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# Bacterial Wilt Disease in Asia and the South Pacific

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# Bacterial Wilt of Groundnut: Control with Emphasis on Host Plant Resistance

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BACTERIAL wilt caused by *Pseudomonas solanacearum* is the only important bacterial disease of groundnut. It is a serious problem in major groundnut-producing areas of Indonesia (Schwarz and Hartley 1927; Machmud, these Proceedings), in southern China (Darong et al. 1981), and in restricted areas of Africa (Simbwa-Bunnya 1972). The disease is a potential threat to groundnut production in several other parts of the world, especially in warm humid areas. Effective control measures are to use suitable crop rotations and to grow wilt-resistant groundnut cultivars (Schwarz and Hartley 1950; Porter et al. 1982). Breeders have produced bacterial wilt-resistant groundnut cultivars in several parts of the world (Schwarz and Hartley 1926; Darong et al. 1981). Several screening/inoculation techniques have been used to identify sources of resistance (Darong et al. 1981; Winstead and Kelman 1952), but the wide range of variability in the pathogen populations complicates wilt resistance breeding.

This paper reviews the disease situation in groundnut and recent advances in identifying sources of resistance. Strategies for incorporating genetic resistance to bacterial wilt and to some other important diseases of groundnut into high yielding cultivars are also discussed.

## Distribution and Economic Importance

Bacterial wilt caused by *Pseudomonas solanacearum* is common on many crops throughout the tropics and subtropics, but the disease occurs in a relatively isolated fashion on groundnuts. For in-

stance, bacterial wilt of tobacco, tomato, and egg plant is common in India, the Philippines, and in West Africa, but there are no reports of the disease on groundnut in these areas. Bacterial wilt, also called slime disease, of groundnut was first observed in 1905 in Indonesia (Van Breda de Haan 1906) where it was later reported to cause an estimated loss of at least 25% of the crop (Palm 1922). In the United States the disease was first reported in 1912 from Granville County, North Carolina (Fulton and Winston 1914), and was later reported to occur in all groundnut-growing counties of Georgia (Miller 1931; Miller and Harvey 1932). However, bacterial wilt is not at present regarded as an important disease of groundnut in the United States. The disease on groundnut has also been reported from Mauritius (Shepherd 1924; Edwards 1928), South Africa (McClellan 1930), Libya (Petri 1931), Somalia (Curzi 1934), Ethiopia (Castellani 1939), Madagascar (Bouriquet 1934), and Japan (Fujioka 1952), but little is known about its present status in these countries.

Bacterial wilt of groundnut is currently known to cause serious damage to the crop in Indonesia (Machmud, these Proceedings), in the south of the People's Republic of China (Darong et al. 1981), and in restricted areas of Uganda (Simbwa-Bunnya 1972). The disease is particularly severe on crops grown in wet soils where incidence commonly reaches 10%. Losses of up to 30% of the crop are experienced in seasons favouring severe disease development (Darong et al. 1981; Simbwa-Bunnya 1972).

## Races and Strains of *P. solanacearum*

The existence of strains of *P. solanacearum* varying in virulence and host specificity is well documented. Van der Goot (1924) suggested that the strain of *P. solanacearum* attacking potatoes in Java was distinct from the strain affecting groundnut, and this viewpoint was supported by

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groundnut germplasm and this currently consists of 11 500 groundnut accessions and 57 accessions of wild *Arachis* species. These could be made available to research workers in countries where bacterial wilt 'hot spots' occur that can be used for field resistance screening. Lines found resistant or tolerant in one region should be retested in other regions because of the possible differences in geographic distribution of pathogenic strains of the bacterium. It may also be possible to organise a project in a country where groundnut is not grown and where *P. solanacearum* is not a problem, to test selected resistant lines for their reaction to inoculation with strains of the pathogen from different regions of the world. Such tests, preferably in conjunction with international disease nurseries would be useful in determining stability of resistance of cultivars to bacterial wilt.

The overall aim should be to combine stable resistance to bacterial wilt with resistance to other economically important diseases and pests that occur in the same regions.

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