

## Poster Presentations

### Integrated Pest Management

Comparatively, FYM based bioinoculants showed longer shelf life than vermiculite based bioinoculants. Among FYM based bioinoculants *B. subtilis* showed maximum population of  $7.60 \times 10^8$  cfu/g of dry wt on 180th day followed by *Pseudomonas*  $10^8$  cfu/g of dry wt respectively

#### P IPM 63

##### Possibilities of mass trapping with *Agriotes sordidus* and *Agriotes lineatus* with pheromone traps in south west French conditions

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Click beetle larvae (wireworms Coleoptera: Elateridae) are significant crop pest in France with more and more damage, mainly on corn, potatoes and different vegetables crops (tomatoes, melon, lettuces, carrot, asparagus...). The augmentation of wireworm problems en culture seem to be the combination between the reduction of active ingredients available for growers and the development of a click beetle specie with a cycle shorter : *Agriotes sordidus*. The development of pheromone traps give us new possibility of control, especially mass trapping. The technique could be used to reduce population of click beetle, mainly male, in a habitat. We have conduct a mass trapping trial at Lanxade center, in south west of France from 2003 to 2013 in the same field. On Lanxade station we have two click beetle species more present: *Agriotes lineatus* with a long life cycle (5 years), and *Agriotes sordidus* with short life cycle (2-3 years). The level of catching is very dependent of the weather of the year and also of the position of the trap in the field. The relation between the levels of click beetle catch, the population of wireworms presents in the field and finally the crop damage is not clear. After ten years of mass trapping, we observe a reduction of number of *Agriotes sordidus* catch; on the other hand, we note an increase of *Agriotes lineatus*. We diminution of damaged are observed in the two crop used for controlling the level of damage : potatoes and carrot.

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##### New Symptoms and Management Of Vascular Streak Dieback On Cocoa

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Vascular Streak Dieback (VSD) is a serious disease that has contributed to declines in the production of cocoa in the entire region, particularly Indonesia. It is very detrimental to cocoa farmers, some of whom are changing to other crops as a result of disease losses. Since 2004, symptoms have changed to become predominantly necrotic, with leaves remaining attached for longer periods. Formerly, the predominant symptom was leaf chlorosis and rapid abscission. It is unknown whether the new symptoms of VSD are related to changes in the resistance of cocoa genotypes. The newer symptoms generally involve a greater degree of dark necrosis of the leaf lamina and vascular tissue than originally observed associated with the disease. Examination of hyphae in infected twigs and sporocarps on leaf lamina and leaf scars on stems showed that the fungus associated with new symptoms is identical in all aspects to *Oncobasidium theobromae* (syn. *Ceratobasidium theobromae*) as described by Talbot and Keane (1971). Isolation of the fungus from infected xylem that the fungus emerging from the vascular tissue is a slow-growing - like fungus with an average hyphal width of 5 mm. Mycelium with similar characteristics was observed in sporocarps on leaf and petiole cracks of infected, attached leaves. Basidiospores were asymmetrical and approximately  $17 \times 7.5$  mm, consistent with earlier descriptions of the fungus by Talbot and Keane. While a previous report suggested *C. ramicola* was associated with VSD-infected cocoa, spores consistent with dimensions of this species in previous reports have not been detected in Sulawesi to date. Examination of longitudinal sections of infected twigs by high-power microscopy indicated hyphae with *Rhizoctonia*-like characteristics in xylem vessels, including perpendicular branching and narrowing at the junctions, occurs in the xylem tissue, consistent with previous descriptions. It is possible that the new symptoms of vascular streak dieback are caused by a change that affects the host response to the fungus. Since the newer symptoms are region-wide it is likely that an environmental factor, such as changes in climate or soil fertility, triggered a change in host response. However, a genetic change in the pathogen cannot be ruled out. Recommendations for management of the disease remain unchanged: this includes pruning branches 30-40 cm below the extent of infection, raising seedlings in covered nurseries and the propagation of resistant cocoa genotypes.