Is there an economic benefit to variable rate seeding in cranberry beans?

In recent years, Ontario dry bean growers have been successfully reducing seeding rates and using variable rate (VR) seeding methods. A three-year, multi-site project was conducted to evaluate the economics of reduced rate and variable rate seeding and determine if historical yield zones or soil parameters across a field should drive variable rate seeding.

The simple answer

There was an average economic benefit of **$18/ac** to varying seeding rates based on historical yield zones. For blanket seeding, the economically optimum seeding rate was **54,200 seeds per acre**.

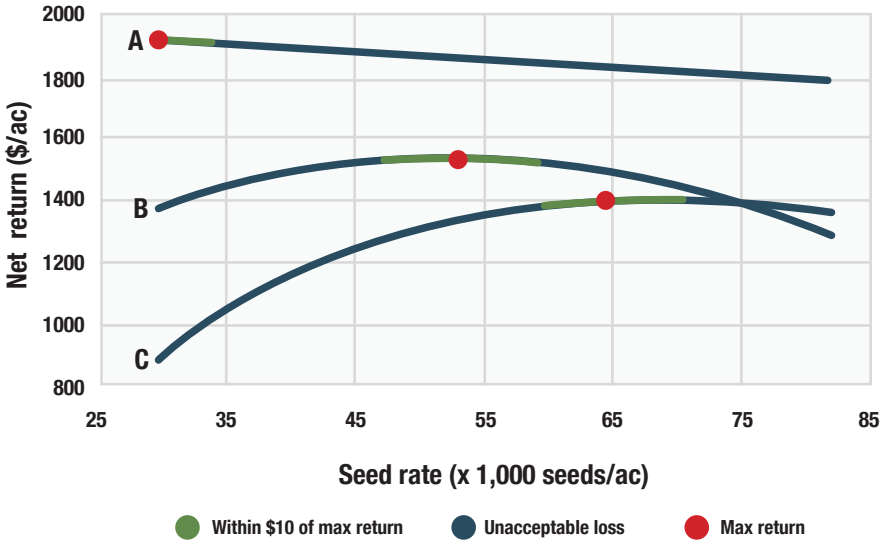
A little more information

Over a three-year period, the relationship between seeding rate and profit was evaluated in 11 fields on farms in Oxford County. Beans were planted in 30" rows with four different seeding rates using the variety Etna. There were up to 60 plots per field – each approximately ½ acre in size – and yield data was collected from load cell yield monitors installed on producers' dry bean combines.

Maximum economic return

Plots were divided into historically high (**A**), average (**B**) and low (**C**) yield zones. The graph is an example of the net economic returns by seeding rate in each yield zone for one of the fields.

Net economic return by seeding rates in historical yield zones



- Green areas of the curves indicate returns that are within $10/ac of the maximum – these areas have a narrow range of seeding rates, in part, because of the high cost of cranberry bean seed.
- Green areas of the curve do not overlap, indicating there was value in varying seeding rate based on historical yield zones.
- Cranberry beans performed very well at low seeding rates in these Oxford County fields.
- The lowest seeding rate was most economical in the highest yielding areas (**A**), which matches commonly held ideas on VR seeding beans, but this was not typically the case with white and black bean fields.

Emergence across all plots ranged from 65-90%. In some cases, emergence was up to 16% better at seeding rates of 80,000 seeds/ac compared to 40,000 seeds/ac, and in some emergence was the same across all seeding rates.

The full story

This project demonstrated the benefits to variable rate seeding for cranberry beans, including an average economic benefit of $18/ac. Here are the overall conclusions for this project, based on a number of factors related to variable rate seeding.

VR by yield zone

If you select the optimal seeding rate for each yield zone (e.g. as in the graph) and seed zones at those rates, the net return increases by $18/ac on average, assuming each yield zone is an equal size. The increase in net return using optimal seeding rate by yield zone ranged from $4-$35/ac and was more than $13/ac for two-thirds of the fields. ***These results indicate there may be value in pursuing variable rate seeding by historical yield zone for cranberry beans.***

VR and SoilOptix data

Soil parameters were evaluated using SoilOptix – a device measuring gamma radiation from the soil calibrated against soil samples taken from the field. Values were collected on elevation, % clay, loam, sand and silt, OM, pH, CEC, K, P, S, B, Ca, Mg, Fe, Mn, Zn, K:Mg, Ca:Mg, leakability and plant available water. Although soils varied across fields and within individual fields, none of the parameters measured by SoilOptix correlated with optimal seeding rate.

Maturity

At lower populations, plants branch more and may take longer to mature – significantly reducing seeding rates in shorter season regions may result in issues at harvest.

Weeds

Seeding rate did not significantly impact annual weed density in this project. All fields were cultivated between the rows during late vegetative stages.

White mould

In one of the 11 cranberry bean fields, plots with higher seeding rates had more white mould than those with low seeding rates. Lush growth and thick canopies can result in higher risk of white mould, but early season rain and fertility often have a greater impact on vegetative growth than seeding rate.

FIELDCROPNEWS

For more information contact:
meghan.moran@ontario.ca fieldcropnews.com

CANADIAN AGRICULTURAL PARTNERSHIP
ONTARIO BEAN GROWERS
Ontario
Canada