

Increasing Yields by Maximizing Effectiveness of In-Crop Weed Management in Pulses

- Reduce Competition:** Weeds and crops that emerge in spring are competing for nutrients, water, and sunlight. Some crops are more competitive, however, pulse crops tend to be poor competitors especially early in the growing season. Reduce competition by keeping weed pressures low during early growth. Once plants get into rapid vegetative growth they are more competitive and less impact of newly emerging weeds on yield loss.
- Timing of Weed Control:** There are two terms used when talking about critical timing: critical weed free period (CWFP) is defined as the growth stages in the crop that must be kept weed free to prevent a maximum of 5% yield loss and usually relates to how long a soil residual product would have to work to minimize losses; critical period of weed control (CPWC) has more application for post emergent foliar herbicides as it relates to the stages at which in-crop weed control is most beneficial.
- Size of Weeds:** Small weeds are much easier to control than large weeds. Applications of in-crop herbicides when weeds are in the right stage helps to increase effectiveness.
- Crop Health:** Make sure crop is not stressed prior to applying herbicides. Stress such as drought, frost, wind, heat, nutrient deficiencies, and others can result in increased risk of injury to pulses from in-crop herbicide application. Ability of plants to metabolize herbicides is dependent on the health of the crop. Wait at least 48 hours after a stress to ensure plants have time to recover.
- Weed Health:** Weeds need to be actively growing for effective control with herbicides. Effects of many herbicides are related to inhibition of metabolic and biochemical processes or plant growth and require the plant to be actively growing to have effect: lipid biosynthesis inhibitors (Groups 1, 8, 15), amino acid biosynthesis inhibitors (Groups 2, 9, 10), mitotic inhibitors (Group 3), growth regulators (Group 4), pigment synthesis inhibitors (Groups 11, 13, 27).
- Environment:** Extremes of temperature and moisture impact crop and weed health which can alter the effectiveness of herbicides. In addition, some herbicide mode of actions also require sunlight to induce cell and plant death. Cell membrane disruptors (Group 5, 6, 7, 10, 14, 22) are more effective when applications are followed by sunny days. Activity may be slowed or reduced if application is followed by a long stretch of overcast days.
- Rates:** Use rates recommended and registered for control of labelled weeds in target crop. Using reduced rates reduces effectiveness and can increase risk of developing herbicide resistance.

Crop	Critical Periods
Peas	1-2 weeks after emergence is the start of CWFP. Applications of herbicides during early recommended stages has more yield benefit than later applications. Waiting until 4 weeks after emergence can dramatically affect yields.
Lentils	CPWC is 5-10 node stage with herbicide applications recommended earlier (5-6 node) vs. later stages.
Faba Beans	The CPWC in faba bean is currently under investigation by the University of Saskatchewan Weed Program. Preliminary results suggest a fairly wide CPWC of 5-node to early flowering based on two locations over two years. This work is continuing in 2021 to confirm the preliminary results.
Chickpeas	Not a competitive crop so it is important to manage weeds early on.
Soybeans	CWFP starts at emergence and goes to V3 stage. It can last until reproductive stages as well.
Dry Beans	Not a competitive crop with CPWC from 20-42 days after seeding with work from Ontario suggesting V2 to first flower stages of growth.