



## EXTENSION

Institute of Agriculture and Natural Resources  
**UNIVERSITY OF NEBRASKA-LINCOLN**  
 Northeast Research & Extension Center  
 601 E. Benjamin Avenue, Suite 104  
 Norfolk, NE 68701-0812  
 Phone: (402) 370-4000  
 Fax: (402) 370-4010

**Vol. 27 #6 June 6, 2007**

### Timing of Post-emergence Weed Control in Soybean

With the advances of herbicide tolerant soybean, (e.g. Roundup-Ready) there is still a need to understand how to “time” post-emergence weed control. To decide whether or not weed control is economically worthwhile, there is a need to know if a given weed infestation is likely to reduce yield if left uncontrolled. This establishes the concept of **critical period of weed control (CPWC)**. The CPWC is a period in the crop growth cycle during which weeds must be controlled to prevent yield loss. Weeds present before or after this period may not present a threat to crop yields. This information is essential for achieving an efficient use of herbicides.

Research at the University of Nebraska has shown that each crop has a CPWC during which weeds must be controlled to maintain maximum yield. However, the length of the critical period is influenced by cropping practices, for example row spacing in soybean.

**Time of weed removal as affected by soybean row spacing:** Critical time of weed removal is a time in the crop growth cycle when weed control needs to begin in order to prevent yield loss. Studies were conducted in 1999 at Mead, 2000 and 2001 at Mead and Concord. The predominant weed species at both locations/years were velvetleaf, common waterhemp and green foxtail, with the densities ranging from 70-100 plants per square yard.

The critical time of weed removal was significantly influenced by row spacing. Generally, an increase in row spacing resulted in a need for earlier weed removal, thus a less competitive crop. For example, beginning of the CPWC in the wide-row soybean (30") was approximately at the 1<sup>st</sup> trifoliolate stage, based on a 5% acceptable yield loss level (Table 1). This suggests that in the wide-row soybeans control measures should start early in the season (at the 1<sup>st</sup> trifoliolate stage). Beginning of the CPWC in the 15" rows was delayed and corresponded approximately to the 2<sup>nd</sup> trifoliolate stage, compared to the 3<sup>rd</sup> trifoliolate stage in soybean grown in 7.5" rows.

Table 1. The beginning of CPWC in soybean based on 5% yield loss expressed as crop leaf stage and days after crop emergence (DAE) as affected by row spacing, at two locations in 1999, 2000 and 2001.

<u>Row spacing</u> Inches	<u>Time to control weeds</u> Soybean leaf stage	<u>Time to control weeds</u> Days after crop emergence
7.5	V3	19
15	V2	15
30	V1	9

University of Nebraska-Lincoln, cooperating with the counties and the counties and the U.S. Department of Agriculture

This data implies that reducing row spacing delays the timing of weed control and increases the tolerance of soybean to weed presence. The mechanism of soybean tolerance needs to be determined yet. The speculation is that even though the weeds are present in narrow row soybeans they are not growing as vigorously and are not as competitive against the crop, possibly due to crop shading effects. Furthermore, from a practical standpoint, these results indicate that a reduction in soybean row spacing increases soybean tolerance to weeds and it may require less intensive weed management programs (e.g. weed control measure applied perhaps once or twice).

**Cost of delaying weed control:** The commonly asked question among producers is “how much is it going to cost me if I delay weed control”. Possible reasons for delayed weed control may include weather constraints (rainfall, wind), and time constraints due to large acreage to spray. In order to answer the above question the yield loss data from the above studies were pooled among years-locations and graphed against the crop growth stage at the time of weed removal in corn and soybean (Figure 1).

A 2 percent yield loss per every leaf stage of delay past the critical stage of weed control, was determined as the cost of delaying weed control in soybean. For example, the time to control weeds in 7.5 inch rows soybean is the V3 stage (third trifoliolate-Table 1), if weed control is delayed to the V4 (fourth trifoliolate), it will cost a producer about 2 percent in yield loss due to prolonged competition from weeds. The same is true if weed control is delayed past the recommended critical time in other soybean row spacings (Table 1). This recommendation is applicable up to the R3 stage in soybean (beginning pod). If the weed control is delayed further than these indicated stages the yield losses may be much higher than suggested.

In terms of actual economic loss in soybean, it will be about \$7.50 per acre for every soybean leaf stage of delay, assuming a price of \$7.50 bushel and a yield goal of 50 bushels/acre.

**Weed Size:** Weed size at the time of weed control is another concern. If the weeds emerge 4-5 days before the crop or they are taller than crop they will shade the crop, so control should be initiated 4-5 days (1-2 leaves) prior to the beginning of CPWC. If the weeds emerge 5-10 days after the crop they will not shade the crop that early in the season so the control can be initiated 5-10 days (2-3 leaves) after the beginning of CPCW.

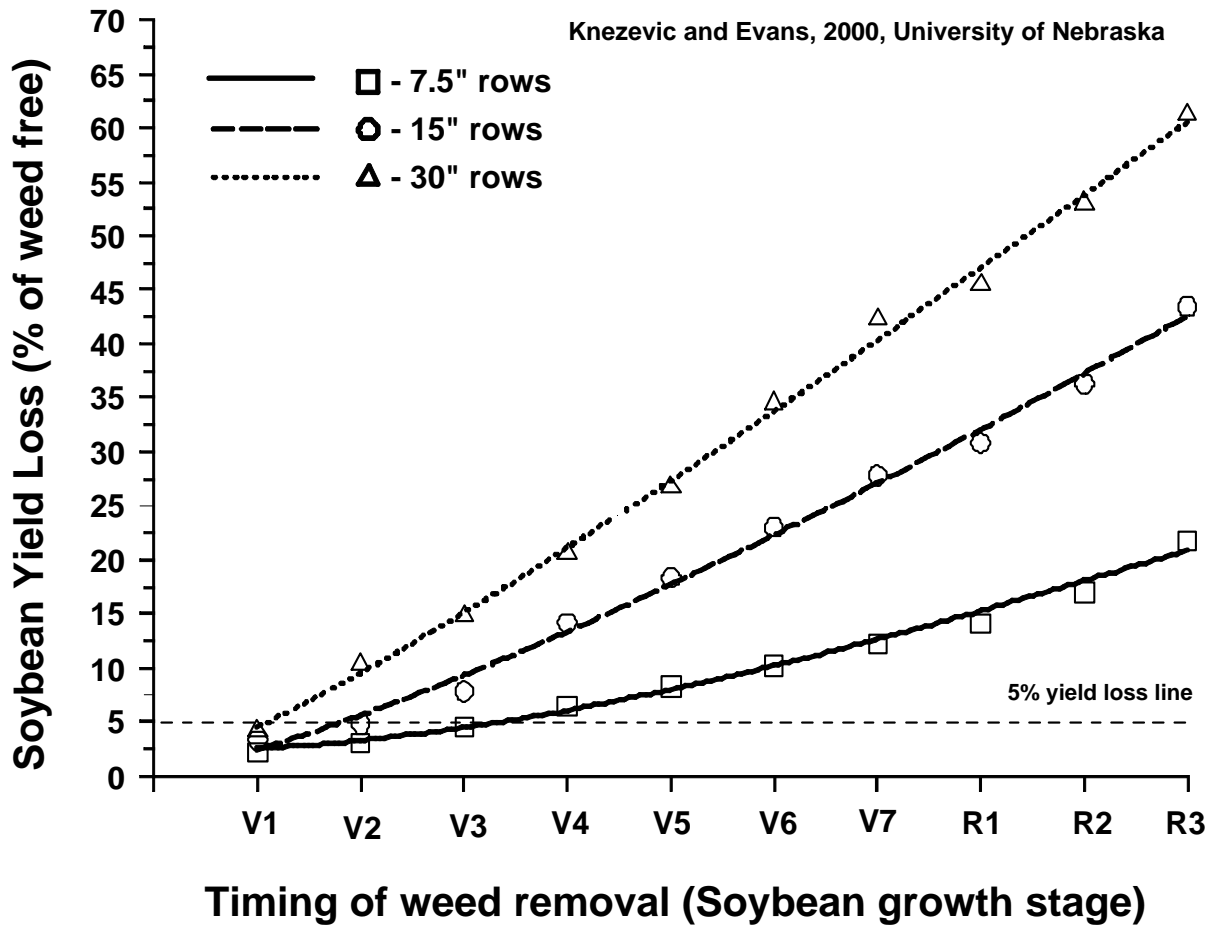
The size of weed species will effect the herbicide use rates too, especially the rates of Roundup or any generic glyphosate in Roundup-Ready soybeans. It is well known that Roundup has much better activity on grassy species. Therefore the rates of 16 to 24 oz should provide control of most common annual grassy species (foxtails, barnyardgrass, field sandbur, woolly cupgrass, panicums) that are 3-8 inches tall. The same rates should control annual broadleaves (velvetleaf, lambsquarters, pigweeds, mustards) that are less than 6 inches tall. For taller grasses and broadleaf species a full rate (32 oz) will be required. Higher rates of Roundup (40 oz - 60 oz) will be needed to control species such as ivy-leaf morning-glory, sweet clover, field bindweed, Venice mallow and various smartweed species (lady's thumb, Pennsylvania smartweed, wild buckwheat, etc).

**Practical use of the CPWC and timing of weed control in herbicide tolerant crops:**

Roundup-Ready soybeans have received high levels of acceptance. The concept of critical period of weed control is an important part of integrated weed management in answering a fundamental question **IF** and **WHEN** to apply post-emergence herbicide.

A generally sound strategy in Roundup-Ready soybeans will be to apply Roundup tank-mixed with a residual herbicide at the beginning of the critical period, which will provide adequate weed control the entire critical period. In order to select appropriate herbicide mixtures for the weed spectrum at your farm, we suggest consulting the herbicide efficacy tables from the Guide for Weed Management in Nebraska (Extension Publication, EC-130).

**Figure 1:** Soybean yield loss and beginning of CPWC as influenced by the timing of weed removal and row spacing.



### Control of Volunteer Corn in Soybean

It is not surprising to see volunteer corn in soybean since the two crops are used in rotation. However, volunteer corn is a weed and should be treated accordingly. It reduces light interception to soybean, interferes with harvesting procedure and makes the field look ‘messy’. Growth of corn is generally ‘faster’ than soybean, therefore if it is left uncontrolled, soon it will overtop the soybean canopy. Control can be achieved by mechanical means (e.g. inter-row cultivation) and herbicides.

Timing of inter-row cultivation should depend on the weed pressure. If volunteer corn is a predominant “weed”, the timing of cultivation should be around the 5-6 leaf stage of corn. The growing point of corn remains in the ground until the 6<sup>th</sup> leaf stage. Therefore any cultivation

done prior to that leaf stage may result in regrowth of the plants and it will require second cultivation. It is especially true with shallow cultivation.

If you have Roundup-Ready soybean, Roundup will control volunteer corn, unless you have had Roundup Ready corn in the previous year. Roundup will not control volunteer RR-corn in RR-soybeans.

Herbicides can also be used to very effectively control volunteer corn. There are several grass type herbicides (graminicides) that can be used at their lower rates post-emergence in both conventional- and RR-soybean. The list of herbicides and their lower rates per acre includes: Assure (4 oz), Fusilade (4 oz), Fusion (2 oz), Poast-Plus (10-16 oz), and Select (4 oz). Best control is achieved when herbicides are applied by the 3-4<sup>th</sup> leaf stage of corn. These herbicides used at full label rates will also control many grassy species, including barnyardgrass, green and yellow foxtail, fall panicum and sandbur. (SK)

## **Buckbrush Control in Pasture**

Buckbrush (*Symphoricarpos orbiculatus*) is a commonly found native weed in northeastern Nebraska's rangeland, woodland, ravines and along streams. It is a perennial forb that reproduces both by seeds and rhizome. The rhizome is a horizontal creeping root system growing within 2-12 inches of the surface. Rhizomes can access soil moisture from a deeper profile at much better rate than fibrous roots of pasture grasses, giving buckbrush a competitive advantage over grass, especially during dry years.

Buckbrush plants usually start growing in sparse groups (patches or clusters) and then spread further if not controlled. The stem is erect, 2-6 ft tall, brownish, somewhat smooth, with many branches. Leaves are opposite, elliptic to ovate with pointed tips. Like many other plant species, the overall growth and development depends on the amount and timing of rainfall.

Buckbrush can flower from July to August, with greenish-white to purple flowers. Buckbrush can provide forage for deer early in the season, while the fruits are an important food source for upland game-birds, wild turkeys and songbirds. It has no value to livestock because of its low palatability.

Ranchers need to control this species because heavy stands of buckbrush can reduce grass production as much as 80%, especially in dry years. This weed can be controlled by various means. Goats and sheep can reduce the stands of buckbrush considerably if kept confined in the area. Single mowing of new 1-2 feet tall plants can also reduce buckbrush populations, especially in dry years. Additional mowing will be needed in wet years. Mowing can also help remove previous years' growth to prepare the site for broadcast applications of herbicides. Herbicides are the most effective tools in providing season long control. Herbicide application should be conducted when the new growth is 6-12 inches tall. The list of effective herbicides and their rates per acre include: 2,4-D-Ester (2-3 qt/acre), Grazon P+D (1-2 qt/acre), Telar (1.0 oz/acre); mix of Cimarron (0.25 oz/acre ) with WeedMaster (16 oz/acre); mix of Cimarron (0.25 oz/acre) with RangeStar (16 oz/acre), and Cimarron (Ally, Escort) used alone at 0.5 oz/acre. SK)

### **Contributing Authors:**

Keith J. Jarvi, Editor & IPM Extension Assistant  
Charles A. Shapiro, Ext. Soils Specialist  
William L. Kranz, Ext. Irrigation Specialist  
Stevan Knezevic, Integrated Weed Mgmt. Spec.  
Tom Hunt, Extension Entomologist  
David P. Shelton, Extension Agricultural Engineer