DEVELOPMENT OF NEW BIOINSECTICIDES

UNIVERSITÉ LAVAL

INTRODUCTION

Since last years, considering the pollution and the security of agricultural workers, some researches were performed on the development of biopesticides. The market of the new products increased over the world mainly in greenhouse crops. The most important development of new products was observed with the bioinsecticide. The majority was based on predator, parasitoid and entomopathogenic fungi. Few were composed with bacterial strains.

OBJECTIVE

In this work, we try to perform a new bioinsecticides based on Bacillus strains. Bacillus strains are currently used as biofungicide like *B. amyloliquefaciens*, *B subtilis*.

MATERIAL AND METHODS

TRIAL 1:

- Plant: Cyclamen in greenhouse conditions
- Substrate: PRO-MIX BX mixed with GHA180 (*Bacillus Pumilis*) (PRO-MIX PLUS, Premier Tech) or with Met 52 (*Metharizium anisopliae* strain F52, novozymes)
- Counts on sticky cards: each 7 days
- Two foliar treatements performed during the trial

TRIAL 2:

- Plant: pepper and begonia in a same greenhouse
- Substrate: PRO-MIX BX (begonia) or PRO-MIX HP (pepper) mixed with GHA180 (*Bacillus Pumilis*) (PT) or with a Met 52 (*Metharizium anisopliae* strain F52, novozymes)
- Counts on sticky cards: each 7 days
- Two foliar treatements performed during the trial

TRIAL 3:

- Plant: Poinsettia in greenhouse
- Substrate: PRO-MIX HP mixed with GHA180 (Bacillus Pumilis), *B. Subtilis* #1, *B. Subtilis* #2 and a mix with GHA180 (*Bacillus Pumilis*) and *B. Subtilis* #1
- Counts on sticky cards: each 7 days
- Two foliar treatements performed during the trial

For each trial growing analysis and microbiological count on the substrates were performed.

TRIAL 1: CYCLAMEN ASSAY

NUMBER OF FLYING INSECTS ON CYCLAMEN CULTIVATED WITH OR WITHOUT BIOINSECTICIDES

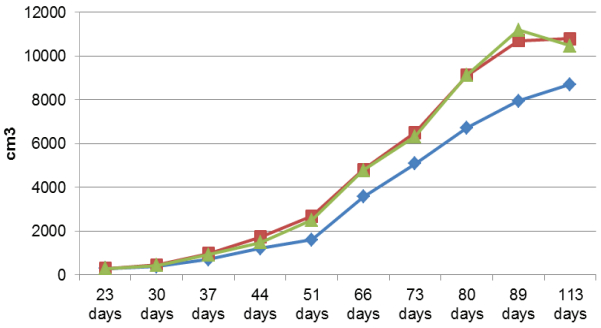
Presence of GHA180 (*Bacillus Pumilis*) in the medium decrease the number of insects compared to the standard or in mix with Met 52 (*Metharizium anisopliae* strain F52, novozymes).

PRO-MIX BX

PRO-MIX BX +GHA180 (*Bacillus Pumilis*)

PRO-MIX BX + Met 52 (*Metharizium anisopliae* strain F52, novozymes)

GROWTH INDEX



Statistically significant by Duncan at 51, 80 and 113 days

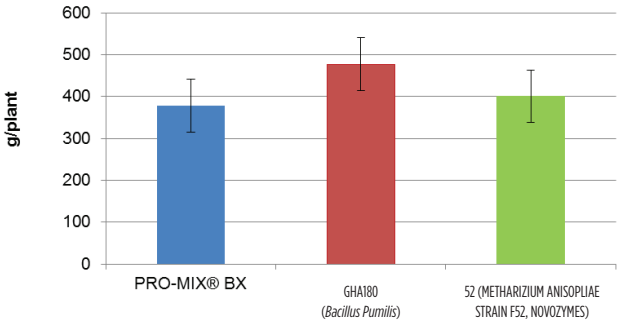
p is respectively 0.002, 0.030 and 0.030

PRO-MIX BX

PRO-MIX BX + GHA180 (*Bacillus Pumilis*)

PRO-MIX BX + Met 52 (*Metharizium anisopliae* strain F52, novozymes)

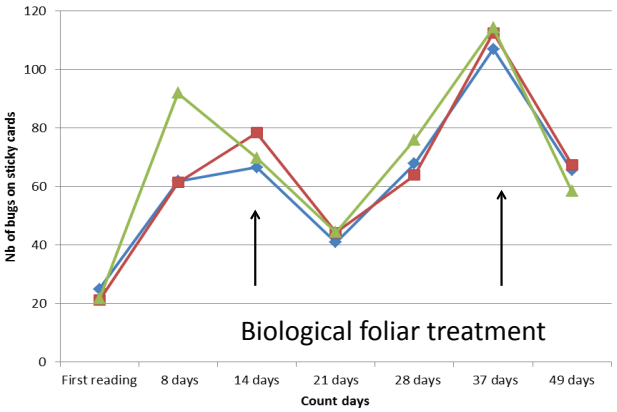
FRESH ROOT WEIGHT



Presence of GHA180 (*Bacillus Pumilis*) increase the shoot weight 26.3 % compared to the standard and 18.9% compared to the substrate with Met52 (*Metharizium anisopliae* strain F52, novozymes).

TRIAL 2: PEPPER AND BEGONIA ASSAYS

COUNT OF TOTAL INSECTS ON STICKY CARDS

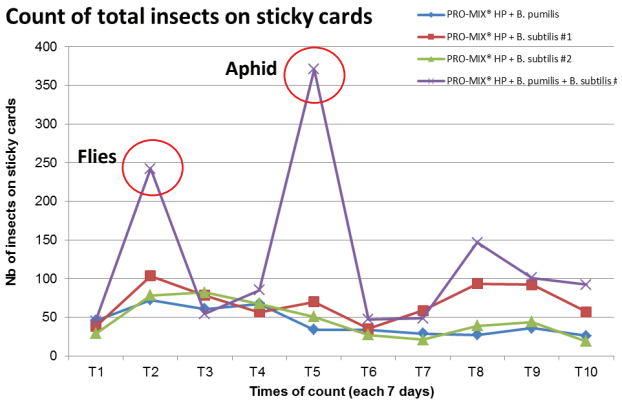


PRO-MIX

PRO-MIX + GHA180 (*Bacillus Pumilis*)

PRO-MIX + Met 52 (*Metharizium anisopliae* strain F52, novozymes)

TRIAL 3: POINSETTIA ASSAY



PRO-MIX HP + GHA180 (*Bacillus Pumilis*)

PRO-MIX HP + *B. Subtilis* #1

PRO-MIX HP + *B. Subtilis* #2

PRO-MIX HP + GHA180 (*Bacillus Pumilis*) + *B. Subtilis* #1

GHA180 (*Bacillus Pumilis*) and the strain #2 of *B. subtilis* have a positive effect on the growth of the poinsettia compared to the mix or to the use of *B. subtilis* #1.

CONCLUSION

These explorative assays show the potential of bacterial strains mix into the substrate to descrease the developement of flying insects. GHA180 (*Bacillus Pumilis*) bacterial strain have a positive effect on eggs and larvae directly on the substrate. The next step is to test the bacterial strain directly on the plant with a foliar treatment. It would be interesting to observe the effect of substrate amendement and foliar treatment.

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