Moisture management effects on soybean and faba bean in Saskatchewan

Dr. Dale Tomasiewicz
Agriculture and Agri-Food Canada

SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Total Project Cost
$79,890.00	Completed	April 2015 – March 2018	$79,890.00

Project Description

To determine the effects of selected irrigation treatments, and of preceding fall tillage, on soybean and faba bean development, yield, and quality and on soil moisture and temperature.

Outcome

The project determined the effects of irrigation treatments on soybean and faba bean yield and quality to develop information useful for irrigation management and to indicate adaptability of the crops to soils and areas where drought and/or excess moisture may occur. Soybean irrigation requirements were lower than those for fababean. Clearly faba bean is much more sensitive to drought stress than soybean, and a risky crop for at least the Brown and Dark Brown soil zones without irrigation. Although the flowering and seed development stages are generally regarded as the important times for irrigation to avoid reductions in yield due to drought stress, yield was also somewhat limited by earlier stage stress. Irrigation needs to respond to the conditions actually present rather than rules of thumb. Monitoring of soil moisture levels provided a good indicator of when irrigation was required – significant yield losses to drought occurred only in cases where soil moisture met critical levels at some point in the season. However, it was found that moisture monitoring had to be done at relatively shallow depth to detect yield-limiting drought stress early in the growing season. Both crops tolerated intentional excess early or late irrigation well. Only a slight yield loss and reduction in seed protein associated with excess late water occurred for soybean in one year, when crop lodging (not caused by the excess water) was present – but lodging is not a common problem for soybean in Saskatchewan. Clearly both these crops are tolerant of excess water conditions. This does not necessarily mean that they are tolerant of poor soil drainage/waterlogged conditions, which were not present in the study. Irrigation treatments only affected grain quality or crop disease levels when yield was substantially reduced by drought – in that case fababean height, lodging, and seed size and protein content were all lower.

Research Objective

OBJECTIVE 1

To determine the effects of selected irrigation treatments, and of preceding fall tillage, on soybean and faba bean development, yield, and quality and on soil moisture and temperature.