Potential for avoidance of the red sunflower seed weevil in the Northern Great Plains



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Outline

Pest status and the idea of avoidance

- Causes of high populations?
- Effects of 'cultural practices' on crop
- Planting habits in central South Dakota
- Future research and discussion



S. fulvus Primary Insect Pest in North America

- Most damaging seed pest in surveys (ND, SD)
- Common: 67, 69% fields in 2019, 2021
- Severe: up to 30, 76% damage in 2019, 2021
- SD with 2.1–3.4 times damage in ND

- Weevil weaknesses?
- One generation per year
- Host-specific to sunflowers



Avoidance to Manage S. fulvus?



Causes of High Populations?

- Loss of chlorpyrifos
- Resistance to pyrethroids
- ND << SD populations
- Warmer winters
- Limited tillage
- More sunflowers



Causes of High Populations?

- Loss of chlorpyrifos nope, problem was bad before this!
- Resistance to pyrethroids maybe

• <u>ND << SD populations...</u>

- Warmer winters 6 warmest winters since 2012 (NOAA)
- Limited tillage SD no-till up 29% from 2004–2013 (NRCS)
- More sunflowers central SD up 19% for 2012–2017 (NASS)
- Late planting let's come back to this one...

Causes of High Populations? Warm winters...

Between -4°C and -8°C starts killing weevils

- 2019–2020 average soil temp always > 0°C
- Larval survival to emergence = 11.7%

- 2020–2021 February average soil temp -4°C
- Larval survival to emergence = 1.9%

ND sometimes benefits from 'winterkill' (SD less so)



Causes of High Populations? Limited tillage...

- Spink Co. and Brookings Co., SD
- Various tillage treatments
- 1981 = 32–36% fewer adults
- 1982 = 22–39% fewer adults

- 2020–2021 emergence in Fargo, ND
- Fallow = 62 / 3000 larvae
- Spring wheat = 19 / 4000 larvae
- Soil disturbance cut survival > 2/3



Causes of High Populations? More sunflowers...

- Up only ≈ 10%
- But 'packed in'
- New growers?





- 1981–1984, Cass Co., ND (two sites)
- Leonard: May 7 June 18

May 7 = 40% less damage, no oil loss

• Mapleton: May 19 – June 20

May 19 = 25% less damage, minimal (1%) oil loss

 Similar <u>no-insecticide</u> trials near Redfield & Watertown, SD Plantings ≈ May 1 were <10% damage (80% less) Adding short-maturity hybrid down to <3% damage

- Dickinson, 2022
- No insecticides

- Low RSSW levels
- Late July bloom
 w/< 5% damage



• DLRF, 2022

• No insecticides

• <u>High</u> RSSW levels

- May 27 = 23%
- June 3 = 51%
- June 17 = 96%



• DLRF, 2022

• No insecticides

• <u>High</u> RSSW levels

• 'Extra' on May 16 <10%



• 2450 lb/ac

Planting Habits in Central South Dakota

- Data from USDA-RMA
- Reported planting dates (and yields*)
- Hughes, Hyde, Potter and Sully Counties

- Grower-reported
- Not single fields, date is last date for a group

Oilseeds only (most of the data)

Planting Habits in Central South Dakota



Conclusions and Future Research

- Several factors help weevils survive in greater numbers (SD)
- No tactic is a 'cure-all' (early planting <u>or</u> insecticides)

• ND at risk too (100+ weevils / head in RRV in past)

- If you plant early in 2023 or know someone who does, call!
- (...Or if you can host a June-planted RSSW resistance trial)
- Planting date trials 2023 in 4 sites, RSSW, yield, oil % data

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