



PRESS RELEASE

Amoéba: the efficacy of the biocontrol solution against grapevine downy mildew confirmed through the second European field trials campaign.

Chassieu (France), July 27 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 that the results of the second field trials campaign against grapevine downy mildew validate, for the second consecutive year, the efficacy of its biocontrol solution.

Second test campaign in Europe on downy mildew in grapevine

Following the very promising results obtained in 2019 during the first field trials campaign against grapevine downy mildew, Amoéba has just completed its second trials campaign in Europe.

These trials were carried out on behalf of Amoeba by accredited service providers, in several European countries (France: 14 trials / Italy: 3 trials / Germany: 1 trial) and according to protocols recommended by EPPO¹.

These trials were conducted either under natural conditions or, more often, with artificial contamination to trigger the disease and a misting system to maintain the wet conditions favorable to the downy mildew development, even during dry periods.

Trial protocols included up to two reference products (third-party products with a marketing authorization) and an untreated control:

1. Bordeaux mixture (copper sulphate) was routinely used as the conventional reference product at its maximum authorized dose or, in 5 trials, at a dose varying during the season and close to the practice.
2. A recently authorized and marketed biocontrol product of natural origin was added in some trials as a biocontrol reference.
3. An untreated control was used to measure the intensity of disease in the absence of protection and, by comparison, to measure the efficacy of experimental and reference products.

Three experimental products containing the bio-fungicidal active substance of Amoeba (lysate of the amoeba *Willaertia magna* C2c Maky) were tested: a wettable powder with 60% active substance and 2 liquid suspension concentrates with 20% active substance.

The wettable powder is an improvement of the best-performing formulation in 2019, the suspension concentrates are two new formulations that have been validated under controlled conditions (climatic chamber) during 2019-2020 winter.

The products were applied every 7 to 10 days. Such protocol essentially allows the intrinsic performance of the tested products to be measured and compared, but gives only a partial indication of the possibilities of practical use.

The main objectives were to:

¹ EPPO: European and Mediterranean Plant Protection Organization



1. flesh out the effective dose under agronomic conditions
2. compare formulations
3. measure the performance of experimental products combined with a very low dose of copper (tank-mixes).

Climatic conditions: a "downy mildew year" in the South

After a mild winter and a warm spring, the grapevine was particularly advanced in 2020, 1 even 2 weeks ahead of the average of the last 30 years, which is considerable.

In the South and South-West of France as well as in the North of Italy, several episodes of very heavy rainfall (cumulative rainfall of 200 mm or more) during the month of May led to particularly intense downy mildew contaminations while the grapevine - due to the earliness of the vintage - was then in flowering, the most sensitive stage. In Languedoc, Provence, Bordeaux and Gascogne for example, the disease caused serious damage and winegrowers found it difficult to provide acceptable protection during the month of June, despite the wide range of conventional products available.

Thus, 2020 has been a "downy mildew year" in the South, putting fungicide products to the test, a much more difficult situation than in 2019.

On the other hand, the vineyards located further north (Beaujolais, Champagne, Alsace, Loire Valley for example, as well as Germany) experienced a much drier spring, with downy mildew being naturally scarcely present.

Results of the second test campaign

Generally, the efficacy of Amoéba experimental products on **leaves** is, on average, **superior to the efficacy of the biocontrol reference (authorized product)**.

Concerning bunch protection, the 2020 results confirm the 2019 observations, with a particularly remarkable protection for a biocontrol product (regularly above 50% efficacy (35-85%) even under exceptional disease pressure).

It should be noted that:

- in the event of a strong attack at flowering time, the efficacy on mildew on "grey rot" facies may be limited, although it is greater than the efficacy of the biocontrol reference product.
- even in difficult situations, efficacy on mildew on "brown rot" facies, which develops later on berries, is particularly robust.

These performances on bunches remain lower than that of copper sulphate at its full dose but is, in most trials, significantly higher than the performances of the biocontrol reference: up to over 30%.

It should also be noted that, in two trials, the exceptional climatic situation (in particular the centennial rainfall on 11 May in a trial near Bordeaux) led to massive contamination at the time of grapevine flowering and, in these two trials, Amoéba's experimental products, like the biocontrol reference, showed only limited and transient efficacy (of about 20-30%) under these exceptional conditions.

Positioning the treatment as close as possible to the contaminating rainfall seems to be a key success factor.

As the 2019 trials suggested, the improved formulations of this year determined that the optimal dose rate, even in highly contaminated situations, is between 500 g and 1000 g of active substance per hectare.



In a majority of the comparative trials, the liquid suspension concentrate formulations were slightly superior to the wettable powder formulation at the same dose of active substance.

Mixtures of Amoéba's experimental products with copper at reduced doses performed very well in all cases, providing a high level of protection. However, it is relatively difficult to demonstrate additivity between the active substance and copper, as copper alone often provided good protection even at low dose rates in tests. *Such additivity could however be statistically established in a particularly infested Italian trial (98% bunch damage in the control, and 62% efficacy for mixtures with copper, whereas - at equivalent dose - copper alone was 48% and the suspension concentrate at 43% efficacy).*

Conclusion: performance on bunches is confirmed and unprecedented for a natural biocontrol product.

This 2020 testing campaign took place under frequently difficult conditions, with an intense disease pressure in May and June, which made it possible to demonstrate the effectiveness of the active substance: the results of 2020 are perfectly consistent with those of 2019. **This stability of performance between 2 very different years is a major strength for a plant protection product in general, and for a biocontrol product in particular.**

These results make it possible to know the optimal dose, and already approach a positioning of the product in the season: it will be privileged at the very beginning of the cycle, then in period of post flowering.

The good results of combinations with a reduced dose of copper open up prospects for organic farmers in particular, especially if the re-registration of copper at the European level, scheduled for 2026, leads to a reduction of the maximum authorized dose. These results also indicate that this new active substance should make it possible to significantly reduce the use of chemical fungicides in many situations, while ensuring good plant protection.

The partners, who signed a Material Transfer Agreement with Amoéba at the beginning of the year (refer to press release dated April 29, 2020), wishing to visit these trials were able to do so. A full report will be presented to them in mid-September.

« With these first 2 years of field experimentation, Amoéba has totally fulfilled its objectives in the evaluation of its new active substance on downy mildew in grapevine. We now know a precise range of the maximum use dose of the substance, as well as its main characteristics and its high level of performance for a biocontrol product. As the European dossier for the active substance was submitted in May, with a response expected in late 2022/early 2023, we now have two years -2021 and 2022- to confirm these results with definitive formulations. In accordance with the schedule already announced, new efficacy trials, required for the application for authorization of formulated products, will be carried out and the results submitted to the Member States once the active substance will be approved" 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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