

Weed/Crop Competition

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Extension Weed Science

Our weed definition

- ▶ Any plant that humans have deemed undesirable because of a characteristic or group of traits that cause losses. Those losses can be monetary in nature or less tangible.

Why do we have them?

- ▶ It is important to realize many weeds were brought here to serve a purpose



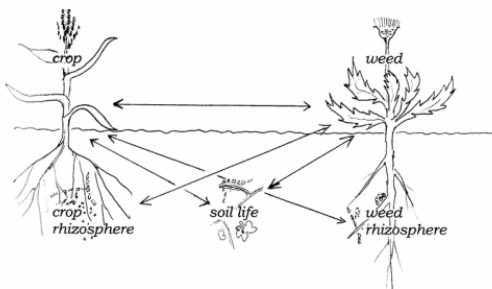
What happens when they establish here?

- ▶ They compete for:

- Water
- Light
- Nutrients
- Space



- ▶ **Ecology** is the study of a species in both its physical and biological environment.



- If crop competition encompasses the largest majority of weed control, how do we make our crop more competitive?

Cultural Practices

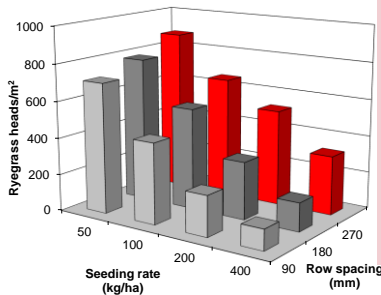
- Many summer annual weeds emerge early.
 - Weeds emerging early in the season have a much greater potential impact on crop yield than those that emerge later in the season.
 - Crop-planting a few weeks later may allow opportunity for disking, harrowing or chemical application to remove them.



Cultural Practices

- Modification of crop row spacing is a widespread practice that directly affects weed competitiveness.
 - The goal is to maximize crop yield while reducing time required for the plant canopy to close.

David Minkey, Merredin, Australia

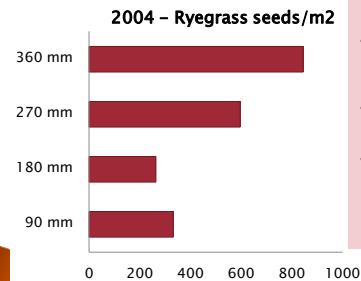


- Near perfect data set
- It is possible to improve competition with weeds by:
 - Reducing row spacing
 - Increasing seeding rate
 - Both!



Glen Riethmuller

27 year trial – stubble retained



- 27 year long crop row spacing & residue trial (Merredin)
- Same row spacing is repeated on the same plots
- Compares stubble burning with full stubble retention
- Uses pre-emergent herbicides for ryegrass control



GRAHAM CENTRE
The Agricultural Institute

Charles Sturt University
Department of Primary Industries

Row spacing of winter crops in broad scale agriculture in southern Australia

Graham Centre Monograph No. 3

Reynold J. Scott
Peter Martin
Glen F. Riethmuller

GRDC
Grain Research & Development Corporation
Total Support and Contracts, Victoria

1% / inch

And the best news of all?
Narrow row spacing of wheat yields more than wide row spacing!

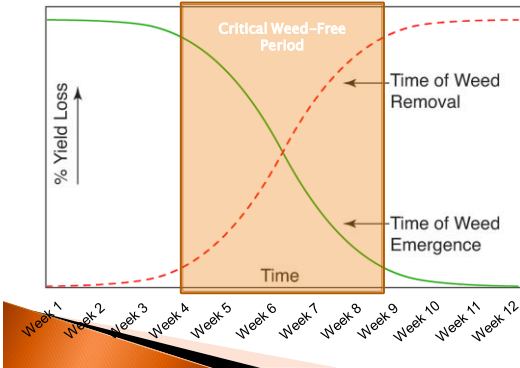
- 1% yield decrease for every inch of row spacing wider than 7" (18cm) (CSU survey)
- The higher yielding the crop, the greater the benefit
- Narrow row spacing results in more crop, less weeds.

It's better than being free, it makes money!

Cultural Practices

- Crop rotation can be effective in weed control.
 - Planting/harvest dates, fertilizer regimes, tillage practice & herbicide usage vary dramatically between different crops.
 - Different weed control measures can be used with each crop to maximize effect.

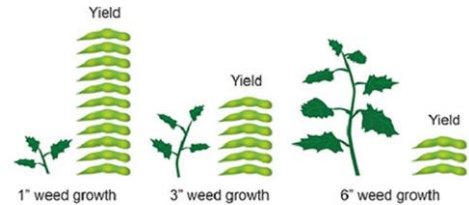
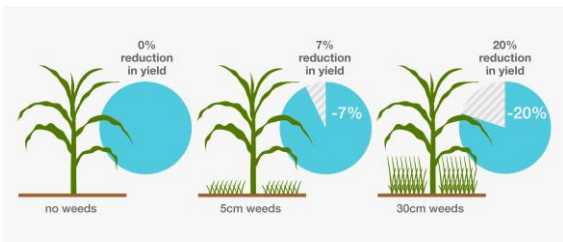
The time a weed spends in contact with a crop plant can have a dramatic effect on yield.



The time a weed spends in contact with a crop plant can have a dramatic effect on yield.



The number of weeds in place also has a dramatic impact on crop yield.



6-8" of dense weed growth can cause 4-5 bushels of lost yield*

*Study by Southern Illinois University.

Adaptation

- Weeds may have special adaptations allowing them to compete effectively in specific environments.
 - These adaptations provide weeds an advantage over other species.
 - Removing the set of conditions to which a particular species is adapted will reduce competitive ability.

Cultural Practices— against adaptations

- ▶ Flooding is a weed-control practice used with rice.
 - Allows regulation of germination of annual weed seeds by indirectly managing oxygen available in the soil.



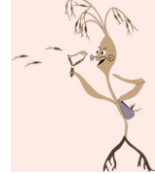
Cultural Practices— against adaptations

- Cover crops can suppress germination and compete effectively with existing weed species.
 - Also an effective method of reducing soil erosion.



Cultural Practices— against adaptations

- In addition to effects of competition, production of chemicals by plants that are toxic to other plants may play a role in the suppressive effect of cover crops on weeds—**allelopathy**.



What factors do we contribute to weed/crop competition ?

