



MG COFFEE

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HEDGE NATURAL DEFENSE PLANT PROTECTANT TRIALS

Hemileia vastatrix, or “Roya” is a fungal disease that has caused havoc on coffee crops in all the countries in which it has been introduced. The disease leaves visible marks that can be recognized very easily, such that the undersides of the leaves have yellow-orange or black spots, that, when touched, disperse a type of powder and this powder is the form by which the fungus moves from plant to plant, able to contaminate all the coffee in very little time.

This previously uncontrollable fungal disease has caused the devastation of fields, farms and entire operations. HND Plant Protectant has been tested in several of these referenced areas with dramatically positive results - leading to locals dubbing the material “magic water”.



LOCATION 1

HND Plant Protectant was tested against a commercial fungicide, TIMSEN (active ingredient BZK) and control for effectiveness against the control of *Hemileia vastatrix*. Study included a total of five product applications over five study locations. Plants selected randomly for various treatments (or lack of treatment).

Evaluations were made four times over a five day period (pre-application, 1, 3 & 5 days).

All areas produced consistent findings:

- HND performed equally well or better than commercial fungicide in all tests
- No phytotoxic effect was present in the cultivation of coffee in any treatments
- There was no damage from HND regarding the beneficial fauna in the trial zone
- HND was selected as the best treatment method in terms of percentage of disease control.



LOCATION 2

For approximately the past 6 years, LOCATION 2 has been going through a disastrous crisis in the coffee sector because of the damage caused by coffee leaf Rust. Many small coffee growers have been left with a total lack of production, and have abandoned their farms as a result. HND Plant Protectant was put to the test as a remedy to this urgent problem.

The test consisted of two parts: an initial (field) validation, followed by a laboratory designed study.

Validation

Two lots of healthy plants (asymptomatic), one protected by HND Plant Protectant and the other without treatment, were transplanted to outdoor natural growing locations in close proximity plants infected with rust. 60 total plants were allowed to grow for three months, but without interference. Plants were monitored at one month intervals to record observations including infestation data and to validate material's ability to protect against infection.



60 SEEDLINGS
TRANSPLANTED

AFTER
15 DAYS



TREATED WITH HND



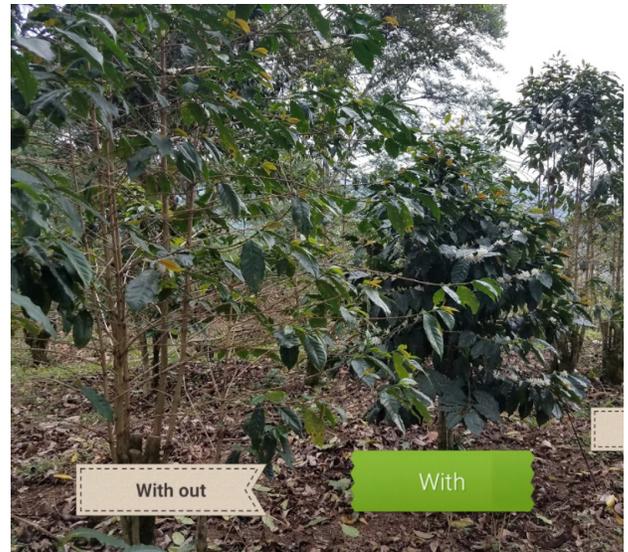
UNTREATED

VARYING DEGREES OF INFESTATION (7-45%) IN UNTREATED PLANTS



AFTER
90 DAYS

Right: Healthy, disease-free plants after 90 days.
Top Right: Mature tree boasts greener, fuller leaves
Test was a complete success.



Right: Warehouse that had sat empty for several growing seasons due to crop rust effect on crop, once again has coffee within its walls after harvest.



Laboratory Analysis

40 healthy plants in the field were randomly selected and divided into two test groups: one group received treatment with HND Plant Protectant, the other did not. All test plants were then sprayed with a concentrated *Hemileia vastatrix* solution sourced from the infected plants above.

Every 30 days (over a total study period of 90 days), three leaves per plant were collected for laboratory analysis.

45% of the untreated plants contracted the disease

All plants treated with HND Plant Protectant were found to have 100% plant health

Percentage of plants infected with Rust:

