



## More resilience, more productivity – powered by biology

**EndoFuse™** from Sumitomo Chemical is a plant and soil enhancement product that contains arbuscular mycorrhizae fungi (AMF). Mycorrhizae are beneficial fungi that naturally exist in soils colonising the root systems of plants. EndoFuse includes 4 high performing endo-mycorrhizae species that have been proven to increase crop resilience, productivity and overall plant and soil health.



### KEY AREAS ENDOFUSE HAS BEEN SHOWN TO IMPACT:

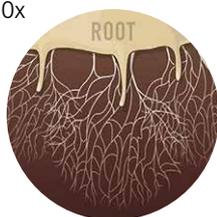
- Crop resilience under plant stress conditions
- Crop yield
- Root and shoot biomass
- N, P, K and trace mineral uptake
- Water uptake during moisture stress
- Improved resilience against disease and pest attack
- Soil health

## Mycorrhizae increase root surface area up to 50X

As roots begin to grow in the soil, mycorrhizae quickly colonize and produce long, fine structures called hyphae. The hyphae are what expand the root system and are able to go well beyond where the plants roots alone can access. Mycorrhizae can increase the surface area in excess of 50x that of a plants own natural root system.

### ROOT MASS EXPANSION

*Hyphae attach to root hairs and access areas inaccessible to the roots alone.*



## Improved soil structure

Mycorrhizal fungi also improve soil structure. Mycorrhizal filaments produce carbon rich organic “glues” (extracellular polysaccharides) that bind soils into aggregates and improve soil porosity. Soil porosity and soil structure positively influence the growth of plants by promoting aeration, water movement into soil, root growth, and distribution.

## Boost productivity following canola

Growing non-mycorrhizal crops like canola will deplete mycorrhizae levels in the soil and can often result in lower productivity of the following crops. Certain plant species are non-mycorrhizal, meaning they do not form a symbiosis with mycorrhizae and therefore levels in the soil will be run down after these crops are grown. Brassica species like canola do not form a symbiosis and studies have shown that inoculating the following crop with mycorrhizae can significantly improve productivity.

## Prevent long fallow disorder

Long-fallow disorder is a term describing poor crop growth following extended clean fallows. The ability of a fallow period to reduce mycorrhizae levels is increased where continual wetting-drying cycles occur and where the length of the fallow extends beyond 12 months. Mycorrhizae require live plants to survive and grow, hence levels are often significantly reduced after a fallow period. Treating crops with EndoFuse following fallow periods will reduce the chance of long fallow disorder and under-performing crops.



**ENDOFUSE TECHNOTE**

## Increased nutrient uptake

In addition to increasing the surface area of roots, Mycorrhizal fungi also release powerful chemicals that dissolve tied up nutrients such as phosphorous, zinc and other tightly bound soil nutrients. Mycorrhizal fungi form an intricate web capturing and assimilating nutrients, thus better utilising the nutrient capital already in soils. In soils with limited or no mycorrhizae much of these valuable nutrients are tied up and unavailable to the crop.

### NUTRIENT ACCESS AND UPTAKE

Hyphae can access small soil spaces that root hairs can't. They also produce enzymes to release nutrients that are tied up in the soil.



## Improved water uptake and drought stress

The same extensive network of fungal filaments important to nutrient uptake are also important in water uptake and storage. In rain fed cropping systems, plants treated with mycorrhizae often exhibit far less drought stress compared to non-treated plants. In irrigated systems, applied water is more efficiently utilised.

### DROUGHT TOLERANCE

Vesicles are created, storing resources until needed by the plant.



## Easy-to-apply liquid formulation

Technology to produce a high quality, highly concentrated and easy to use mycorrhizae inoculant like EndoFuse is only a recent development made possible through the knowledge and processes available within the Sumitomo group of companies. EndoFuse is an extremely concentrated highly uniform liquid formulation designed to be easy to apply to broadacre crops as a seed treatment or as an in-furrow spray. The use rate for EndoFuse is **10-15 mL per ha** (refer to label for detailed recommendations).



EndoFuse can easily be applied to seed using equipment such as a well calibrated auger injection system.



EndoFuse mixes readily with water, liquid fertilisers and insecticides and can be easily applied as an in-furrow spray / injection during the sowing operation.

## Crop relationship with mycorrhizae

Certain crops are much more dependant on good mycorrhizae colonization than others and will be more prone to poor growth where levels are low.

### Arbuscular mycorrhizal dependency of various crops species

Mycorrhizal dependency	Winter crops	Summer crops
Very high	Linseed, Faba beans	Cotton, Maize, Pigeon peas, Lablab
High	Chickpeas	Sunflowers, Soybeans, Navy beans, Mungbeans, Sorghum
Low	Field peas, Oats, Wheat, Triticale, Lentils	
Very low	Barley	
Independent	Canola, Lupins	

\* Over 80% of the world plant species form a symbiotic bond with Mycorrhizae.  
Source: John Thompson

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