

# Improving Phosphate Use Efficiency



## The Problem With Phosphate

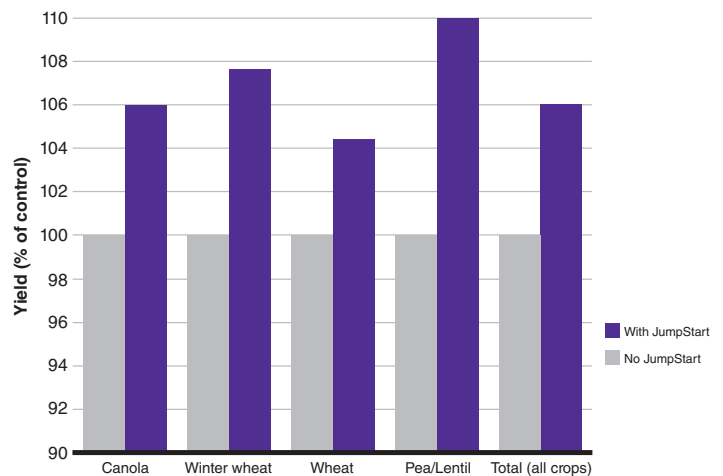
Up to 90%<sup>1</sup> of applied phosphate (P) fertilizer goes unused in the year of application as it gets tied up (bound) with soil particles and other elements, making it unavailable to the crop. Only some of the unavailable phosphate is released and used by the crop.

### JumpStart<sup>®</sup> increases the availability and uptake of phosphate

JumpStart is an inoculant containing the naturally occurring soil fungus *Penicillium bilaii*, discovered by Agriculture and Agri-Food Canada, which colonizes (grows along) plant roots, releasing compounds that, in turn, release the bound mineral forms of soil and fertilizer phosphate, making it more available for the crop to use. JumpStart does not replace the need for phosphate fertilizer, but provides crops access to more phosphate for higher yield potential.

360 independent, large-plot research trials in Western and Eastern Canada showed that JumpStart increased yield by an average of 6%.

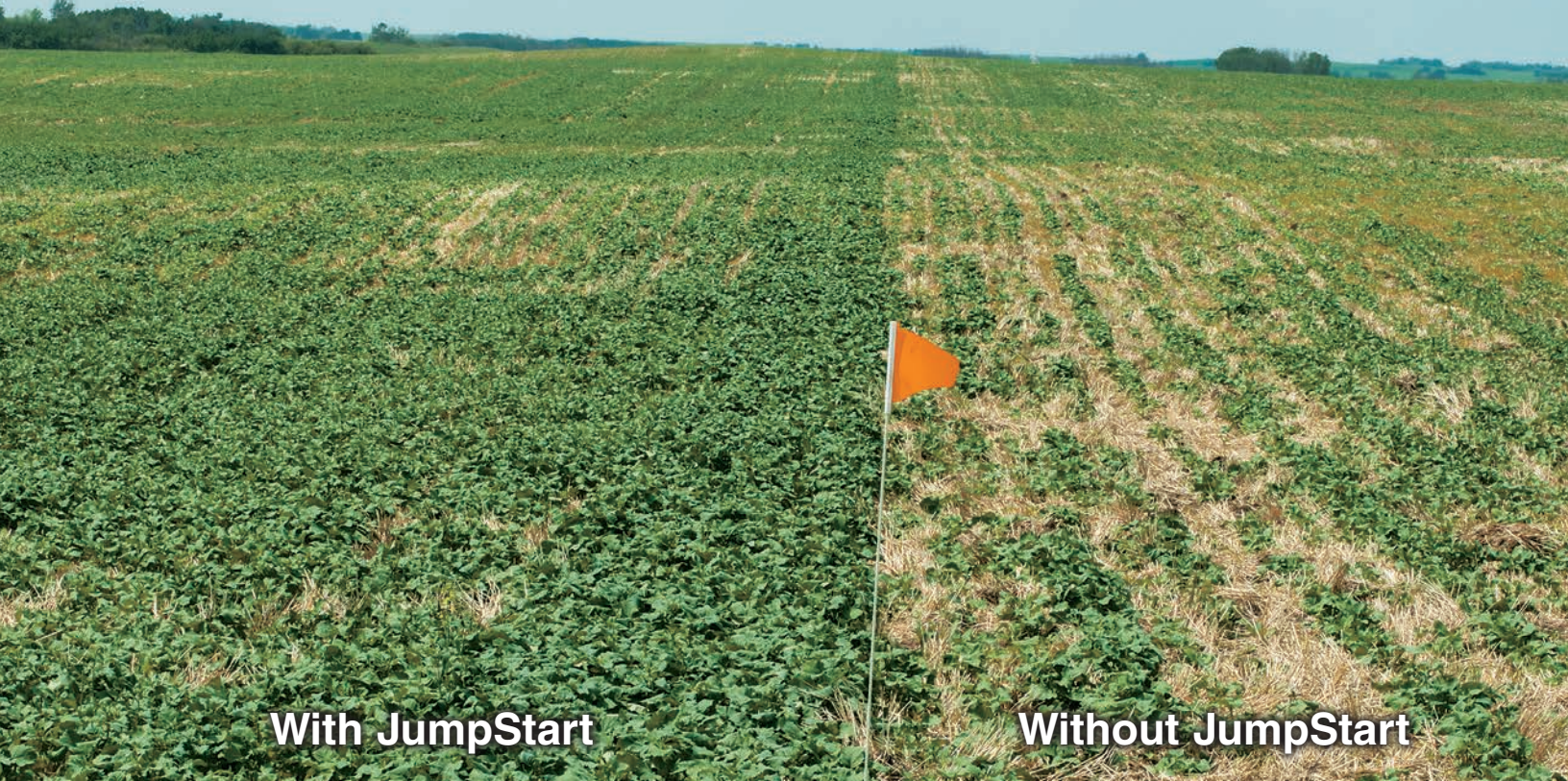
## JumpStart can increase yield potential



Source: Results from 360 independent large-plot research trials in Western and Eastern Canada show that JumpStart inoculant averaged 6% higher yield across all crops over 26 years. Individual results may vary.

**JumpStart<sup>®</sup>**

MONSANTO   
**BioAg<sup>™</sup>**



**With JumpStart**

**Without JumpStart**

Canola field photo taken July 2014 near Meacham, Saskatchewan. Individual results may vary.

**Benefits of JumpStart®**

- Early vigour – the pop-up effect
- In independent research, JumpStart resulted in a 22% increase in the proportion of root containing root hairs and a 33% increase in the mean root-hair length<sup>2</sup>
- Greater stress tolerance
- Phosphate is crucial to nitrogen fixation.<sup>3</sup> Phosphate nutrition increases the number and size of nodules, and the amount of nitrogen fixed by the plant
- Increased availability of soil and fertilizer phosphate
- More even supply of phosphate to improve crop uniformity
- Higher yield potential

**Where to use JumpStart**

- JumpStart results are greatest in soils with lower levels of available phosphate, or in other words, soils that have a high affinity to bind phosphate
- JumpStart works at low soil temperatures when phosphate availability is normally limited

- JumpStart can work in soils within a wide pH range. It is the level of available phosphate, not the pH level, which determines the benefit of JumpStart

**Using JumpStart**

- Over 60 varieties of canola seed are available centrally treated with JumpStart by seed companies. Visit [useJumpStart.ca](http://useJumpStart.ca) for a complete list of varieties
- JumpStart is now available in a granular formulation for use on canola

In addition to canola, JumpStart can be used on:

- Alfalfa
- Sweetclover
- Mustard
- Chickpea
- Corn
- Lentil
- Pea
- Soybean
- Wheat

If you need more information or have questions about JumpStart, contact Monsanto BioAg toll-free at 1-800-667-4944 or visit our website at [useJumpStart.ca](http://useJumpStart.ca).

<sup>1</sup> Source: *Better Crops* Vol. 86 (2002, No. 4), International Plant Nutrition Institute (formerly: Potash and Phosphate Institute).  
<sup>2</sup> Source: *Penicillium bilaii* inoculation increases root-hair production in field pea. Robert H. Gulden and J. Kevin Vessey, May 17, 2000.  
<sup>3</sup> Source: *Phosphate for Agriculture*, International Plant Nutrition Institute (formerly: Potash & Phosphate Institute).

**ALWAYS READ AND FOLLOW LABEL DIRECTIONS.** Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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