



# IN VITRO EFFICACY TESTS AGAINST *FUSARIUM* SPP. CAUSING GARLIC DRY ROT

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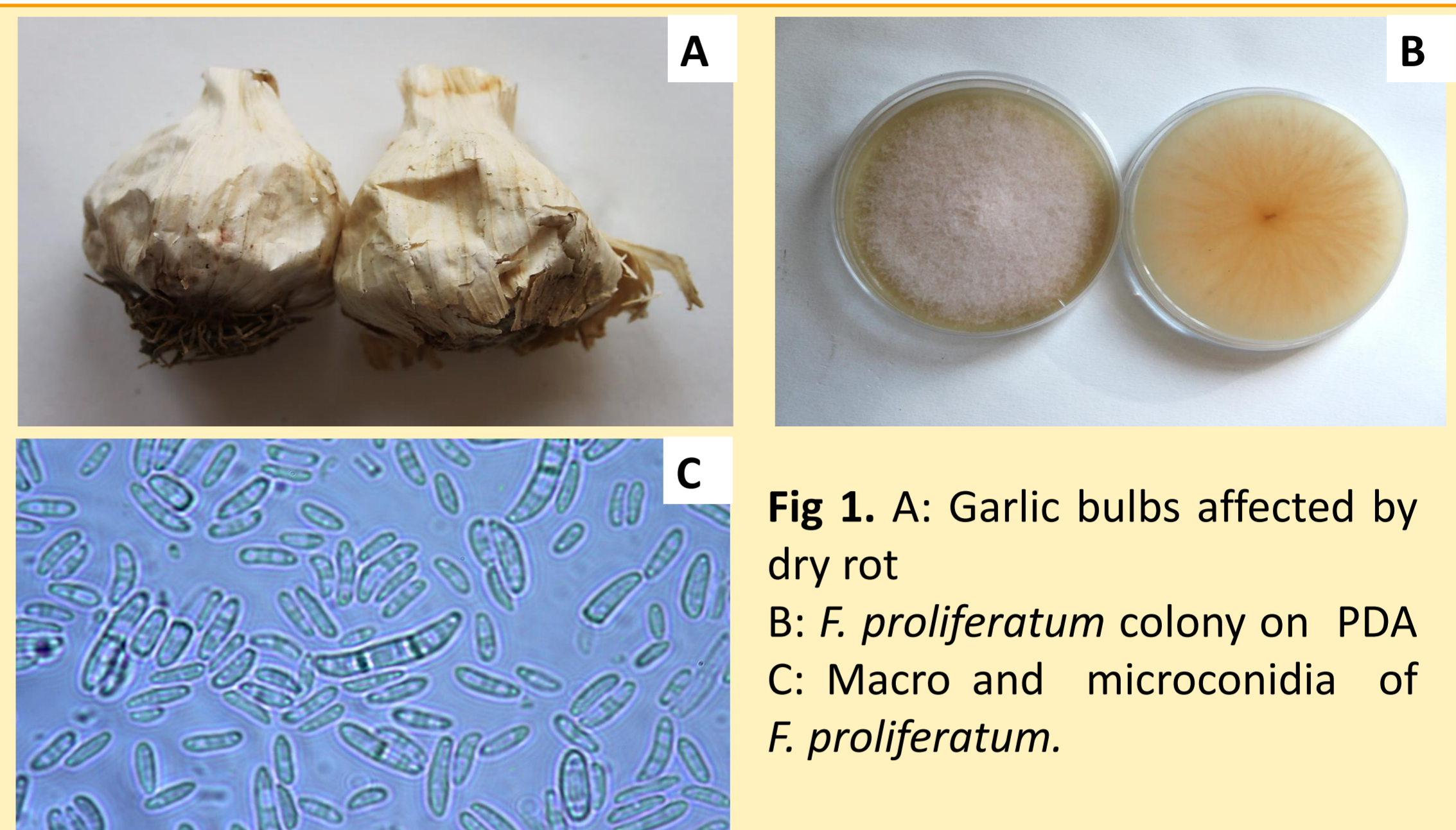
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## Introduction:

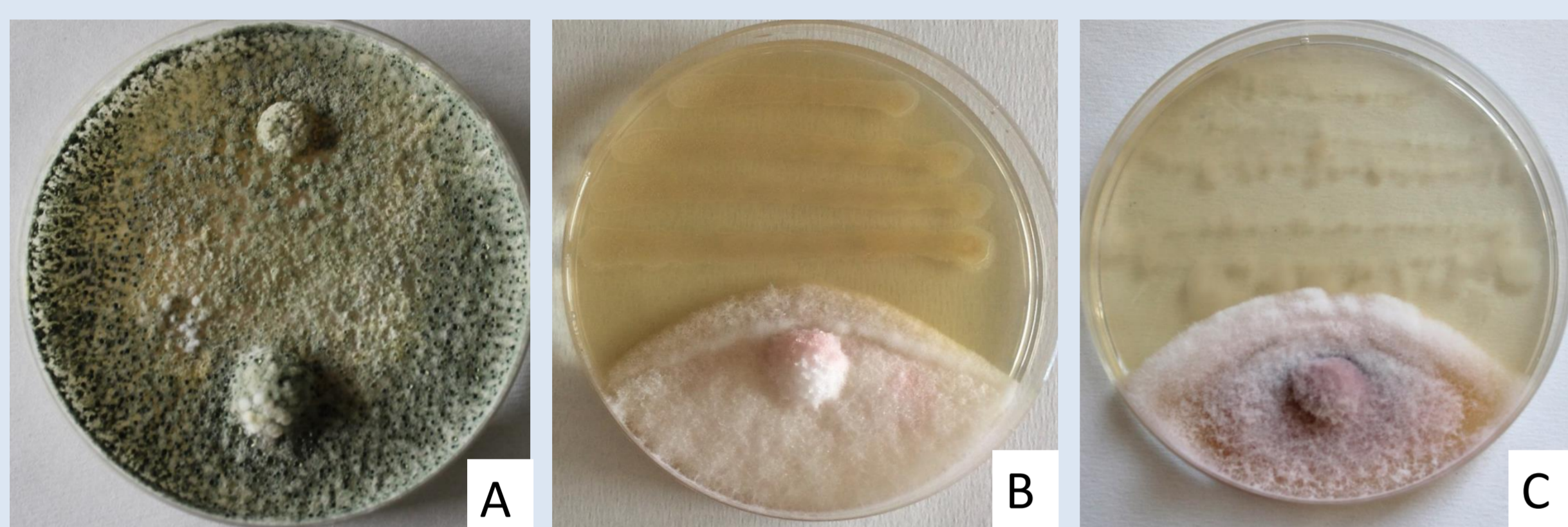
Garlic is cultivated worldwide and, according to FAOSTAT, in 2016 1.5 million hectares were destined to this culture; in Italy 3000 ha. Since 2002, *Fusarium proliferatum* (Fig. 1) was signaled as the main causal agent of garlic dry rot; in Italy was reported in 2012. In order to prevent pathogen spread in field, seed treatment seems crucial. **The aim of this study** was to check *in vitro* the efficacy of chemical and biological fungicides.



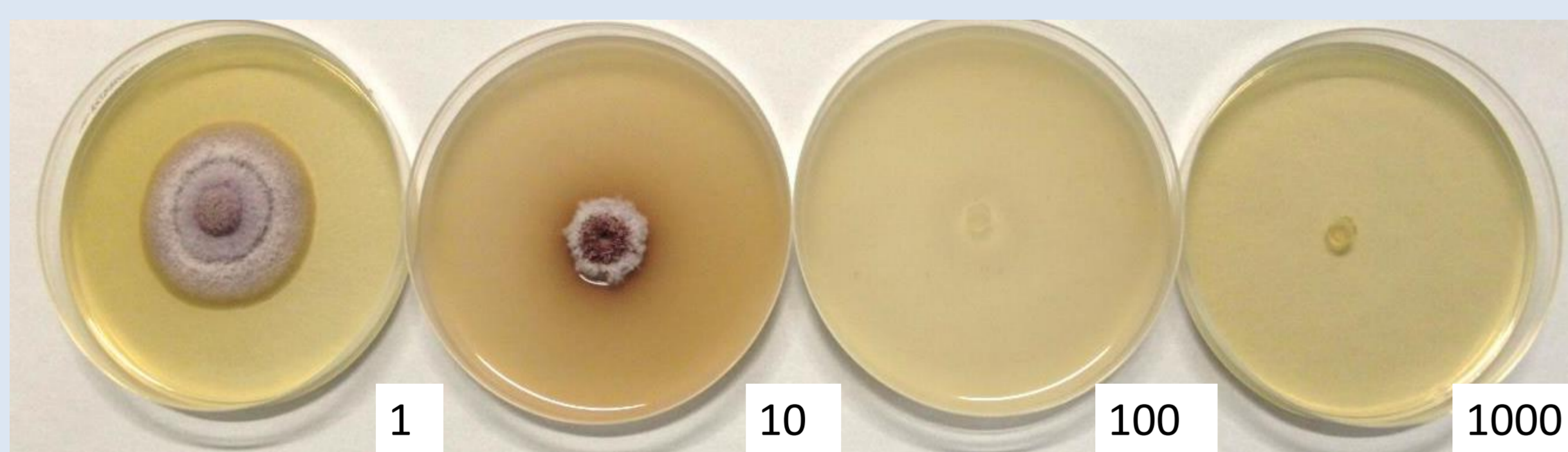
**Fig 1.** A: Garlic bulbs affected by dry rot  
B: *F. proliferatum* colony on PDA  
C: Macro and microconidia of *F. proliferatum*.

## Materials and methods:

*F. proliferatum* (MPVPG29) was used in *in vitro* trials and incubated at 3 temperatures (10-15-25° C). The percentage of growth reduction (PGI) was calculated after 21 days.



**Biocontrol Agent (BCA):** dual cultures were performed with *Trichoderma gamsii*+*T. asperellum* (A), *Fusarium oxysporum*, *Bacillus subtilis* (B) and *Streptomyces griseoviridis* K61 (C).



**Chemicals:** 6 fungicides belonging to triazoles, alone or in mixture, were tested by *Fungicide-modified PDA*, 4 concentrations of a.i. 1, 10, 100, 1000 ppm.

## Conclusions and perspectives:

All **active ingredients** tested were **very effective** towards *F. proliferatum*, with growth reduction till to **100%** and best performances at **15°C**.

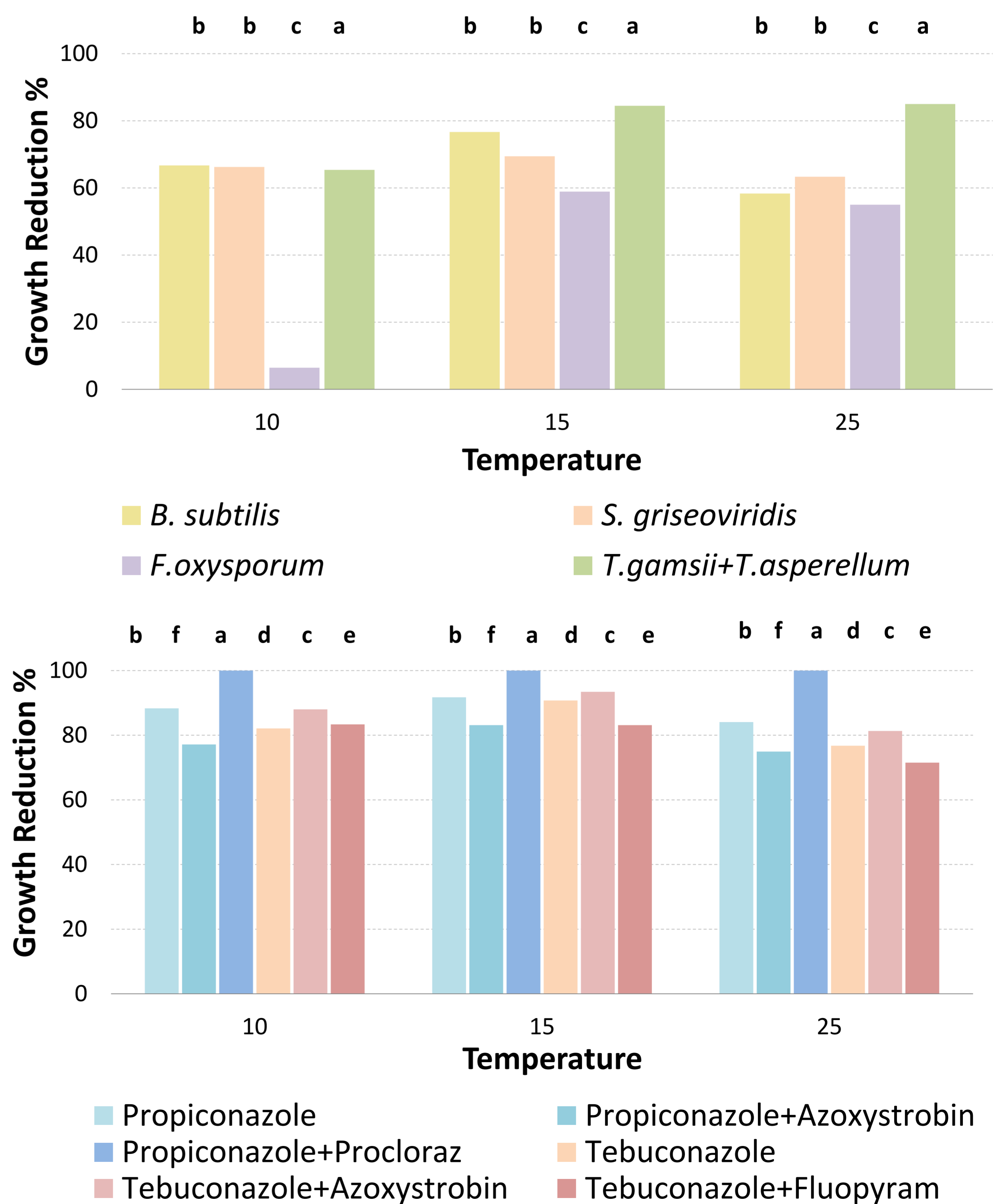
This fits with field conditions at garlic sowing time. These products were in fact tested for **seed treatment**; results are very promising.

A **field trial** is the following step to confirm the efficacy in garlic dry rot prevention.

## Results

**BCA:** the most effective BCA was *T. gamsii*+*T. asperellum*, *S. griseoviridis* and *B. subtilis* had the same performances.

**Chemicals:** the most effective product after 21 days was **Propiconazole+Procloraz**, fungal growth stopped at **1 ppm**. All products completely inhibited fungal growth at 100 and 1000 ppm. Both BCA and chemicals had the best performances at 15°C. (Fig 2.)



**Fig 2.** Percentage of growth reduction of **BCAs** and **Chemicals** after 21 days of incubation at 10-15-25°C.