AGR1701: Lentil Input Study

Integrated management strategies are essential to improve weed control and disease management problems challenging lentil producers in western Canada. A study was conducted over a three-year period at five locations throughout Saskatchewan. The study included three seeding rates (130, 190. and 260 seeds/m^2), three fungicide treatments (none, single, and dual application), and two herbicide management practices (pre-seed burnoff vs. pre-seed residual) to total 18 treatments. The response variables measured were crop and weed density, crop and weed dry weight biomass, disease ratings prior to fungicide application, 7, 14, and 21 days after initial application (DAIA), days to flower, days to maturity, seed yield, thousand kernel weights, and test weight. The results indicated that a pre-seed residual herbicide reduced early season annual weed populations by 66% compared to the traditional pre-seed burnoff strategy.

Weed growth was largely influenced by both seeding rate and herbicide application. The least effective weed management strategy was utilizing the current seeding rate recommendation of 130 seeds/m^2 with glyphosate applied alone. If a burnoff strategy is to be used, the seeding rate must exceed 130 seeds/m^2 to reduce weed interference. A residual herbicide application was more effective than glyphosate applied alone at all three seeding rates (130, 190, and 260 seeds/m^2). The most effective weed management strategy utilized a seeding rate of 190 seeds/ m^2 combined with a residual herbicide to reduce weed biomass by 76%. Seeding rate also influenced disease severity throughout the growing season. Disease severity tended to increase with seeding rate (260 seeds/m^2 > 190 seeds/m^2 > 130 seeds/m^2). Seeding rates of 190 seeds/m^2 resulted in disease levels similar to unsprayed lentils at the current seeding rate recommendation (130 seeds/m^2). This indicates that if seeding rates are to increase to 190 seeds/m^2 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^2 resulting in the highest yield compared to seeding rates of 130 and 260 seeds/m^2. A seeding rate of 190 seeds/m^2 also provided the best economic returns, regardless of management strategy.

The highest net returns occurred with a seeding rate of 190 seeds/m^2, unsprayed fungicide, and a residual herbicide application. Although the cost of a fungicide typically reduced net returns compared to the unsprayed, the fungicides should be viewed as a form of insurance rather than an input cost, as disease management is essential for proper lentil production. Additionally, the 15 site-years of experiments were generally conducted under drought conditions with limited disease pressure and therefore may not show the economic benefits associated with fungicide applications. A second factor to consider is the use of a residual herbicide over a burndown weed control method like glyphosate applied alone. In this study, there was limited weed pressure (< 58 plants/m^2) and therefore under weedy conditions there would likely be a significant profit with a residual herbicide. Additionally, economic and agronomic benefits to herbicide layering and residual products are likely to be realized over the longer term versus exclusively during the year of application and can also help to mitigate the development of herbicide resistance in weed populations.