

ABSTRACT

Characterisation of yam anthracnose phytotoxins and population genetics of *Colletotrichum gloeosporioides*.

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One hundred and thirty-four isolates of *Colletotrichum gloeosporioides* obtained from diseased leaves of yam, anthurium, avocado, mango, passion-fruit, grapefruit, coffee, and orange were tested for pathogenicity to determine host-selectivity. Four of these, of which two were from yam (CHL6 and SL84) and one each from anthurium (DAN) and mango (MN4) were used for the extraction of phytotoxins from their culture filtrates. The phytotoxins were purified by column chromatography, SDS-PAGE and ultra filtration and characterised with respect to structure, host-selectivity and immuno-specificity.

Isolates of *C. gloeosporioides* were pathogenic only on the crop variety from which they were obtained. Similarly, phytotoxins only affected those crop types from which the isolates producing them were obtained. PCR-RAPDs of *C. gloeosporioides* isolates from yam and other hosts, and phytotoxin studies showed that there may be a molecular basis for host-

selectivity of both yam isolates and yam anthracnose phytotoxins. Yam isolates were related to each other to the extent of 90-100 percent and were distantly related to isolates from other crop types. Moreover when yam isolates were compared by geographic origin, those from similar yam cultivars formed a discrete cluster.

Structural analysis of phytotoxins produced by *C. gloeosporioides* isolates indicated that they were glycoproteins with both N- and O-glycosidic linkages. The estimated size of these phytotoxins was approximately 40kDa, which was reduced to 36KDa when treated with deglycosylation enzymes. Sugars accounted for 53 percent of the glycoprotein and consisted mannose, galactose, and rhamnose, while all amino acids except histidine, aspartic acid, glutamic acid and tryptophan were detected. Only the protein moiety of the glycoprotein was active on plants or plant cell suspensions. Antibodies raised against the phytotoxins were generally specific and able to recognise the antigen in the membrane fraction but not the cytoplasmic fraction of yam cell suspensions.

Keywords: anthracnose, glycoprotein, phytotoxin and *Colletotrichum gloeosporioides*