Seed Treatment Insecticides for Managing Soil Insect Pests of Sugarbeet

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Introduction

• Several soil insect pests damage sugarbeet in N. America
• Conventional granular, liquid insecticides used for decades

Drawbacks:

1) broad-spectrum activity (pests & nontargets)
2) many are highly toxic to mammals, including humans
3) require specialized application equipment
4) inconvenient or hazardous to store, transport, load

• Advantages of Insecticidal Seed Treatments

1) accurate delivery of desired rate
2) simple and relatively safe to deploy
3) lower active ingredient needed per acre hectare
Objective

Assess efficacy of seed treatment insecticides for controlling soil insect pests of North American sugarbeet:

1) sugarbeet root maggot

2) wireworms (*Limonius* spp.)

3) subterranean springtails (*Collembola*)
Materials & Methods

• Plot size:
  
  SBRM: 35 ft long by 7.3 ft wide (4 rows w/ 22-in. spacing)
  Others: 35 ft long by 3.6 ft wide (2 " " " " "

• Design: Randomized Complete Block

• 4 replications
Insecticide Applications

• Counter 15G (terbufos) applied as a BAND at planting (5-inch swaths ahead of planter’s rear press wheels)

• Seed treatments applied by Germain’s Technology Group:
  
  Cruiser 5FS = thiamethoxam (60 g Al/unit)
  NipsIT Inside 5FS = clothianidin (60 g Al/unit)
  Poncho Beta = clothianidin+betacyfluthrin (60:8 g Al/unit)

• 1 unit = 100,000 seeds
Data Collection & Analysis

• Efficacy assessments:
  1) SB RM feeding injury (0-9 scale)
  2) Surviving plant counts (wireworm & springtail)
  3) Sucrose yield

• Data analysis:
  1) General Linear Models Procedure (SAS)
  2) Mean comparisons: Fisher’s Protected LSD test
     (alpha = 0.05)
Springtail Control

Plant Stand

3-yr Combined Analysis (2006-2008)

Plants / 100 ft

Counter  Poncho Beta  NipsIT  Cruiser  Check

6 lb  8 lb  68 g  60 g  60 g  60 g

P = 0.05
Springtail Control

Yield and Gross Economic Return

3-yr Combined Analysis (2006-2008)

Rec. Sucrose / ac

Counter  Poncho Beta  NipsIT  Cruiser  Check

6 lb  8 lb  68 g  60 g  60 g  b

$882  $825  $776  $781  $755  $562

P = 0.05
Springtail Plots – Prosper, ND, 2006

- CHECK
- Counter 8 lb BAND
- Poncho Beta 68 g
Wireworm Control

Stand Counts – St. Thomas, ND (2006)

- MIF 10 lb
- Spoon 10 lb
- Poncho Beta: 60:8
- Cruiser: 60 g
- Check: 10

P = 0.05
Root Maggot Control

Feeding Injury

2-yr Combined Analysis (2007-2008)

Injury rating (0-9)

Counter  Poncho Beta  NipsIT  Cruiser  Check

12 lb  10 lb  68 g  60 g  60 g

P = 0.05

Legend:

- c
- b
- a

Note: The chart shows the injury rating for different treatments and their corresponding weights or amounts of product.
Root Maggot Control

Yield and Gross Economic Return

2-yr Combined Analysis (2007-2008)

P = 0.05

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SUMMARY

• **Springtails:**
  - Best stand protection by Counter 15G (6 lb prod/ac)
  - Significant stand protection by all seed trts (vs. check)
  - No yield differences between any seed trt and Counter 15G

• **Wireworms:**
  - Seed trts: equivalent stand protection to Counter 15G
  - Further study needed to determine yield impacts

• **Root Maggot:**
  - Counter 15G provided better root protection than seed trts
  - Seed treatments resulted in equivalent yields to Counter
Conclusions

- Poncho Beta, NipsIT Inside, and Cruiser provide comparable soil insect control and yield benefits to those of Counter 15G.

- Seed treatment insecticides appear to have a good fit for managing soil insect pests of sugarbeet in North America.

- Benefits of seed treatment technology:
  - simple and accurate deployment
  - reduced risk of exposure to applicator
  - major (up to 95%) reductions in active ingredient per acre

- Note: Cruiser is not yet registered for use in sugarbeet.
Thank you!