

Field tests confirm the efficacy of Amoeba's biocontrol solution on several major wheat diseases.

Chassieu (France), July 22, 2020 - AMOEBA (FR0011051598 – AMEBA) - producer of a biological biocide capable of eliminating the risk in water and human wounds, and of a biocontrol product for plant protection, still in the testing phase, announces the first efficacy results of its biocontrol solution on several major wheat diseases as part of its 2020 tests campaign.

Confirmation of the efficacy of its biocontrol solution on wheat in climatic chambers

Following the conclusive results obtained in climatic chambers on bean rust (*Uromyces fabae*) in 2019¹, new tests under controlled conditions were carried out during the first quarter of 2020 against two cereal rust diseases: yellow rust (*Puccinia striiformis*), which attacks wheat and barley, and brown wheat rust (*Puccinia recondita*).

These tests were carried out by the pathology laboratory of a public service provider, on young wheat plants under conditions of artificial contamination.

The Active Substance (AS) alone, lysate of the amoeba *Willaertia Magna* C2c Maky, showed good activity, with a stronger dose-effect relationship on yellow rust than on brown rust. In addition, different formulated products containing the AS were tested (2 wettable powders on yellow rust, 1 wettable powder and 1 suspension concentrate on brown rust) and showed a better efficacy than the AS used alone on both rusts.

An unprecedented level of protection for a bio-fungicide, ranging from 70% to 90%, could be measured against these 2 pathogens. At effective doses, symptom expression was reduced and sporulation was delayed.

First wheat field tests launched in May 2020

Based on these promising results in climatic chambers, Amoeba decided to test, for the first time, its bio-fungicide active substance in the field under real conditions against wheat diseases.

These tests, randomized in small plots, with 4 replicates, were carried out on behalf of Amoeba by accredited service providers, in several European countries (France, Germany and Italy) and according to strict protocols recommended by EPPO².

Protocol in place: Reference products are always conventional fungicides used at their maximum authorized dose. An untreated control measures the intensity of the disease in the absence of protection and, by comparison, measures the efficacy of the experimental and reference products.

¹ See press release of July 1st, 2019

² EPPO: European and Mediterranean Plant Protection Organization



The Active Substance of Amoeba (lysate of the amoeba *Willaeitia magna* C2c Maky) has been tested within the 2 formulated products having the best results in the climatic chamber tests (a wettable powder containing 60% AS, and a suspension concentrate at 20% AS). The selected co-formulants are classically used agents, authorized in plant protection and intended to improve various parameters such as suspension, resistance to leaching and even penetration into the leaf cuticle.

The main objectives were to:

1. Determine the effective rate under agronomic conditions
2. Compare the 2 formulations
3. Evaluate the interest of programs with 2, 3 or 4 successive treatments.

Results validating the effectiveness of the biocontrol solution

Results of these field trials are as follows:

- **In situations of explosive disease development or very late onset**, experimental products, as sometimes also references (conventional fungicides at their maximum registered dose), **have not shown sufficient efficacy.**
- In tests where the disease development (notably *Zymoseptoria tritici septoria* and *Puccinia recondita* brown rust) was more progressive, the products demonstrated good efficacy, with yield gains of up to 8% compared to the untreated control and equivalent to those of the reference.
- **On rusts** (yellow rust and brown rust), **these results confirm the high efficiency potential already observed in the laboratory, reaching 75%.**
- **On septoria**, the results of protection observed reached 66%, very slightly lower than the conventional references (chemical fungicides) used in the trials.
- A clear efficacy was measured on wheat helminthosporiosis (*Dreischlera tritici-repentis*) in a test where this uncommon disease appeared.
- **Programs with 4 successive low-dose treatments are often greater than 2 high-dose treatments.**
- Both formulations showed comparable performances with a slight advantage for the concentrated suspension

These results could be observed mainly on test plots located in southern Europe, given the persistent drought conditions in northern France and Germany, which are not very conducive to development of cereal diseases.

Under field conditions in Europe, the active substance demonstrates **versatility on the main fungal diseases of wheat, the treatment of which represents a market of euros 2 billion.**

These results confirm that the solution developed by Amoéba is, to my knowledge, the only biocontrol product effective against rust and with proven versatility (rust, septoria and potentially helminthosporia). This first year of field experimentation has provided Amoéba with new, very positive data, and confirms the potential seen in the laboratory. This is a major breakthrough in the development of biocontrol on field crops, with the aim of reducing the use of conventional fungicides, and in the fight against resistance of pathogens to the major chemical families present on the market. Thus, future trials will aim to confirm these results under varied conditions, in particular on wheat varieties with different susceptibilities, to measure efficacy on specific diseases of barley (rust due to *Puccinia hordei*, rhynchosporiose and helminthosporiose), to optimize effective doses and to work on



"positioning in treatment programs" explains Jean-Luc Souche, Business Developer plant protection at Amoéba.



About AMOEBA:

Amoéba's ambition is to become a major player in the treatment of bacterial risk in the fields of water, healthcare and plant protection. Our biological solution is an alternative to chemical products widely used today. Amoéba is currently focusing on the market of industrial cooling towers estimated at €1.7Bn ⁽¹⁾ on a global chemical biocide market for water treatment, evaluated at €21Bn ⁽²⁾ and on the biocontrol market for plant protection estimated globally at €1.6Bn ⁽⁴⁾. In the future, the Company is looking at developing new applications such as chronic wound care, estimated at € 751 million ⁽³⁾ in the USA. Sales of associated products with healthcare, biocides and crop protection are subject to the Company being granted local regulatory market authorizations. The Company is currently in a trial phase for biocidal and plant protection applications and does not market any products.

Created in 2010, based in Chassieu (Lyon, France) with a subsidiary in Canada and in the United States, Amoéba is quoted on the compartment C of Euronext Paris. The Company is a member of the BPIfrance Excellence network and is eligible for the PEA-PME SME equity savings plan setup. More information on www.amoeba-biocide.com.

(1): Amoéba data combined from sources: DRIRE 2013, Eurostat, ARHIA 2013

(2): Sources combined by Amoéba from water treaters, Freedomia, Eurostat et MarketsandMarkets

(3): BCC Research, "Markets for Advanced Wound Management Technologies," Wellesley, MA, 2017

(4): Biopesticides Worldwide Market 2013, CPL, Wallingford, UK

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