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Tropical race 4: Current and future impact on export and subsistence banana production

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Norman Simmonds classified fusarium wilt of banana, caused by *F. oxysporum* f. sp. *cabense* (FOC), as one of the most destructive plant diseases. Susceptibility to race 1 of FOC doomed 'Gros Michel,' the banana cultivar on which the first export trades were based; it was replaced by race 1-resistant Cavendish clones by the 1960s. Currently, the tropical American trades depend on the Cavendish subgroup. A new variant of FOC, tropical race 4 (TR4), has recently decimated Cavendish monocultures in southeastern Asia. We summarize the threat that TR4 poses to global production. TR4 would affect 85% of total production were it disseminated to other important banana-growing regions. In the Americas, a hemispheric plan has been drafted to address courses of action for before and after TR4 would arrive in the region; it has been discussed with regional quarantine authorities, producers and scientists, and is used to focus activities that surround the issue and inform a developing contingency plan (OIRSA). Decades of research on race 1 resulted in no highly effective management options for infested soils other than the use of resistant genotypes. Thus, as expected, biological and cultural measures have proven to be ineffective long-term measures for managing the TR4 problem. We discuss the conventional and nonconventional improvement of banana with TR4 resistance, the recent development and application of a TR4 diagnostic, and future research objectives.

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