DROUGHT ADVISORY

EM4856

Water Conservation, Weed Control Go Hand in Hand

Weeds, like other plants, consume large quantities of water, and most of it is lost by transpiration to the atmosphere. Plants with deep roots have an advantage under conditions of moisture stress. Growth of common lambsquarters, kochia, and Russian thistle Is less affected by a shortage of moisture than is growth of many crops.

Importance in Dry Years

Research concerned with common annual weeds and with their water use requirements, compared with those of agricultural crops, shows that weed control must become an integral part of the farming operation. Weed control is even more important during years of water shortage. When moisture is in short supply, weeds can reduce crop yields more than 50% through moisture competition alone.

Weeds Need More Water than Many Crops

Some common annual weeds growing in association with cultivated crops use up to three times as much water to produce a pound of dry matter as do the crops. For example, common lambsquarters requires 658 pounds of water to produce one pound of dry matter, common sunflower requires 623 pounds, and common ragweed 912 pounds, compared with 349 pounds for corn and 557 pounds for wheat.

The same figures can be expressed in gallons of water required to produce one pound of dry matter. Lambsquarters requires nearly 79 gallons of water to produce one pound of dry matter, and ragweed 109 gallons as compared with only 42 gallons for corn and 67 for wheat.

The amount of water used by an infestation of lambsquarters, if it were conserved through adequate weed control practices, could produce an additional 1.9 tons per acre of corn and 1.2 tons per acre of wheat.

In a 2-year field study, each Russian thistle plant removed an average of 18 gallons of water while competing with the spring wheat crop (mid-April to early August). In addition, each plant used 26 more gallons from crop harvest to killing frost (October).

Other competitive annual weeds common to crops in Washington also show negative values. It has been estimated that one wild sunflower plant uses about the same amount of moisture required to grow one potato plant, or nearly two and one-half corn plants. One common mustard uses as much moisture as four wheat plants, and one Russian thistle uses as much moisture as three sorghum plants. Roots on some weeds, such as Russian thistle, develop much faster than roots of the crop with which it is competing. This allows the faster developing weeds to reach deeper soil moisture first.

Annual weed competition studies conducted in field beans by the USDA-ARS in cooperation with Washington State University showed that annual weeds reduced bean yields from an average of 2795 pounds per acre to less than 900 pounds per acre.

Moisture was not the limiting factor in these studies, but other research has shown that interactions compound the advantage to the weeds in a competitive system. Thus, if weeds suppress crops

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by shading them, the crops are less able to compete for water and nutrients, and severe yield reductions result.

Research and grower experience clearly points out the importance of a good weed control program in all crops when adequate water is available. One can imagine the seriousness under limited irrigation water.

Weeds on Dryland

Under dryland conditions, weeds usually cause the most severe reduction in yield the first two or three weeks of crop growth. Good preplant or preemergence weed control and early post-emergence weed control seem to be essential for maintaining or maximizing yields.

Row crops and forage crops under irrigation are not the only production areas to suffer during drought years. If less water is available on rangelands, we may see fewer plants growing in a given area. This thinning will open up more sites for invasion by weeds. We may see a *normal* weed, such as downy brome, replaced by a more serious weed, such as one of the knapweeds.

Drought Effects on Herbicides

The efficacy of most herbicides depends on water. Soil applied herbicides are less active under drought conditions. This is especially true of preemergence herbicides that require overhead moisture to move into the soil where weed seeds germinate. A harrowing or rotary hoeing can help incorporate herbicides and remove escaped weeds where adequate moisture has not occurred. However, tillage can expose the soil to further drying.

Postemergence herbidides perform best when weeds are actively growing. High temperature, high relative humidity, and adequate soil moisture are ideal. Drought stress of weeds reduces herbicide effectiveness. Weeds are not able to grow as rapidly with limited moisture. Weeds also develop a thicker wax layer, or cuticle, on their leaves to reduce moisture loss during dry conditions. This can reduce the ability of postemergence herbicides to enter weed foliage. Herbicide adjuvants can help increase the penetration of the herbicide into the leaf. However, adjuvants may reduce the selectiveness of selective herbicides and increase crop injury.

Weed control programs are needed to maintain economic levels of crop production, even under optimum growing conditions. Weed control becomes even more important in dry years. Good weed control means higher crop yields and higher net returns per acre.

Outstanding weed control programs have been developed for many Washington crops. Growers should consider weed control an important part of every crop production plan.

Information on soil moisture monitoring and crop evapotranspiration from Washington's Public Agricultural Weather Stations (PAWS) and Washington Irrigation Scheduling Expert (WISE) are available on the Scientific Irrigation Scheduling (SIS): web page
http://sis.prosser.wsu.edu

Drought advisories and other Washington State University Cooperative Extension Bulletins are available online at
http://pubs.wsu.edu
Type "drought" in the search box for downloadable files.

By Robert Parker, Ph.D., Washington State University Cooperative Extension weed scientist, WSU Prosser Irrigated Agriculture Research and Extension Center.

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