

QuickRoots®

CANOLA

CORN

FIELD PEA

LENTIL

SMALL GRAINS

SOYBEAN

APPLICATION GUIDE

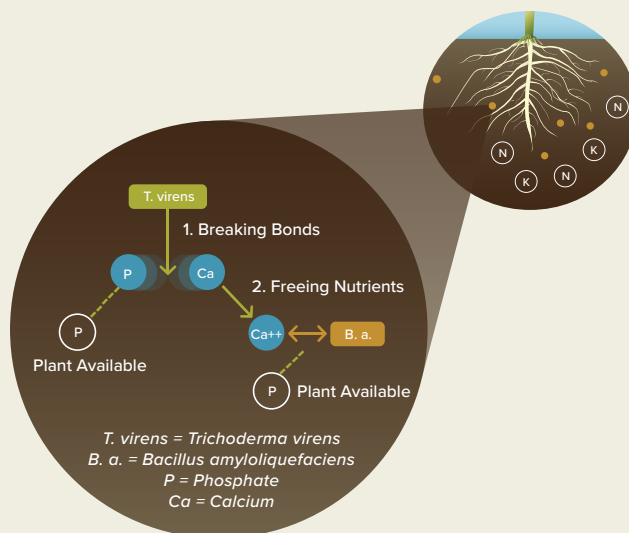
BIOLOGICALS FOR NUTRIENT AVAILABILITY

QuickRoots technology is a microbial seed inoculant for canola, corn, field pea, lentil, small grains and soybean that can improve nutrient availability and uptake. The *Bacillus amyloliquefaciens* and *Trichoderma virens* based treatment helps increase availability and uptake of nitrogen, phosphate and potassium. Its ability to release nutrients from the soil helps maximize the effectiveness of your inputs and improve your yield potential.

By growing directly on your crop's roots, QuickRoots inoculant works to improve nutrient availability and uptake. The microbial inoculant performs in a variety of soil conditions and types (including soils low in phosphate availability). This can enable optimal plant growth and increased yield potential.

BENEFITS OF USING QUICKROOTS®

- Improved availability of nitrogen, phosphate and potassium.
- Enhanced nutrient availability, which supports root and shoot growth.
- Increased yield potential.
- Performance in a variety of soil conditions and types.



HOW THE TECHNOLOGY WORKS

- 1 The biologicals *Bacillus amyloliquefaciens* and *Trichoderma virens* have the ability to release phosphate in the soil not readily available to the plant.
- 2 Improved phosphate availability can lead to expanded root volume, which enhances nitrogen and potassium uptake.
- 3 This ultimately can enable optimal plant growth and increased yield potential.

STORAGE AND HANDLING

- Store unopened containers of QuickRoots in a dry cool place, less than 20°C (70°F), away from sunlight and heat sources.
- Minimize temperature fluctuations.
- Avoid freeze/thaw cycles.
- Use before the expiration date. The expiration date is valid for unopened containers stored according to the conditions listed here.

QUICKROOTS WETTABLE POWDER APPLICATION INSTRUCTIONS

If applying QuickRoots alone:

- Dilute (mix) with adequate amount of non-chlorinated water.
- Apply proper and continuous agitation to avoid settling (agitation directed across the pre-mix tank creating a bubbling action on the far wall).
- Mix well and apply uniformly to seed.
- Slurry must be applied to seed within 2 hours.

If applying QuickRoots wettable powder with other seed treatment products:

- Monsanto Company strongly recommends a SIMULTANEOUS APPLICATION USING SEPARATE TANKS/NOZZLES (also called wet sequential application), where the other seed treatment components and QuickRoots products are mixed in separate premix tanks and sprayed wet onto the seed at the same time (simultaneous application).
- In the event a tank mix application will be used, we recommend pre-wetting the QuickRoots wettable powder with water before adding to the tank mix.

Seed treatment compatibility:

- Although QuickRoots is compatible with many fungicide (FST) and/or insecticide (IST) seed treatment products, on-seed and in-tank survival of QuickRoots may be significantly reduced by using a common tank mix application method.
- Do not apply with seed treatment formulations containing high levels of zinc or copper.

- QuickRoots has not been tested with all possible seed treatment combinations. Please contact your local Monsanto BioAg Representative for up-to-date QuickRoots compatibility recommendations.

Labeling of seed to which QuickRoots wettable powder has been applied:

- Each container of seed is required to have a label (bag tag) showing that QuickRoots wettable powder has been applied.

Best practices for treaters:

- Apply QuickRoots wettable powder within two hours once mixed with water. Best recommendation: rinse out and clean inoculant tanks at the end of each day. This helps prevent contamination.
- If you have bulk seed tanks – run the fans. Cold seed is very slow to absorb any treatment. An increase of as little as 10°C can improve seed treatability. Condensation on the seed can reduce the quality of seed treatment adhesion.
- Use separate tanks. Apply insecticides/fungicides using a separate tank rather than tank mixing with QuickRoots wettable powder. This allows you to customize treatment options. Remember, DO NOT use chlorinated water in combination with QuickRoots wettable powder.
- Level your treater. By leveling the treater, you reduce the seed flow through the treating system. This improves both coating and drying.
- Allow treated seed to dry before packaging.
- Beware of rapid drying and exposure to sunlight and heat. QuickRoots contains live spores of the naturally occurring fungus *Trichoderma virens* and the naturally occurring bacteria *Bacillus amyloliquefaciens*. Spores are live and may be damaged when exposed to high temperatures.
- Check calibration often, at least bi-weekly. Calibration can be affected by changes in seed size, temperature, and humidity. Even in the presence of a seed wheel and flow meter, the calibration on the inoculant flow can vary throughout the season.
- Replace the peristaltic pump hose at the beginning of the season or when hose is worn out. Leave the pressure on the pump hose once you have calibrated to ensure that you have a consistent flow and are in the same spot on the hose.

Application information for QuickRoots wettable powder				
QuickRoots wettable powder formulation	Crop	Container size	Application rate	Seed treated / container
QuickRoots wettable powder small grains	Small grains (wheat, barley, oats, rye, spelt)	180 g spoutpak	3 g / 45 kg	2700 kg
		4.5 kg pail	3 g / 45 kg	67,500 kg
QuickRoots wettable powder corn multi-crop	Corn	180 g spoutpak	7.2 g / 80,000 seeds (unit)	25 units
	Canola	180 g spoutpak	10 g / 50 lb seed (bag)	18 bags
	Sorghum	180 g spoutpak	10 g / 50 lb seed (bag)	18 bags
QuickRoots wettable powder soybean multi-crop	Soybean	200 g spoutpak	4 g / 140,000 seeds (unit)	50 units
		4.8 kg pail	4 g / 140,000 seeds (unit)	1200 units
	Sugar beet	200 g spoutpak	8 g / 100,000 seeds (unit)	25 units
		4.8 kg pail	8 g / 100,000 seeds (unit)	600 units
	Sunflower	200 g spoutpak	30 g / 200,000 seeds (unit)	6 units
		4.8 kg pail	30 g / 200,000 seeds (unit)	160 units
	Dry bean	200 g spoutpak	1 g / 26,000 seeds	5 million seeds
		4.8 kg pail	1 g / 26,000 seeds	124 million seeds
	Chickpea	200 g spoutpak	1 g / 35,000 seeds	7 million seeds
		4.8 kg pail	1 g / 35,000 seeds	168 million seeds
	Field pea	200 g spoutpak	1 g / 60,000 seeds	12 million seeds
		4.8 kg pail	1 g / 60,000 seeds	288 million seeds
Lentil	200 g spoutpak	1 g / 110,000 seeds	22 million seeds	
	4.8 kg pail	1 g / 110,000 seeds	528 million seeds	

Please read the label before application for complete use instructions.

This Application Guide provides information regarding QuickRoots wettable powder for corn multi-crop (corn, canola sorghum), small grains (wheat, barley, oats, rye and spelt) and soybean multi-crop (soybean, sugar beet, sunflower, dry bean, chickpea, field pea, lentil), as well as QuickRoots planter box for corn multi-crop (corn, canola, sorghum). This information is not a substitute for labeled information attached to each container of product. Read label prior to use and always follow all label instructions. If you have questions, please contact 1-800-667-4944.

QUICKROOTS PLANTER BOX APPLICATION INSTRUCTIONS

Applying QuickRoots planter box:

- Measure full level scoop (provided in bucket) of QuickRoots as directed for prescribed amount of seed.
- One scoop measures 16 g.
- Disperse inoculant evenly onto seed.
- Mix well and be sure to coat all seeds uniformly.

Application information for QuickRoots dry planter box				
QuickRoots dry planter box formulation	Crop	Container size	Application rate	Seed treated / container
QuickRoots dry planter box corn multi-crop	Corn	400 g spoutpak	16 g / 80,000 seeds (unit)	25 units
		3.2 kg pail	16 g / 80,000 seeds (unit)	200 units
	Canola	400 g spoutpak	16 g / 50 lbs of seed (bag)	25 bags
		3.2 kg pail	16 g / 50 lbs of seed (bag)	200 bags
	Sorghum	400 g spoutpak	16 g / 50 lbs of seed (bag)	25 bags
		3.2 kg pail	16 g / 50 lbs of seed (bag)	200 bags

Please read the label before application for complete use instructions.

Seed treatment compatibility

- QuickRoots planter box is compatible with many fungicide (FST) and/or insecticide (IST) seed treatment products.
- Please contact your local Monsanto BioAg Representative for up-to-date QuickRoots compatibility recommendations.

If you need more information or have questions about QuickRoots, contact Monsanto BioAg toll-free at **1-800-667-4944** or visit **MonsantoBioAg.ca**.

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