

Symiro™ mode of action

Our Symiro technology enhances nodulation in legumes resulting in increasing nodule numbers. It also promotes crop growth and yields.

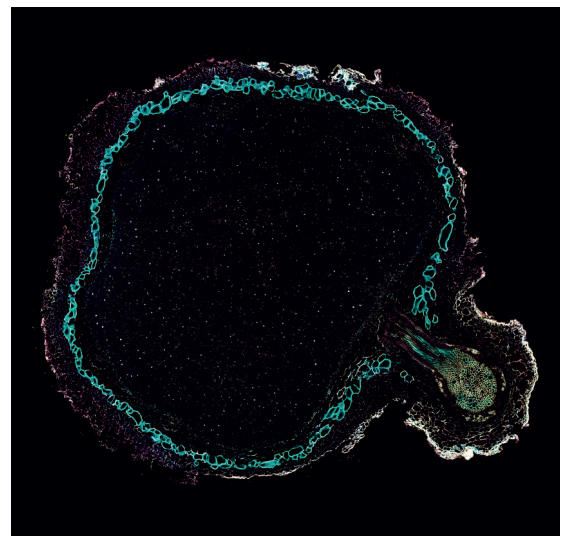


Benefits of Symiro technology

- ✓ Increases nodule numbers in soybeans
- ✓ Supports nitrogen fixation in legumes
- ✓ Promotes plant cell division and expansion
- ✓ Improves photosynthesis
- ✓ Simulates crop yields.

Process of nodulation

As a legume, soybeans form a symbiotic relationship with rhizobia. The bacteria enter the plant via root hairs and form nodules. As part of this process, the rhizobia secrete Nod factors (lipochitoooligosaccharides (LCOs)) which are recognised by receptors in the roots and this results in changes in the root, including swelling. In the resulting nodules, the bacteria then convert atmospheric nitrogen to a form that the plant can use in exchange for a suitable environment and energy source.



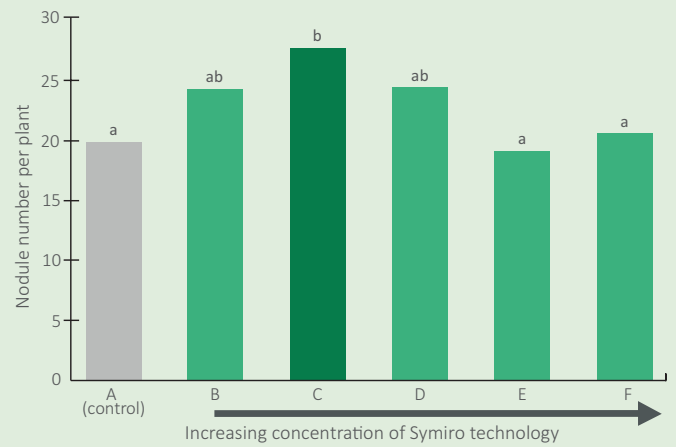
Soybean root with nodule

Role of Symiro technology in nodulation

Although Symiro technology does not contain LCO's, it does contain a naturally occurring compound that is known to be secreted from rhizobia for signalling to plants. It affects the plant cells making more sugars available for the rhizobia. It also causes increased root respiration, which in turn increases CO₂ availability (this benefits the rhizobia as exogenous CO₂ is used in some biological pathways) and aids the synthesis of compounds thought to be useful to the rhizobia. As a result, the use of Symiro technology can increase nodule numbers and hence nitrogen fixation.

Effect of Symiro on nodule number

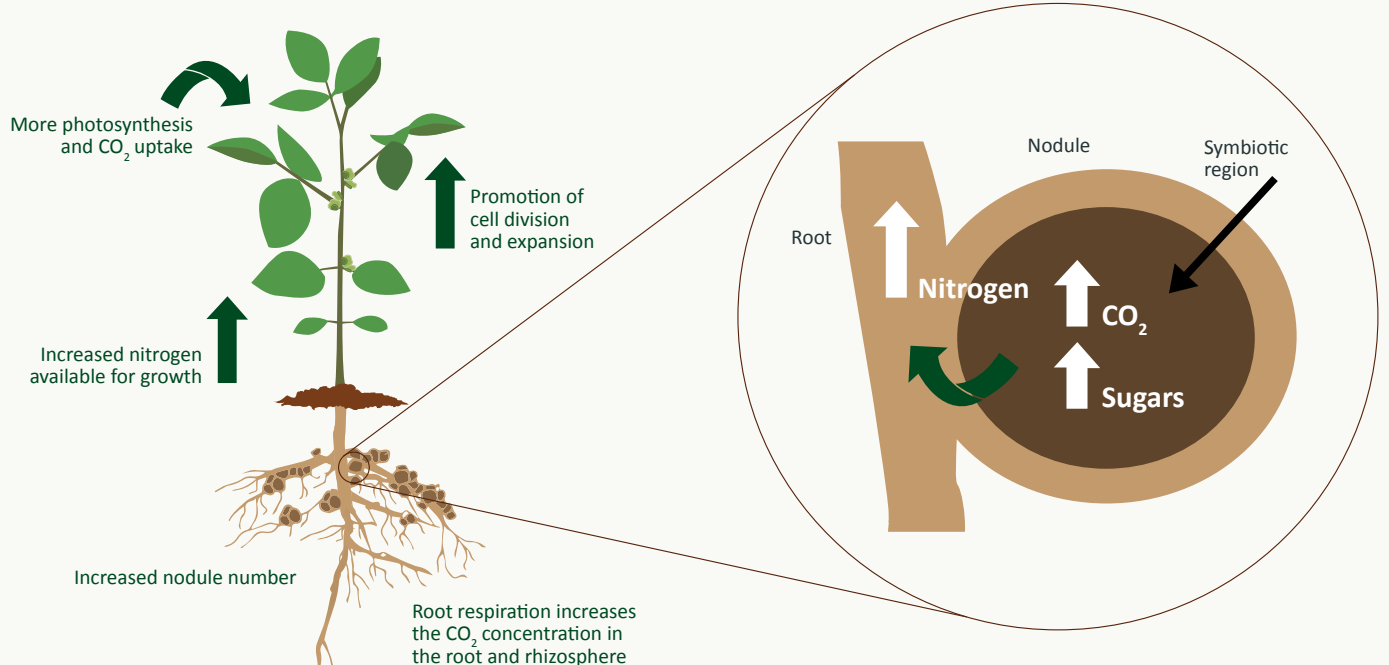
The effect of incorporating Symiro technology onto soybean seeds has been shown to significantly ($P < 0.001$) affect nodule number. However, the effect is very concentration dependent. When insufficient Symiro was present (concentration B) there was no significant effect on nodule number. Similarly at very high concentrations (concentrations D, E and F, which are above what would be possible when using InSync™ Plus), Symiro was safe but did not significantly improve nodule number. At the optimal concentration (concentration C, as used in InSync Plus) nodulation was increased by 40% and overall biomass was also increased. As a result Symiro technology can improve nitrogen fixation in soybeans.



Promotion of plant growth and yield

Not only does Symiro technology affect the plant in a way that benefits the rhizobia (and indirectly benefits the plant through increased nitrogen fixation), the technology can also signal changes that directly enhance crop performance. There are numerous Plant Growth Promoting Rhizobacteria (PGPR) that have been identified. These can work by improving the rhizosphere, assisting with nutrient availability, or by secreting compounds which are known to simulate plant growth. Symiro is known to be secreted by some rhizobia, and benefits both the rhizobia and the crop. It can also be produced within plants, but our trials have shown that an additional exogenous application can be beneficial and increase crop yields. The direct stimulation of growth and yield caused by Symiro technology is thought to be due to the promotion of cell division, cell expansion and enhanced leaf photosynthesis.

Benefits to plants with Symiro technology



Find more information on our Symiro technology at:
www.plantimpact.com e: info@plantimpact.com