

Weed Management in Organic Grain Production

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Weeds: the good

- “*What is a weed? A plant whose virtues have not yet been discovered.*” ~Emerson
- Weeds can fix nitrogen, hold soil, retain nutrients - similar to a cover crop
- Can provide pollen/nectar for insects, food for birds, animals & humans

But...

Weeds: the bad

- Weeds reduce crop yields
- Weeds can reduce crop quality
- Weeds can harbour disease, pests
- Not controlling weeds = seed production
- Organic growers - weeds considered one of the biggest stumbling blocks

Successful weeds

- Plasticity/adaptability
- Long lived seed
- Germinates easily
- High seed output in good conditions
- Seeds travel near & far
- Plant flowers quickly and produces seed for a long period
- Can self or cross pollinate

(Baker 1965)

Successful perennial weeds

- Vigorous vegetative reproduction
- Brittleness at the lower nodes, rhizomes, or rootstocks
- Can reproduce from different segments of the root

(Baker 1965)



Organic fields still yield well

- Yield is not dramatically different between conventional and organic farms despite greater weed competition
- Organic cropping systems may tolerate a greater abundance of weeds compared to conventional systems

(Ryan et al. 2009 Weed Research - Rodale trials)

Influencing competition

In any competitive relation, we want to set up conditions to give the crop an advantage over the weeds

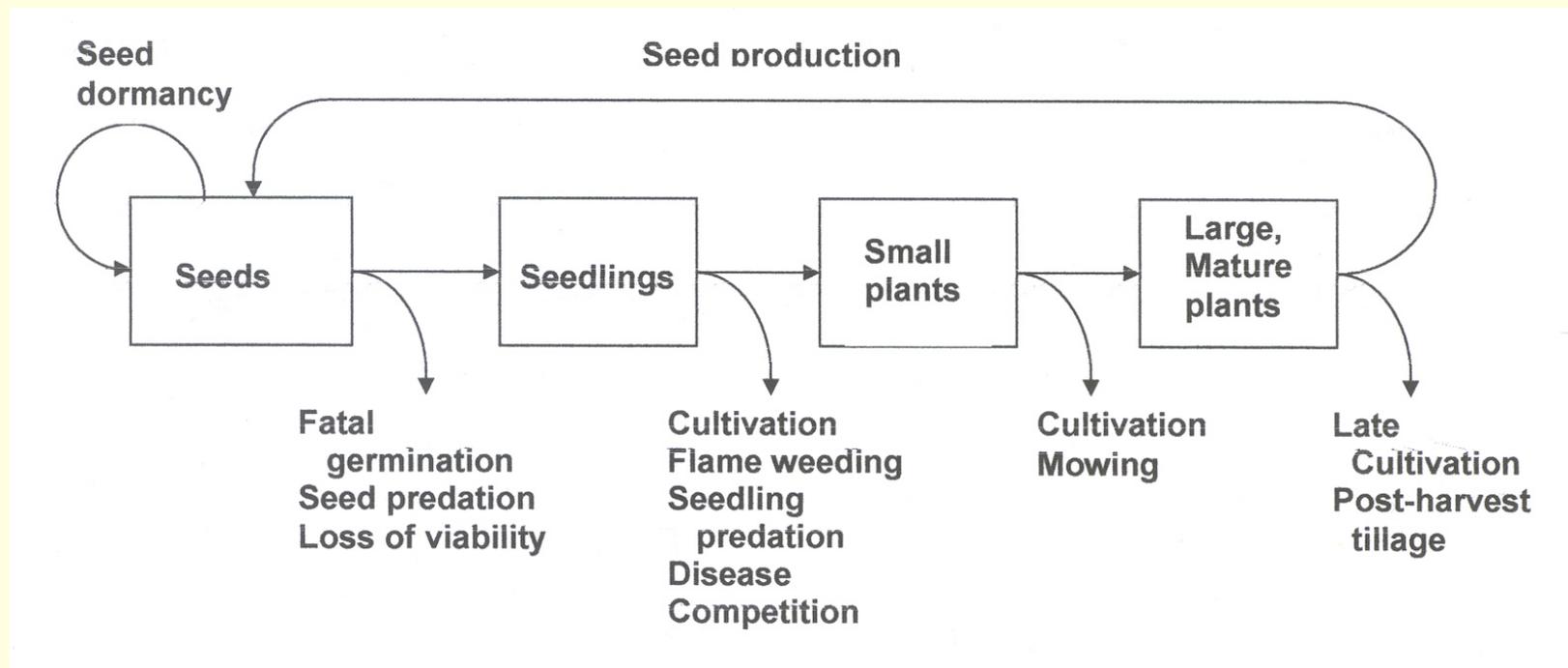
✓ Cultural weed management

We can also use:

- Mechanical techniques
- Biocontrol



Weed life cycle



Mohler (Cornell U)

Timing of emergence

- Worst weeds have competitive ability similar to the crop; factors like time of emergence relative to the crop may determine competitive success (Zimdahl 2004).
- Early seeding can give crop the advantage
- Stale seedbed techniques for later crops

Choose competitive cultivars

- Tall
- Large leaf area
- Good germination, healthy seed
- Fast emergence & growth
- Deeply rooted



Don't overfertilize

- Weeds love excess fertilizer
- Experiment: weeds vs. wheat
Increased nitrogen (N) = increased growth, and greater N uptake by weeds
- Organic sources of N are released slowly, may favour crops over weeds

Increase seeding rate



- Shade out weeds, faster growth, taller, more mainstems and fewer tillers,
- Slightly more expensive, risk of lodging
- Good for fields with high weed pressure
- Can also change planting arrangement

Use good rotations

- Include a good cover crop to suppress weed germination & growth
 - Physical suppression
 - Allelopathy
- Make your rotations long & diverse
- Plant less competitive crops after good cover crops
 - ACORN site - “Under Cover”
acornorganic.org/pdf/UnderCover2008.pdf



Know your weeds

- Certain weeds grow best in specific environments - indicators of soil conditions
 - Amend soils to make field less attractive to that weed
- How a weed grows/reproduces can be used to best determine plans for control

Mechanical controls

- Good seedbed preparation, then mechanical weeding – finger/tine weeders, cultivators,
 - Timing is crucial!
- It is most effective to kill weeds early and often
- Don't be afraid to weed aggressively -

Maritime context

- Couchgrass/quackgrass, lamb's quarters & chickweed were mentioned as being problematic - OACC Research Survey
- Need to adapt your control strategy depending on the weed & crop