab	21.2 ab	15.68 a	726
Poncho Beta	Seed		68 g ai/ unit seed	5746 bc	19.8 bc	15.68 a	688
Check	---	----	---	5193 c	18.2 c	15.53 a	612
LSD (0.05)				579	1.9	NS	

Means within a column sharing a letter are not significantly (P = 0.05) different from each other (Fisher's Protected LSD).
[a]S= Spoon; Seed = Seed treatment

Similar to the results on root maggot feeding injury, plots that received Poncho Beta-treated seed were the only plots that produced yields that were not significantly greater than the untreated check. It should be noted, however, that the Poncho Beta plots produced an average revenue increase of $76 more than the untreated check. The rather marginal performance of Poncho Beta in this study in 2008 is inconsistent with our findings on this material from past years (Poncho Beta was identified in previous reports in this publication as "Poncho + beta-

cyfluthrin"), and could possibly have resulted from the moderately high rainfall received after planting. Over ten inches of rain were received at the St. Thomas site during 2008.

The fact that the 20G formulation of Counter provided equivalent levels of performance to those of the labeled 15G formulation is a very positive finding because a 20 percent granule can be applied at a lower volume per acre than a 15G material while maintaining the same rate of active ingredient being applied. Thus, the higher-concentration granule would enable growers to plant more acres before needing to refill the planter insecticide hoppers.

References Cited:

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