

Effects of early harvest on hardseededness in dry bean

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Total Project Cost
\$115,311.00	Completed	May 2015 – June 2017	\$115,311.00

Project Description

To understand when and how physical dormancy (PY), also known as stone seed or hardseededness, forms during seed development; to determine if the amount of stone seeds (PY dormancy) present in prone genotypes can be decreased by manipulating seed maturity; to determine if PY dormancy decreases with after-ripening of the bean seed; to determine how much physiological dormancy (PD) is present in freshly harvested bean seeds and how much after-ripening is required.

Hardseededness is a condition in dry beans where seeds do not take up water during processing, resulting in so called stone seeds, which are undesirable in a processed product. It is also related to reduced germination, as seeds need to take up water to germinate. The trait is highly influenced by the environment but some varieties, especially of black bean, are more susceptible to developing hard seeds. Preliminary work in our group suggested hardseededness is related to physical dormancy induced by harvesting at the wrong time. The primary objective of this project was to determine the time frame during seed development critical to the development of hardseededness in black beans. The goal was to make recommendations as to the best agronomic practices for harvesting beans to lower the incidence of hardseededness.

An experimental trial was conducted with two black bean varieties, CDC Jet (susceptible to hardseededness) and CDC Blackcomb (resistant), harvested at nine time-points between 28 and 44 days after flowering. Seed germination tests were conducted as a measure of dormancy within one month of harvest and again after six months of storage. The germination tests were repeated with scarified seeds to determine if physiological dormancy was having an effect on germination rates.

Outcome

The susceptible genotype, CDC Jet, had 40–70% dormant seeds when harvested 32 to 40 days after flowering (DAF) but this was reduced to 10-25% if left on the plant until at least 42 DAF. Dormancy in CDC Blackcomb was

Research Objective

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OBJECTIVE 4

To determine how much physiological dormancy (PD) is present in freshly harvested bean seeds and how much after-ripening is required.

OBJECTIVE 2

To determine if the amount of stone seeds (PY dormancy) present in prone genotypes can be decreased by manipulating seed maturity.

OBJECTIVE 3

To determine if PY dormancy decreases with after-ripening of the bean seed.