

White Grub Control Trial in Corn - 1987

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White grubs (Coleoptera: Scarabaeidae) continue to cause damage and yield reductions in field corn, primarily throughout the sandhills area of Cass, Ransom and Richland counties of North Dakota. Although there are currently three insecticides registered for white grub control in corn, there is a need to continue evaluation of these compounds to determine possible changes in efficacy as well as evaluate unregistered candidate insecticides for potential efficacy against this pest.

A suitable corn field was located on the Kelly Klosterman farm in Richland County near Barney in the spring of 1987. The field was surveyed and found to contain one to three white grubs per square foot soil sample in the northern one-third of the field. A sample of larvae were collected and preserved in 80 percent alcohol and sent to Murdick McLeod, a former graduate student at NDSU who completed his masters thesis on white grubs and is currently pursuing a Ph.D. at Ohio State University. He determined that all seven specimens were third instar *Phyllophaga implicita* (Horn). These larvae were expected to pupate later in the summer and emerge as adults in the spring of 1988. Mr. McLeod indicated that this pattern would be consistent with his observations of highest adult populations in 1985, with subsequent high adult emergence every three years.

The soil type in the Barney area is a sandy loam. Stored soil moisture in this area at planting and treatment time (May 4, 1987) was 8 inches according to the state climatologist at NDSU.

Climatic data for the Barney area for the months of May and June 1987 are as follows:

	Average Maximum Temp.	Average Minimum Temp.	Precipitation
May	70.0°F.	50.0°F.	2.21 inches
June	86.0°F.	56.0°F.	0.62 inches

Average temperature and precipitation data based on a 30-year average (1951-1980) for the Barney area indicates the following:

	Average Maximum Temp.	Average Minimum Temp.	Precipitation
May	70.0°F.	42.9°F.	2.88 inches
June	78.7°F.	53.2°F.	4.09 inches

Methods and Materials:

Ten different granular insecticides were included in the 1987 white grub control trial. The insecticides and rates of application (active ingredient per acre) are presented in Table 1. Counter 15G and Furadan 15G are currently registered for white grub control in corn and were included in the trial as standards for comparison with the other candidate insecticides which are not currently registered for white grub control in corn. All of the insecticides listed in Table 1 have been evaluated for white grub control in corn during one or more years of prior testing with the exception of SC-0567 10G and XRD-429 2G.

The insecticides were applied at planting (May 4, 1987) as single row treatments, replicated three times, in a modified randomized complete block design.

Table 1. Insecticides and Rates of Application Used on the Kelly Klosterman Farm, Barney, ND, 1987.

Insecticides	Rate Per Acre
Aastar 15G (B)	1.0 lb. AI
Counter 15G (F)	1.0 lb. AI
Dyfonate 20G (F)	1.0 lb. AI
Dyfonate 20G-M* (F)	1.0 lb. AI
Force 1.5G (B)	0.125 lb. AI
Force 1.5G (F)	0.100 lb. AI
Force 1.5G (F)	0.125 lb. AI
Fortress 10G (F)	0.5 lb. AI
Fortress 10G (B)	0.75 lb. AI
Furadan 15G (F)	1.0 lb. AI
Lance 15G (F)	1.0 lb. AI
SC-0567 10G (F)	0.5 lb. AI
SC-0567 10G (F)	1.0 lb. AI
Thimet 20G (F)	1.0 lb. AI
XRD-429 2G (F)	0.0625 lb. AI
XRD-429 2G (F)	0.125 lb. AI

NOTE: (B) denotes band application and (F) denotes modified in-furrow application. *M denotes a montmorillonite type clay granule.

The corn variety planted was Pioneer 3737 (100 day corn) at a seeding rate of 26,100 kernels per acre.

Fertilizer usage per acre was as follows: 150 lbs. 18-40-0, 215 lbs. 46-0-0, 125 lbs. 0-0-60 and 70 lbs. of anhydrous ammonia.

Bladex herbicide was applied preemergence at 2 lbs. per acre.

Stand counts were taken on May 28 (initial) and June 10 (final) in order to determine the effectiveness of the various compounds. The counts were taken in 50 feet of row in all three replicates. The stand counts and statistical analysis are presented in Table 2.

Summary and Conclusions:

This test indicated that the following insecticides provided the best stand protection against white grubs differing statistically from the check, none statistically superior to any of the others although numerical differences exist: SC-0567 10G (1.0 lb. AI/A, furrow), Force 1.5G (0.125 lb. AI/A, furrow), Fortress 10G (0.5 lb. AI/A, furrow), Force 1.5G (0.100 lb. AI/A, furrow), Force 1.5G (0.125 lb. AI/A, band), SC-0567 10G (0.5 lb. AI/A, furrow), Furadan 15G (1.0 lb. AI/A, furrow) and Lance 15 (1.0 lb. AI/A, furrow).

None of the following compounds differed significantly from each other or from the check: XRD-429 2G (0.125 lb. AI/A, furrow), Aastar 15G (1.0 lb. AI/A, furrow), Counter 15G (1.0 lb. AI/A, furrow), Dyfonate 20G montmorillonite clay granule (1.0 lb. AI/A, furrow), Dyfonate 20G (1.0 lb. AI/A, furrow) and Thimet 20G (1.0 lb. AI/A, furrow).

The results of this white grub trial are similar to results of previous tests conducted with these insecticides with the exception of SC-0567 10G and XRD-429 2G, which had not been included in trials prior to 1987.

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Table 2. 1987 White Grub Control Trial in Corn with Banded and Modified In-Furrow Granular Insecticides on the Kelly Klosterman Farm, Barney, ND, 1987.

Insecticides	Rate Per Acre	Plants Per 50 Feet of Row					Duncan's Multiple Range Test*
		I	II	III	Total	Mean	
SC-0567 10G	1.0 lb. (F)	73	71	67	211	70.3	a
Force 1.5G	0.125 lb. (F)	70	68	70	208	69.3	a
Fortress 10G	0.5 lb. (F)	71	67	66	204	68.0	a
Force 1.5G	0.100 lb. (F)	69	69	66	204	68.0	a
Force 1.5G	0.125 lb. (B)	71	68	63	202	67.3	a
XRD-429 2G	0.0625 lb. (F)	64	73	63	200	66.6	a
Fortress 10G	0.75 lb. (B)	63	65	70	198	66.0	a
SC-0567 10G	0.5 lb. (F)	67	68	60	195	65.0	a
Furadan 15G	1.0 lb. (F)	67	72	56	195	65.0	a
Lance 15G	1.0 lb. (F)	64	65	65	194	64.6	a
XRD-429 2G	0.125 lb. (F)	65	59	64	188	62.6	a b
Aastar 15G	1.0 lb. (F)	65	66	57	188	62.6	a b
Counter 15G	1.0 lb. (F)	63	57	67	187	62.3	a b
Dyfonate 20G (M)	1.0 lb. (F)	62	54	68	184	61.3	a b
Dyfonate 20G	1.0 lb. (F)	65	69	49	183	61.0	a b
Thimet 20G	1.0 lb. (F)	59	59	64	182	60.6	a b
Check		57	54	50	161	53.6	b

*NOTE: Means followed by the same letter do not differ at the .05 level of significance.