

Integrated management strategies are essential to improve weed control and disease management problems challenging lentil producers in western Canada. The purpose of this study was to provide lentil producers with improved weed control, seeding rate, and fungicide recommendations and determine which combination(s) of inputs are most economically feasible. The trial was conducted over three years (2017-2019) at Scott, Yorkton, Indian Head, Swift Current, and Outlook. The study included three seeding rates (130, 190, 260 seeds/m<sup>2</sup>), three fungicide treatments (none, single, dual application), and two herbicide management practices (pre-seed burn-off vs. pre-seed residual) to total 18 treatments. The pre-seed burn off consisted of glyphosate and the pre-seed residual included glyphosate and Focus® co-formulated.

The results indicated that pre-seed residual herbicide reduced early season annual weed populations by 66% compared to the traditional pre-seed burn-off strategy. Weed growth was largely influenced by both the seeding rate and herbicide application. The least effective weed management strategy was utilizing the current seeding rate recommendation of 130 seeds/m<sup>2</sup> with glyphosate applied alone (Figure 1). If a burn-off strategy is to be used, the seeding rate must exceed 130 seeds/m<sup>2</sup> to reduce weed interference. A residual herbicide application was more effective than glyphosate applied alone at all three seeding rates. The most effective weed management strategy utilized a seeding rate of 190 seeds/m<sup>2</sup> combined with a residual herbicide to reduce weed biomass by 76%. Seeding rates also influenced disease severity throughout the growing season. Disease severity tended to increase with seeding rate (260 > 190 > 130 seeds/m<sup>2</sup>). Seeding rate of 190 seeds/m<sup>2</sup> resulted in disease levels similar to unsprayed lentil at the current seeding rate recommendation (130 seeds/m<sup>2</sup>). This indicates that if seeding rates are to increase to 190 seeds/m<sup>2</sup> then fungicide applications are likely required, particularly under moist conditions. Furthermore, dual

fungicide applications tended to have the least amount of disease pressure compared to single applications and unsprayed. Yield was also largely influenced by seeding rate with 190 seeds/m<sup>2</sup> resulting in the highest yield compared to seeding rates of 130 and 260 seeds/m<sup>2</sup>. A seeding rate of 190 seeds/m<sup>2</sup> also provided the best economic returns, regardless of management strategy. The highest net returns occurred with a seeding rate of 190 seeds/m<sup>2</sup>, unsprayed fungicide, and a residual herbicide application.

The lentils grown in the 15 site-years were generally under drought conditions with limited disease pressure and therefore our results may not reflect the potential economic benefits associated with fungicide applications under a wider range of conditions. Producers can reduce their risk of yield loss from plant diseases by choosing a cultivar with excellent disease resistance. Under weedy conditions, it is better to use a residual herbicide over a burn-down weed control method like glyphosate alone.

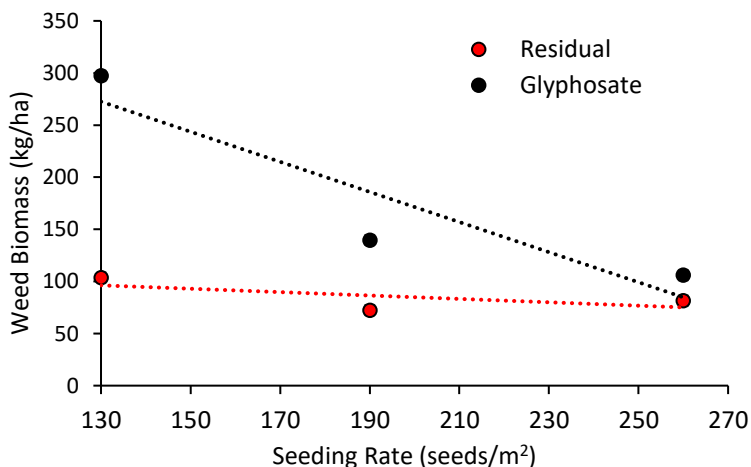


Figure 1. Effect of seeding rate and herbicide applications on weed biomass at physiological maturity across 15 site years.

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