

Workshop Title:

Weed control in organic grains

Speakers:

Eric Gallandt, Weed Ecologist, University of Maine

Executive Summary:

The speaker specialized in weed control. He explained different methods for controlling weeds and explained his findings from research that he has done locally as well as in Europe.

Main Notes:

- The speaker works with the Crop Field Farm in PEI
 - Disease management, rotation and equipment
 - Speakers research is on weeds in organic vegetables, with research specifically in organic grains
- The speaker asked how farmers grow currently
 - Crop rotation, cover crops, stale seedbed (difficult in short growing season)
- Competition
 - Cereals are competitive, making relative yields of weedy crops smaller, with cereals at the top of the list
 - What hasn't been applied yet is the fact that when you do grow a cereal, the competitive ability of different varieties varies in terms of how they affect relative weed biomass
 - Most people choose cultivars for other reasons
 - Seed size is important

- Big seeds are better
 - When large seeds are planted, the weed biomass is reduced by 25%, and the increased seedling rate reduced weed biomass by 20%
 - Combined, 45%
- Density/Arrangement
 - Increasing seeding rates
 - Experiment done of relative wheat yield by wild oat density
 - Oat plants compete for resources
 - Elevated seeding rates can help change this
 - Not always easy to simply increase seeding
 - It depends on how they are planted
 - Poor drill, poor seed bed, etc. causes the plant populations to not reach target
 - Planting just on weight can be a problem
 - From a weed management perspective, need to think of it like soy beans, and we need a high density in the field
 - Uniform sowing vs. rows
 - Speaker claims that we should not even be planting in rows
 - Crop rows are long, narrow, dense clumps of plant
 - Don't want from a competition perspective

- If there are weeds, the clumping in row reduces the ability to compete against weeds
- Spreading out seed in both lateral and horizontal direction minimizes competition within self, and maximizes competition with weeds
 - High density rows have more flowers, low density has fewer
 - Biomass of weeds was a lot less in uniform pattern than in rows
- Farmers explain that they do planting N/S and E/W
 - Speaker says this is good
 - Fertilizer placement
 - Should attempt to get nitrogen below the seed
 - Slurry injector – injects below the ground
- Question about mixed grains
 - Speaker says it's rare to see intercrops perform less than best of monoculture
 - Speaker says mixtures of cultivars, and work has shown that for disease, has been successful. Cannot comment from a weed perspective.
 - Will help maintain crop performance, which is a good thing from the weed management perspective
- Question about seed density: what density is too high?

- Speaker explains that from the weed perspective, so far we have not gotten too high
 - At some point, the grower will have to worry about disease from lack of air flow
- Grower explains that they doubled their planting, with smaller seed and it reduced harvest by 70%
- Physical weed control
 - Tine harrowing
 - Crude, raking of crops over field
 - Do not use when crops are at sensitive stage, do it post emergence
 - Creates uniform soil disturbance, crop is well anchored
 - It turns out that to get better weed control, you need to be more aggressive, but that also hinders crops
 - Research says that tine harrowing gives good weed control
 - But does not benefit crops as much as we think
 - Rasmussen has a lot of research on tine harrowing
 - Must have balance from damage to controlling weeds
 - Should do it at a time that is effective
 - Efficacy of weeds killed is not usually 100%
 - 50% to 95% range, lots of variability
 - Average of 70% weed control in cotyledon to early stage
 - Generally lower than herbicide

- 30% surviving, which is a lot of plants for a large population
- If you have 10 000 seeds, 500 germinate, kill 440 on first harrowing, kill 110 more after second harrowing
- Tine harrowing does nothing against perennials
 - In Europe, growers plant cereals in rows so they can harrow more aggressive
- Alternative weed management system for organic cereals
 - Wide row system
 - Treatments showed that weed biomass was reduced in narrow, high density the most, and in the wide row system when compared to the standard system
 - Economic performance showed that the economic returns for wide row system compared to narrow dense row
 - Comes down to the cost of see
 - In second year, there was not much of a benefit
 - Similar experiment with spring wheat (mustard)
 - Likewise results, wide row system performed well along with high density narrow and standard rows
 - Economic was shockingly good for wide row system

- Again, due to high cost of seed in high density rows
 - Reduce seed cost
 - Canada thistle was terrible for a farmer in Sweden
 - Tried a wide row system, and invented the “chameleon” that is an air seeded and inter-row hoe as a single unit
 - Instead of planting in rows and hoeing between the rows, spread the seed out to be more uniform to have competition with weeds and less with itself
 - Seeding in bands was the new approach
 - Band sowing and inter-band hoeing for improved weed control in organic cereals
 - Improves competition with weeds
 - Narrow row performed best, and the research from last summer did not support band sowing as an improvement
 - Looking at alternative crops
 - In crops, such as wheat and oats show that band sowing is better than row sowing
- Question: Why did band sowing not work as good?
 - In the research, the standard system was better so it is a tougher system
 - There were some problems with this data, it was the first year and they decided late

- More research needs to be done into it
- New tools to be aware of
 - Comb cut
 - Thistle management tool
 - Forward speed of sharp knife hitting stem of a weed, brushes keep blades clean
 - 76-94% higher yields
 - Harrington Seed Destructor
 - Cage mill on the back of a combine so that chaff and straw flows through the mill, pulverizing it and making it a powder, killing weed seed
- Speaker wants to emphasize that creating a stale seed bed is a good place to start
 - Achieve the stands that you are targeting is important
- Know limitations of tine harrowing, hoeing offers a more robust option
- Question: Would you consider a weed seed bank for weed control? Should grower do a quantitative assessment to determine what to do?
 - Speaker says that the results would line up with this research that is being done