

COOPERATIVE EXTENSION



GREAT PLAINS CONSERVATION TILLAGE FACT SHEET

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Water Use by Weeds in a Wheat-Fallow System

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It has been estimated that uncontrolled weed growth between wheat harvest and fall dormancy in the Great Plains consumes an estimated 7.0 million acre feet (8.6 million m³) of water each year. This is equal to 80 percent of the annual irrigation allotment of the huge Colorado River complex. It is no surprise then that a number of weed control systems, both by tillage and herbicide, are gaining acceptance during the early part of the fallow season in new wheat stubble. These weed control efforts are showing net gains of 1/2 to 2 inches (1.25 to 5.08 cm) more soil water per fallow season. In turn, this water can be used by wheat to increase yields at the rate of 4 to 7 bushels/acre-inch (11,102 to 19,429 kg/m³).

There are dozens of weed species that, if allowed to develop, can consume large quantities of water. Categories of weeds that infest different periods of the fallow season include:

Broadleaf Annuals—summer species such as kochia, sunflower, Russian thistle, cocklebur, etc.; winter species of wild lettuce, mustard, etc.

Grassy Annuals—summer types of stinkgrass, foxtail, ticklegrass, etc.; winter types of downy brome, wild oats.

Perennial Weeds—deep rooted species such as bur-sage, Canada thistle, bindweed.

Volunteer Wheat—ungrazed volunteer wheat is classified as a weed with a high water use capacity.

Weed seed numbers are extremely high, usually tens of millions per acre (0.4 ha) in the top three inches (7.62 cm) of soil. Weeds compete for more than water, however. They also occupy space, use available light, and require the valuable plant nutrients, nitrogen and phosphorus, at about the same ratio per pound (0.45 kg) of growth as domestic crops.

Water Use Facts

- Ten common broadleaf weed species have an average water requirement of 525 lb water per pound (236.25 kg water per kg) dry matter production. This is the same value as the water requirement for winter wheat.
- In the field, a full stand of weeds can consume 0.25 to 0.30 inch (6.35 mm to 7.62 mm) of soil water per day. (N. Platte, NE and Akron, CO).
- Undisturbed weed growth ranges from 800 to 2,700 lb/acre (896 to 3,024 kg/ha) between wheat harvest and fall dormancy, and will consume 2 to 6 inches (5.08 to 15.24 cm) of total water (NE Colorado).
- In growing from 2 inches to 6 inches (5.08 to 15.24 cm) in height, a full stand of pigweeds will have used a little over one inch (2.54 cm) of water (Colby, KS).
- Rooting depths of five common broadleaf weeds range from 9.3, 8.4, 7.8, 7.3, and 6.0 feet (2.79, 2.52, 2.34, 2.19, 1.8 m) for cocklebur, puncture vine, pigweed, kochia, and Russian thistle, in that order (Bushland, TX). The feeding diameter potential likewise ranges from 14 feet (4.2 m) for cocklebur to 6 feet (1.8 m) for pigweed.
- Cultivation is a high priority for weed control. It should be done before the damage by weeds occurs. It should be remembered, however, that cultivation also hastens soil water evaporation, estimated at 0.25 to 0.40 inches (6.35 to 10.16 mm) of water per cultivation.