2016 UPDATE

CATAPULT™

RELEASE & CATCH TECHNOLOGY

CataPult inoculum for increased yields and drought tolerance in cotton

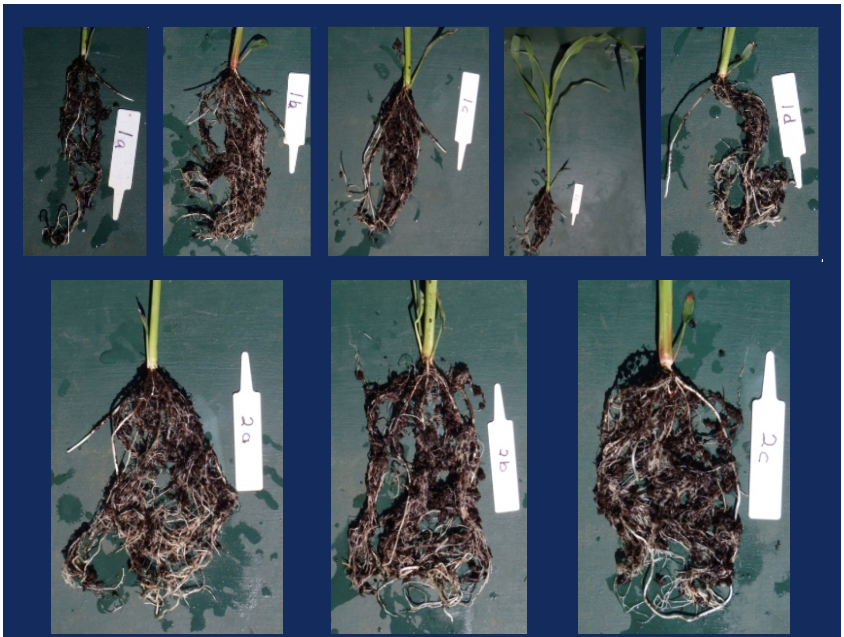
CataPult™ is an inoculum for use in cotton and other crops. It contains a high-grade VAM (vesicular arbuscular mycorrhizae) plus two compatible species of Bacillus microbes to improve crop nutritional status, maximise water harvesting capacity and increase yields. CataPult was released into the cotton market for the 2014 planting season. One grower who tested CataPult on his property on the Lower Namoi recorded an average yield of 16.98 Bales/ha, ginned, over 40 Ha, second highest recorded in Australia (and the world). For a summary of the 'in the field' comparison of CataPult versus non-CataPult yields see overleaf.

In many crops CataPult is used to reduce fertiliser requirements and increase drought tolerance. Because cotton is a high-value crop CataPult is used to maximise yields in irrigated cotton and to provide drought tolerance and increase nutritional status in dryland crops. CataPult uses a combination of VAM and Bacillus species that have been selected in our R&D program to work together synergistically. This is how the inoculum works to increase crop nutritional and water status:

The technology is called **RELEASE & CATCH TECHNOLOGY**. VAM provides the **CATCH** part of the technology. VAM colonise into the roots and send out a very large network of hyphae (very fine fungal filaments) that extend out well beyond the root hair zone. These hyphae collect P, N, Zn, Ca, Mg and micronutrients very effectively and deliver them back into the plant. Close to the root hair is a 'nutrient depletion zone' where the normal root hair uptake depletes most of the available nutrients .

The hyphae deliver nutrients from beyond this zone to provide a very constant nutrient supply that is necessary for high yields. In addition to nutritional effects, VAM provide an improved water harvesting capacity and this is particularly valuable in helping dryland cotton get through early and mid-season dry spells without a check. VAM also assist in getting the crop finished in the face of low late season moisture.

Bacillus provide the **RELEASE** part of the technology. The Bacillus microbe species used in CataPult provide phosphorous solubilising compounds that release a proportion of the P that is bound and unavailable in many soil types. This is then efficiently captured by VAM hyphae for the crop. The Bacillus also produce a range of plant growth regulators that drive rapid early root growth and development of a high proportion of secondary and finer roots that assist nutrient capture. Early development of a vigorous root system is important in dryland cotton to provide resilience to dry spells early in the crop cycle. The images below show effects of CataPult on root growth in sorghum plants used in our development trials.



Root growth trial. Top row is minus Catapult, bottom row with Catapult.

The Bacillus in CataPult are provided in very high numbers (>10^{12} per ha) and assist in development of a healthy root microflora. A healthy root microflora assists in suppression of unwanted microbe and fungal species. To achieve very high yields in cotton root function has to be at 100% efficiency throughout the season and soil/root microflora effects are increasingly understood to be important in achieving this.

CataPult APPLICATION

CataPult is applied to cotton crops at planting or early in crop development. The powder format allows delivery by liquid injection, either at planting or using a cutting tine to deliver to the roots of a young crop, by fertigation, or by any method that delivers CataPult into the root zone.

COTTON ON-FARM RESULT: SECOND HIGHEST YIELD EVER RECORDED IN AUSTRALIA AND THE WORLD

Location Lower Namoi Valley, NSW, Australia	**Crop** Cotton cv Sicot 74BRF; Planted Oct 2014, Harvested 15/5/2015
Yield 16.98 Bales/ha ginned, 40 ha field.	**Yield in comparison field** 15.75 Bales/ha ginned
Crop nutrition 5 m^3/ha chicken manure preplant, 280U/ha N as Big N, **CataPult**	**Crop nutrition in comparison field** Identical except no CataPult was applied
Irrigation Standard program	**Soil type** Self mulching black clay
CataPult application At planting via liquid inject along with Bifenthrin insecticide	

The recent 2016 cotton harvest included a growing number of CataPult crops as cotton producers moved from trials to commercial use. The crop pictured was grown in the Texas, Qld district. This well-known Texas grower applied CataPult at planting via liquid injection. He uses a moderate phosphorous rate and made no reduction in P, preferring to target high yields. The crop was a bumper for the district with 15.3 Bales/ha ginned. With the cost per ha of CataPult Power Inoculum relatively low this was a great way to maximise profits.

Cotton farmers in the 2016 planting season should consider applying CataPult at planting or soon after for any of the following reasons:

- To help maximise the likelihood of high yields via a low cost input.
- If the cotton crop is following any Brassica (eg canola) in rotation. Brassicas deplete VAM reserves in the soil quite severely, leaving the cotton crop at a disadvantage, particularly early in the season.
- If the cotton crop is following a fallow season, during which VAM reserves are depleted.
- If the crop is going into a soil that has been waterlogged, with VAM numbers depleted.
- If the crop is likely to face dry spells. CataPult provides superior water harvesting capabilities right through the soil profile and enables the crop to move through short dry spells without checking growth or yield accumulation.
- If the crop is going into soils with P binding problems.

Catapult™ cotton crop prior to harvesting the 15.3 Bales/ha crop

CATAPULT™

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For technical questions about CataPult™ call 0458 989282 or email to info@vanadisbioscience.com Office (07) 54457151

For information sheets on Catapult™ see www.vanadisbioscience.com