



First report of Moko disease caused by *Ralstonia solanacearum* race 2 in plantain (*Musa AAB*) in Ecuador

R. Delgado*, E. Morillo, J. Buitrón, A. Bustamante and I. Sotomayor

Instituto Nacional Autónomo de Investigaciones Agropecuarias (INIAP), Quito, Ecuador

*E-mail: ricardo.delgado@iniap.gob.ec

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In October 2013, in a plantain farm in El Carmen canton in Manabí, Ecuador, the occurrence of wilted plants of cv. Barraganete with necrosis in vascular tissue of rhizomes and pseudostem was observed. Fruits were observed to ripen prematurely and exhibited an internal dry rot. Reddish necrotic spots were also noted in the rachis of the diseased bunches (Fig. 1). Symptoms resembled those described for Moko disease by Thwaites *et al.* (2000). Samples were taken to the Litoral Sur Experimental Station of INIAP for pathogen identification. A whitish ooze exuded from the vascular vessels of affected fruits when suspended in clean water. Pieces of infected tissue from rhizome and fruits were macerated in distilled water then plated onto triphenyl tetrazolium chloride (TZC) medium (Kelman, 1954). The resulting isolates of bacteria were tested for solubility in KOH, growth in King's B, nutrient agar (NA) and yeast extract-dextrose-calcium carbonate (YDC) media, and soft-rotting activity on potato slices. The resulting colonies were Gram negative according to their reaction with KOH, non-fluorescent in King's B, had cream colour in YDC and NA, had a reddish centre with white periphery on TZC (Fig. 2), and did not rot potato slices.

Pathogenicity tests were conducted on banana plants cv. Williams in a greenhouse by pseudostem inoculation with a bacterial suspension, and incubated at 26.5°C. Necrotic symptoms were observed at the infection point after eight days. Yellowing was observed after three weeks. Re-isolation on TZC medium confirmed Koch's postulates. Molecular detection was carried out using three combinations of markers: OLI-1/Y-2, Ps-1/Ps-2 and 759/760 with detection fragments of 288, 553 and 282 bp respectively (Seal *et al.*, 1993; Opina *et al.*, 1997; Pastrik & Maiss, 2000). All bacterial isolates tested rendered the expected fragments for *R. solanacearum* (for example, 282 bp fragments from primers 759/760 as shown in Fig. 3). Based on the bacterial characteristics, pathogenicity test on banana and PCR, we concluded that *Ralstonia solanacearum* race 2 caused the wilt of plantain plants observed. The bacteria probably arrived at this location on planting material brought from Colombia where the pathogen had been recognised since the 1960s (Castaneda & Espinosa, 2005). To date there is no other report of the bacteria outside El Carmen. This is the first report of the occurrence of the *R. solanacearum* in the

coastal area of Ecuador in this crop. Further work is necessary for more refined categorisation of the pathogen in terms of biochemical profile or nucleotide sequence.

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Figure 1



Figure 2

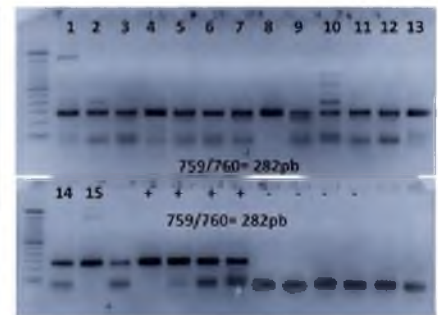


Figure 3

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