

Status of Tropical Race 4 of Panama Wilt in Asia *

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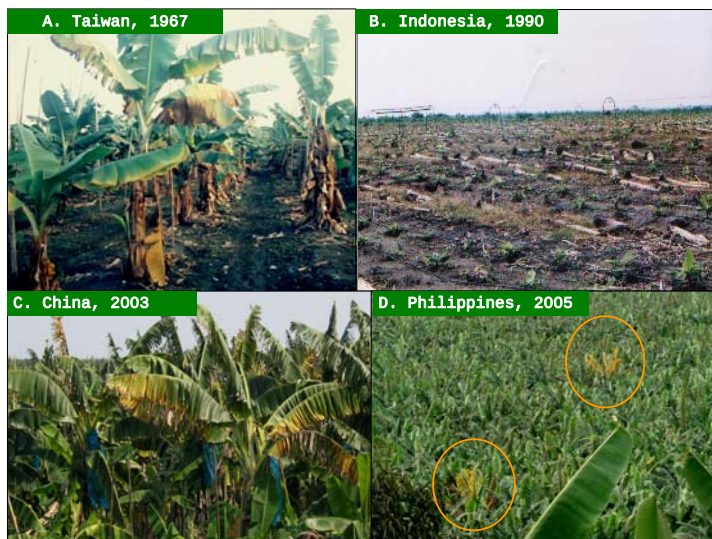
TROPICAL RACE 4 REARS ITS UGLY HEAD ACROSS ASIA AND THREATENS THE REGION'S BANANA INDUSTRY

Panama wilt, caused by the organism *Fusarium oxysporum* f. sp. *cabense* or *Foc*, has in the past obliterated the Gros Michel-based banana export industry of Central America, causing a shift to Cavendish, a variety that is resistant to *Foc*.

Now, the Asian banana industry is under attack by a virulent form of *Foc* - one that can attack the *Foc* resistant-Cavendish, thereby putting the Cavendish-based Asian banana industry on the defensive. This virulent form of the pathogen is called **Tropical Race 4 (TR4)**.

OCCURRENCE OF TR4 IN ASIA

As early as 1967, Panama wilt has been damaging Cavendish farms in Taiwan (A), and in the early 1990s, destroyed new plantations of Cavendish in Indonesia (B) and Malaysia. Field epidemics were observed in the Northern Territory of Australia between 1997 and 1999, and in 2003, a severe *Foc* infection was reported in banana plantations in Guangdong Province, South China (C). In 2006, 6,700 hectares of banana plantations were reported to have been infected by Panama wilt in China, heightening the TR4 threat particularly to a country where 90% of its total banana production is Cavendish. In 2005, the Philippines, Asia's leading banana exporter and second in the world next to Ecuador, confirmed that infections observed in a commercial farm were caused by *Foc* belonging to vegetative compatibility group (VCG) 01213/16, the VCG associated with TR4 (D).



SYMPTOMS OF DAMAGES CAUSED BY TR4

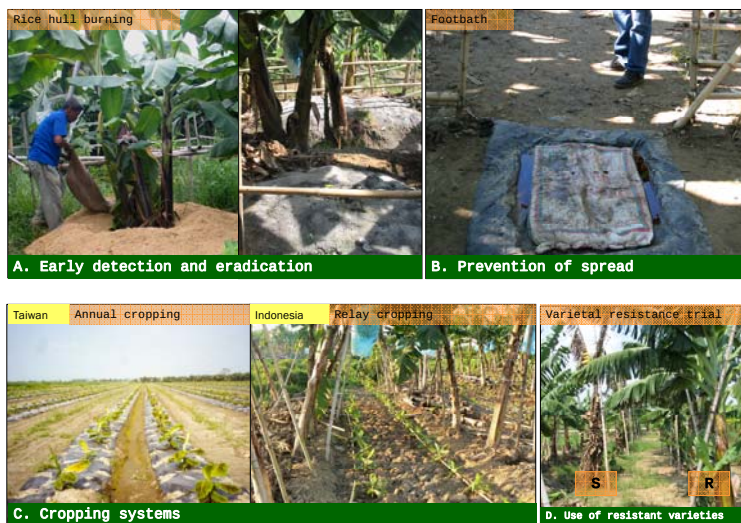
Symptoms of the disease are the following: (A & B) chlorosis that starts from the older leaves; (C) dark brown discoloration on vascular tissues as shown in cross sections of pseudostem; and (D) pseudostem splitting.



RESEARCH AND DEVELOPMENT (R&D) ACTIVITIES IN ASIA: (with support from the Australian Centre for International Agricultural Research [ACIAR])

- Understanding the distribution of various *Foc* races to effect rational quarantine measures preventing spread
- Evaluating and adapting various disease management tactics including cropping systems, biological control, varietal resistance, and early detection and eradication
- Epidemiology, host-resistance, virulence, and suppressive soils studies

MANAGEMENT TACTICS BEING ADAPTED:



Prevention and management of *Fusarium* wilt involves the application of the following tactics: (A) early detection and eradication through rice-hull burning; (B) prevention of spread by applying quarantine measures such as the use of foot baths; (C) implementation of cropping systems; and (D) the use of *Foc* resistant varieties such as the GCTCV 119