Biological fungicide reveals disease resistance in Cameroon

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Russell Bio Solutions has developed an effective microbial fungicide, Dynamic WP. It is a powerful broad-spectrum biological fungicide and bactericide that can be applied to a wide range of crops to suppress fungal diseases. Other target diseases include wheat smut, Fusarium root rot, Banana Panama and Sigatoka disease, powdery mildew, early and late blight, and diseases caused by *Botrytis*, *Alternaria*, and *Rhizoctonia*.

Dynamic is based on *Bacillus amyloliquefaciens* strain D203 wettable powder (WP), formulation. The spore count in Dynamic is spore1x10^8 cfu/gram (cfu = colony forming units). The recommended application rate is 500 g/ha as a preventative and 2 kg/ha as a curative.

Trial results in Cameroon with the biopesticide Dynamic, revealed significant resistance to chemical treatment in black pod disease in cocoa, and taro leaf blight in cocoyam.

The trials were conducted at five locations in the Santchou sub-division of Cameroon (located between latitude 5°18' and longitude 9°54'). Each trial used two applications of chemical (40g copper hydroxide 77%) and biological fungicides.

"The application of Dynamic on cocoyam leaves, against *Phytophthora collocasiae* was very effective," explains Russell Bio managing director, Dr Nayem Hassan. "A significant suppression of disease was observed, with the application of Dynamic completely curbing disease expansion on leaves."

When Dynamic is applied as part of an integrated program, it helps combat plant pathogens in a variety of high value crops. The trials have been conducted in five locations, using two applications of both chemical and biological fungicides, with Dynamic performing well in both crops.

A similar treatment on cocoa pods, to combat black pod disease, also saw immediate results. "One week after treatment, Dynamic had stopped the spread of the disease in the area that was seriously attacked, whereas the cocoa pods already attacked and treated with the chemical fungicide, continued rotting," adds Area Manager, Mr Soliman Masaoudi.

"Dynamic stopped the spread of the disease in the attacked cocoa pods and the process of maturation continued without any problem" he confirms.

Three weeks after first treatment no signs of the disease were observed. The plants' leaves became greener than before. An interval of two weeks was observed between each treatment. No attacks were observed during this period. Moreover, the farmer noticed that the leaves had become greener.

Two weeks after the first chemical fungicide (40g copper hydroxide 77%) treatment, the cocoa pods started to develop disease, the leaves of the plants remained yellowish, and no improvement was observed in the colour of the leaves.

The trial demonstrated that the application of biological fungicide can successfully control economically important black pod disease caused by *Phytophthora megakarya* in cacao in Cameroon. The cacao growers are keen to use biopesticide which gives them access to the residue free export market. Russell Bio Solutions worked with local partner Africa IPM to register Dynamic in Cameroon as a biological fungicide.

Recently the Ministry of Agriculture and Rural Development has approved Dynamic registration for the control of cacao black pod disease and leaf blight in cocoyam, caused *by Phytophthora collocasiae*. Moreover, we Russell Bio Solution also registered another innovative biological insecticide Antrario based on *Bacillus thuringiensis* for small holder farmers in Cameroon for the control of Fall Armyworm.

The active ingredients *B. amyloliquefaciens* could inhibit mycelial growth of a number of fungi, the germination of the cysts, and the swimming of the motile zoospores also noticed once applied on root rot fungi. Our experimental trial indicated that *B. amyloliquefaciens* enhanced the resistance of Banana to *Fusarium oxysporum*, and their control effects were 93%. It is reported in scientific literature that *B. amyloliquefaciens* fermentation broth could induce an active oxygen burst, no production, callose deposition, and lignification (Dong Liu et al., 2019).

Treatment with Dynamic stops the process of rotting of the fruits and maturation continues.

The Research and Development team has also conducted a field trial in Bangladesh and found use of Dynamic can successfully control Panama disease. The biological fungicide was applied three days before planting and then further applied four more times at 15 day intervals. There was a significant difference observed between Dynamic and chemical fungicide (Hexaconazole) treated plots. Over 95% disease control was recorded in Dynamic treated plots.

A similar trend was found in fungal disease control in wheat. Trials have been conducted in wheat against various fungal and bacterial diseases; bacterial leaf streak, powdery mildew, and *Stagonospora* in Zambia. Trial data showed seed treatment is effective against bacterial and fungal diseases in wheat. There was very low level or negligible bacterial leaf streak damage observed in plots where Dynamic was applied 30 and 60 days after planting.

Dynamic is an effective fungicide and bactericide. It can be used successfully against fungal diseases which are generally resistant to chemical fungicides. It can also be used in combination with other biological treatments. It is generally compatible with entomopathogenic fungi including *Trichoderma* species. Russell Bio Solutions is committed to taking this product forward and registering it in African cacao, banana and wheat growing regions. ■

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