

Introduction

If control of some pathogens can be achieved using resistant or less susceptible banana cultivars, induced systemic resistances (ISR) may bring a possible additional reduction of this susceptibility. In this herein study, we looked for the reduction of susceptibility to nematodes by stimulating ISR in 3 banana cultivars, with different susceptibility to nematode species *Pratylenchus coffeae* and *Radopholus similis*.

Materials and Methods

Three Banana varieties were chosen for their different susceptibilities to nematodes (Cavendish cv902, higher susceptibility, CIRAD hybrid cv924 lower, and hybrid cv925, intermediate). ISR stimulation was made with 20 mL of Methyl Jasmonate (MEJA $10^{-4}M$) applied on the soil of tissue culture plants with 5-6 leaves in individual pots. Monospecific populations of *P coffeae* or *R similis* reared on sorghum (400 individuals/plant) were inoculated to the plants one week after stimulation, then nematodes populations were evaluated 45 days later (5 replicates).

Results

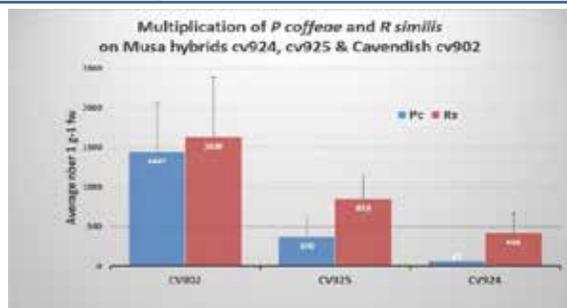


Figure 1: Estimation of the relative natural susceptibility to *P coffeae* & *R similis* of Cavendish (susceptible reference), CIRAD hybrid cv925 and hybrid cv924.

Compared to Cavendish cv902, highly susceptible, the hybrid cv924 was the less susceptible to *nematodes* and the hybrid cv925 showed intermediate susceptibility.

ISR against *Pratylenchus coffeae* in Banana

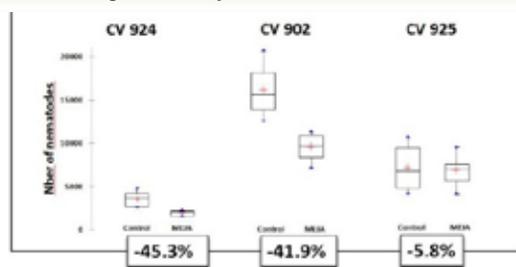


Figure 2: ISR Stimulation by MEJA (10^{-4}) to enhance tolerance to nematodes of Cavendish, CIRAD hybrid cv925 and hybrid cv924.

The hybrid cv924 and Cavendish cv902 both decreased significantly their susceptibility to nematodes respectively by 45.3% and 41.9%, after stimulation. Cavendish reached the same level of tolerance that the semi-tolerant hybrid cv925 in these conditions.

ISR against *Rotylenchulus reniformis* in Pineapple

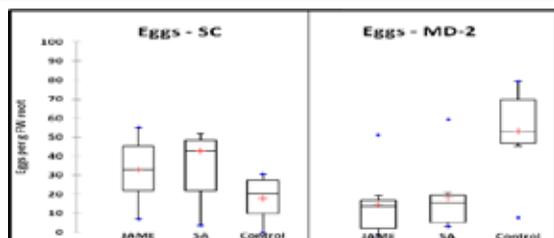


Figure 3: *Rotylenchulus reniformis* fecundity on 2 pineapple varieties after stimulation by MEJA (10^{-4}) or salicylic acid (SA, $10^{-3}M$)

As shown on banana varieties, the ISR (or SAR) stimulation of pineapple drastically reduces the nematode population fecundity but only on some varieties, here MD-2 (70%) but not on Smooth Cayenne. (Soler et al, 2013). In addition for pineapple the same varieties showed a differential response to stress tolerance using the specific molecular markers cysteine proteases & cystatins, (Raimbault, Soler, et al 2013)

Cysteine proteases & cystatins : Molecular marker for varietal stress adaptability to stress in Pineapple

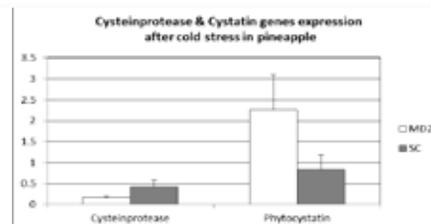


Figure 4 Molecular markers of varietal capability to establish inducible natural defenses to stress, MD2 tolerant, SC susceptible

Conclusion

The capability to produce ISR for banana is variety dependent as already proposed for pineapple (Soler et al, 2013). The ISR seems independent of the natural tolerance of the banana varieties (involves different mechanisms?).

A varietal selection in banana should also include the use of specific molecular markers for stress adaptability and ISR. Typically, genes coding for cysteine-proteases and their inhibitors, phytolectatins are good markers as shown in other crops including pineapple (Fig 4). Systemic resistances have a broad spectrum of efficiency against biotic and abiotic stresses and could be part of banana stress management in field.