

Establish[®] liquid

Plant Signal Technology for pea and lentil

ESTABLISH[®] LIQUID is a pea and lentil product containing naturally occurring plant signal molecules called flavonoids in a rhizobia carrier. The addition of flavonoids in ESTABLISH Liquid work to increase the speed of recognition between the plant and the rhizobia, leading to earlier nodulation and nitrogen fixation.

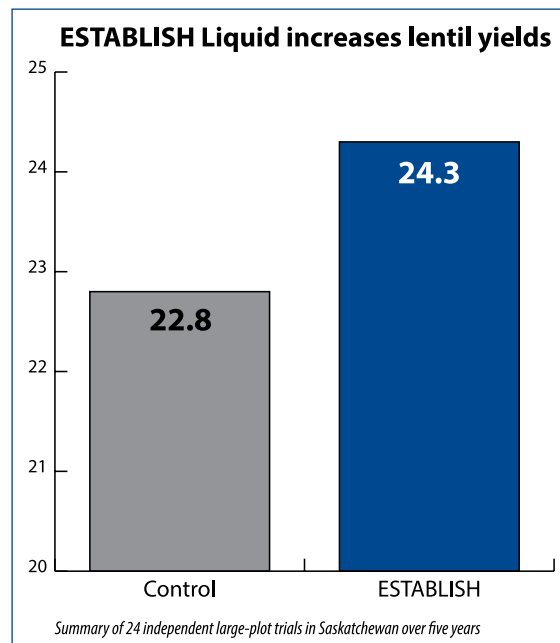
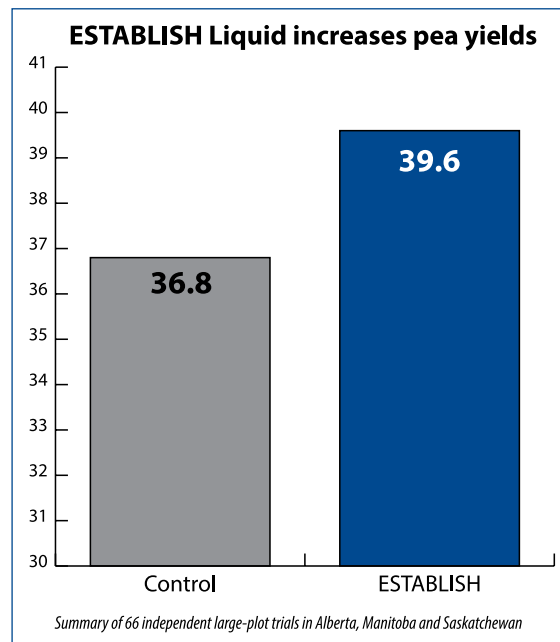
BENEFITS

- Advances the normal nitrogen fixation process
- Stimulates rhizobia and root hair curling for earlier nodule formation and nitrogen fixation
- Enhances root development for improved nutrient and water uptake
- Delivers more consistent, higher yields

CROP BENEFITS

Western Canadian pulses are typically seeded in conditions that are tough on nodulation and nitrogen fixation. Low soil temperature is particularly unfavorable for nodulation, as cold soils reduce the rate of recognition of flavonoids by the bacteria.

The addition of flavonoids in ESTABLISH Liquid ensures earlier recognition of the rhizobium bacteria, leading to earlier nodule formation. This reduces the nitrogen deficiency period that pea and lentil plants experience early in the growing season. An earlier and more consistent supply of available nitrogen can lead to better plant growth and improved performance.



DIRECTIONS FOR USE

ESTABLISH Liquid comes with a small bottle containing 21.5 ml of signals and a large plastic bladder containing the rhizobia.

1. Pour the entire contents of one small bottle of signals into one bag of rhizobia liquid carrier, replace the cap on the bag, and shake well to mix.
2. Replace the cap on the bag with the supplied hose and spigot, hang the bag upside down and drip the contents of the bag onto the seed as it is augured into the seeder tank. To ensure proper mixing, do not run the auger at more than half its capacity. The rate of flow onto the seed in the auger can be calibrated by adjusting the spigot valve.
3. Apply the contents of the bag evenly to 120 bushels of seed (approximately 3 ml/kg of seed).

ESTABLISH Liquid has a 24 hour planting window on bare seed.

SEED TREATMENT COMPATIBILITY

ESTABLISH Liquid has a 24 hour on-seed planting window when applied simultaneously or sequentially with CONSENSUS® L, and a four hour on-seed planting window when applied simultaneously or sequentially with Apron Maxx RTA®.

WHAT ARE FLAVONOIDS?

Flavonoids are plant signal molecules that stimulate the appropriate rhizobium species to produce LCO (lipo-chitooligosaccharide). LCO initiates the recognition process required for nodule formation which leads to earlier nodulation. (See diagram below.)

Flavonoids also attract the rhizobia to the plant's root hairs improving rhizobial adhesion and colonization.

(Cooper, 2007. Early interactions between legumes and rhizobia: Disclosing complexity in a molecular dialog)

