

Workshop Title: Understanding and Controlling Weeds

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Executive Summary

Weed management is best approached with many small hammers. Weeding early allows your plants to fulfill their potential. There are numerous cultural and physical practices you can implement depending on the weed type. Remember to approach weeds from the perspective that they are filling an ecosystem function.

Detailed Notes:

When talking about the ecology of weeds, remember to appreciate things in the ecosystem for what they are rather than just the management aspect. Nothing is unconnected to the whole. Weeds are part of the whole.

Management of weeds depends on their type: seedling/annual/perennial

Knocking down annuals kills them. Knocking out perennial may encourage more growth; management requires repeated cultivation or other plant competition.

Plant community succession:

A disturbance in the ecosystem creates a vacuum of unused nutrients, light and water. Nature abhors a vacuum and so weeds have evolved to take advantage of this. This is the ecological function of weeds : Capturing nutrients, creating biomass, cover bare soil, prevent erosion. Some farmers let weeds be their cover crop.

Adaptations to disturbance:

Take up and utilize large amounts of soluble nutrients. Trees don't do that.

High tolerance to stress

Rapid growth

Rapid seed germination in response to light/nutrients/scarification

Prolific seed production

Seeds disperse widely

Seeds have dormancy mechanisms for longevity

Cut up fragmentation can reproduce them.

Weeds as soil indicators:

Balanced nutrients, well drained, good structure: Lamb's quarters (excess N), pigweed, wild buckwheat, wild mustard

Acidic conditions: hemp nettle

Poor drainage - barnyard grass
Compacted - pineapple weed

Weed problems occur when the following are present:

Favorable environment

Weed seed bank

Susceptible crop

Integrated Weed Management: Different strategies (google search “many little hammers” - don’t take one big sledgehammer pesticide and knock everything out, use multiple approaches):

Chemical Control

Not that many organic herbicides are available. Acetic acid is being developed but it is expensive and can be useful. Not especially effective/cost effective.

Biological Control

Not that many, some being developed

Cultural Control

Give crop an advantage over the weeds by reducing weeds before they’re established, optimize fertility, get rid of perennial weeds, consider summer fallow if coming out of grass, have a good seed bed with good drainage.

Be prudent. E.g. clean off cultivator - knock off soil when moving from field to field. Use weed-free seed.

For row crops, seedbed prep can improve crop competitiveness.

Reduce planting speeds to ensure uniform depth, get good seed soil contact, pack only where you have seeded.

Good crop rotations for weed management

For weed suppression, crops that develop slow or less competitive should follow weed suppressing crops.

Alternate leaf crops with straw crops

Intercropping oats, peas barley for feed diversifies how plants are shading and competing; effective at weed suppression though requires special management.

Rotation examples: Prairie Organic Farm gets money off each harvest

Alfalfa is competitive with Canada Thistle. Alfalfa is usually harvested when thistle goes to seed. Harvesting at this time cuts down thistle when it is sending all its energy to make seed, depleting its energy reserves.

Follow this crop with hemp which grows vigorously and uses the fixed N from alfalfa.

Then lentils, then flax. Each harvest stage provides you with an income while managing weeds.

Other example:

Quebec dairy farm - 30 cows. In a weedy field, forage hard, give a break after first hay cut and then cultivate for 2 months in August (when it's dry to not compact soil and when weeds are vulnerable) then re-seeded with green manure.

Mechanical Control:

There is a critical weed free period during plant growth because plants will sense the competition and lower their own yield expectations depending on how much nutrients they will be able to scavenge.

Timing of control of wild radish vs. Yield of wheat:

With no weeding, wheat yielded 0.14 (t/ha). When weeded when the wheat was at 3-leaf stage, yield was 1.66 t/ha. When weeded at tillering stage, yield was 0.6 t/ha.

For corn, important weed free period to maximise yields is from seedling up to 8 weeks.

The impacts of tilling/plowing on soil are significant. A study was done in fields following potato (which causes high disturbance in soil). The earthworm biomass was measured in years following the potato growth. Results showed that it takes 4-5 years to get earthworm population of your soil back to pre-potato cultivation.

Hit weeds when small at cotyledon stage!

Q: how/when to hit weeds if your crop is small?

A: <http://oacc.info/> (search weed control) has good resources on how crops react to tilling/timing/cultivation or use false seed bed

See False seedbed and stale seedbed graphic (slides 36 & 37)

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Seed into germinating weeds then flame or cultivate germinated weeds while your seed is safe undercover.

To get the timing right for carrots, you can use beets which germinate sooner or a glassbowl in the soil to know when your carrots are about to germinate.

Finger/tine weeder is effective though it damages some crop. You can seed more heavily to counter the damage.

Rotary hoe is useful for large areas in grain crops

New technology has cultivators with camera guide that avoids your row crop while disturbing weeds.

Reigi weeder requires 2 people and a small tractor but can effectively weed 6 acres a day. Works best on small weeds, check youtube.

Wet conditions is a major challenge

Prefer land that is lighter texture (though it will be less fertile) because wet conditions mean you can't do field operations.

Research being done on weed management in black currants has found that:

Hand weeding 1 acre/day is possible

Mowing is not enough if doing small fruits

White woven fabric as mulch gives best yield.

See picture: Plastic vs. Mowing, plastic shows much better yield (slide 61)

Advice: Do a year of site prep and control weeds timely until bushes are well established 2-3 years