

Competition

Competition between weeds and the crop is driven by numbers and size. Large weeds at high densities cause more yield loss than a few small weeds.

A simplified equation for this is

$$\text{Yield} = \text{No. crop plants} / (\text{No. crop plants} + \text{No. weed plants} * \text{CI})$$

where CI is a competitive index basically describing the size of the weed compared to the crop. For weeds that are about the same size as the crop it is close to 1 (eg Wild oats is 0.8 in a wheat crop).

Examples

If there are no weeds in wheat planted at 100 plants/m² then

$$\text{Yield} = 100 / (100 + 0) = 1$$

If there is 125 Wild Oat plants in the same wheat crop then

$$\text{Yield} = 100 / (100 + (125 * 0.8)) = 100 / (100 + 100) = 100 / 200 = 0.5 \text{ or } 50\% \text{ yield.}$$

Doubling the seeding rate to 200 wheat plants/m² in the wild oat infested crop would give

$$\text{Yield} = 200 / (200 + (100 * 0.8)) = 200 / 300 = 0.66 \text{ or } 66\% \text{ of the maximum yield.}$$

In this case we have received 16% more yield simply by doubling the seeding rate of the wheat.

The competition model in HerbiGuide uses this basic equation but also adjusts for weed size compared to crop size, weed species, and row spacing.

For weeds in winter grown broadacre wheat crops the following densities on average cause a 5% yield loss in wheat.

Weed	Density (plants/m ²)
Annual Ryegrass	40
Barley Grass	40
Brome Grass	30
Capeweed	60
Clover	70
Dock	100
Doublegee	70
Wall Furnitory	100
Peas	50
Pimpernel	200
Prickly Lettuce	70
Soursob	40
Toad Rush	400
Vetches	80
Vulpia (Silver Grass)	133
Wild Oats	25
Wild Radish	20
Wild Turnip	33
Wireweed	200

Acknowledgments:

Collated by HerbiGuide. Phone 08 98444064 or HerbiGuide.com.au for more information.