

# Incidence, severity and symptom development on local cocoa clones in Sulawesi

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Mealybug wilt of pineapple (MWP) is a devastating disease of pineapple, *Ananas comosus* (L.) Merr., worldwide. The disease is characterized by severe leaf-tip dieback, downward curling of the leaf margins, and loss of leaf turgidity, that can lead to total collapse of the plant. *Pineapple mealybug wilt associated virus-1* (PMWaV-1), PMWaV-2, and PMWaV-3 have been identified in field-grown pineapple throughout Hawaii and are transmitted by the pink and grey pineapple mealybugs, *Dymicoccus brevipes* and *D. neobrevipes*, respectively. Vector transmission characteristics of PMWaV-2, including acquisition access period (AAP), and persistence and retention of the virus in grey pineapple mealybug vectors were evaluated. PMWaV-2 is transmitted by the grey pineapple mealybug in a semi-persistent manner. In Hawaii, PMWaV-2 infection and simultaneous feeding by mealybugs are both involved in the induction and etiology of MWP, whereas infections by PMWaV-1 and -3 do not appear to be necessary for wilt induction. Genomic analyses reveal that PMWaV-1 and PMWaV-3 lack elements that are present in PMWaV-2 including the intergenic region between the RdRp open reading frame (ORF) and the small hydrophobic protein ORF, lack a conserved motif in ORF4, encode a relatively small coat protein, and lack an diverged coat protein (CPd). These characteristics distinguish them from PMWaV-2 and the ampelovirus type member, *Grapevine leafroll associated virus-3* (GLRaV-3). In addition, a badnavirus, designated *Pineapple bacilliform CO virus-HI1* (PBCOV-HI1), was isolated and sequenced from pineapple in Hawaii. Approaches using non-transgenic and transgenic methods to control *Pineapple mealybug wilt-associated viruses* and badnaviruses were evaluated.

**O44.005 Incidence, severity and symptom development of vascular-streak dieback on local cocoa clones in Sulawesi**

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The incidence and severity of vascular-streak dieback (VSD) of cocoa caused by *Ceratobasidium theobromae* (syn. *Oncobasidium theobromae*) was determined in a range of cocoa clones at two sites in Sulawesi in Pinrang

and Polman Districts. In both study sites, all clones were attacked by VSD, with incidence ranging from 39.9% to 94.2%. However, some clones (PBC123, M05, Gene-J) were more resistant to VSD at both sites, sustaining 37-48% infection of branches, while Husbitori was highly susceptible sustaining over 80% infection. A change in symptoms of VSD has been noted since 2004. The more recent symptoms indicate a greater degree of necrosis of the leaf lamina and vascular tissue compared to the symptoms originally associated with the disease. All clones in the study sustained infections that showed a mix of original and recent symptoms. In most clones the recent symptoms were predominant, but a significantly higher number of original symptoms occurred in BR25. No relation between resistance and the type of symptom was detected in the study. Observations of hyphae in infected twigs and sporocarps on leaf laminae and leaf scars showed that the fungus associated with the new symptoms was identical in all aspects to *C. theobromae*. Isolation of the fungus from infected xylem confirmed that the fungus that first emerges from the xylem is a slow-growing species that cannot be easily subcultured. Further investigations of pathogen populations are underway. This study confirms that VSD is likely to be caused primarily by *C. theobromae*, as originally described for the disease. It is possible that the new symptoms of VSD are caused by changes that affect the host response to the fungus. These could include changes in climate or soil fertility.

**O44.006 Evaluation control of *Meloidogyne* spp. and *radopholus similis* with local material in Indonesia**

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Over 80 *Meloidogyne* species have been described so far and to attack over 1000 host plants and survive under a wide range of soil conditions. Root knot nematodes cause economic damage by reducing crop yield and quality. On a worldwide basis, crop loss due to *Meloidogyne* infestation is estimated at 13 %. The *Radopholus similis* reported cause big problem especially on banana crops. In Indonesia we evaluate control using bioagents such bacterial and fungus. It showed the biological agent such bacteria and fungus could bring hope to control the diseases. The bio agent could suppress the nematode over 10 percentage. To develop the bio control face with the consistency, formulation and transportation especially the case in Indonesia with lower organic soil contains less than 1 percentage. And the farmer had almost no education with small farm area without good farm practical action.

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