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## Reaction of Some ICRISAT Groundnut Varieties to Bacterial Wilt Disease in China

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In 1992, 101 varieties, representing the fourth series of five ICRISAT international groundnut trials, were grown by the Oil Crops Research Institute (OCRI), Wuhan, for evaluation under central China conditions. These trials were the International Insect Pests Resistance Groundnut Varietal Trial (IIPRGVT), International Drought Resistance Groundnut Varietal Trial (IDRGVT), International Medium- and Long-duration Groundnut Varietal Trial (IMLGVT), International Confectionery Groundnut Varietal Trial (ICGVT), and International Foliar Diseases Resistance Groundnut Varietal Trial (IFDRGVT). In addition to these trials, the same lines were also grown in a natural sick plot of bacterial wilt caused by *Pseudomonas solanacearum* in Hong'An, Hubei Province, in 1992 and 1993. The objective of the screening was to score bacterial wilt reactions in these varieties and identify wilt-resistant materials with other desirable traits.

The screening was conducted from Apr to Aug with one replication in 1992 and two replications in 1993. For each breeding line, 60 seeds were sown in a single test row. Taishan Sanlirou (resistant) and E Hua 4 (susceptible) were used as controls, and sown after every four test rows. Wilt incidence was recorded once a month. As the natural disease nursery has been in existence for more than 20 years, disease pressure was uniform and reliable. Wilt incidence was over 95% in the susceptible control, but less than 15% in the resistant control. Disease pressure in 1993 was slightly higher than in 1992, due to higher rainfall.

No variety was highly resistant to bacterial wilt. Almost all the 82 varieties in three international trials

(IIPRGVT, IDRGVT, IMLGVT) were highly susceptible, with less than 30% of the plants surviving in the nursery. However, four varieties in ICGVT (ICGVs 88369, 88382, 88389, and 88402) and one variety in IFDRGVT (ICGV 86699) were tolerant of the disease, with plant survival ranging from 50% to 69%. Fourteen varieties, mainly from ICGVT and IFDRGVT, were moderately susceptible, with plant survival ranging from 30% to 49%.

The ICRISAT-developed lines had a longer latent period than the local susceptible spanish type materials; most ICRISAT lines reached the peak stage of wilting rather late. Resistance to bacterial wilt in groundnut has different mechanisms and components, including latent period (Liao et al. 1992). These components might influence the level and stability of resistance. Breeders working on bacterial wilt resistance should therefore pay more attention to utilizing parents with different resistance components.

In this screening, among the 19 tolerant and moderately susceptible varieties (plant survival over 30%), 12 varieties in ICGVT had ICGV 86564 (Ah 114 × NC Ac 1107) or ICG 7350 as their female parent; 4 varieties in IFDRGVT had NC Ac 17090 as their pollen parent. This suggests that these parental genotypes have some tolerance to bacterial wilt, probably with a different mechanism of disease reaction. In Indonesia, a bacterial wilt-resistant line was selected from the cross GH 32 × NC Ac 17090 (Machmud 1993). NC Ac 17090 was tested in Hong'An, China, for 5 seasons, and showed an average plant survival of 38.65% (Duan Naixiong et al., unpublished data) and a relatively long latent period. Therefore, the ICRISAT-developed groundnut lines may offer potential genetic diversity for long latent period and multiple resistance/tolerance.

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## Identification of Sources of Resistance to Bacterial Wilt in Groundnut Germplasm Under Southern Vietnamese Conditions

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Bacterial wilt, caused by *Pseudomonas solanacearum*, is an important constraint to groundnut production in southern Vietnam. Tay Ninh and Long An provinces are the major groundnut-producing regions in southern Vietnam. Two crops of groundnut after rice is the major cropping pattern. Disease incidence in the range of 20–30% has been reported from this region (Hong et al. 1994). The disease is more common in areas where groundnut is cultivated season after season in the same upland fields.

In the 1993/94 winter-spring season, 73 germplasm lines from Indonesia and a local cultivar Ly were screened for resistance to bacterial wilt. Twenty-two germplasm lines with wilt incidence less than 15% were selected for further screening during the 1994 autumn season, after which 13 germplasm lines were finally selected for a replicated trial during the 1994/95 winter-spring season. All the genotypes were of subspecies *fastigiata* var *vulgaris*, with small to medium sized pods and tan colored seeds. The genotypes were grown in a single-row plot of 5 m length, spaced at 30 cm between rows and 10 cm within rows. The susceptible control Chico was sown after every 5 rows of test materials. Plant debris of wilt-affected plants from neighboring fields was collected and mixed in the soil to increase inoculum levels. Bacterial wilt incidence was monitored at weekly intervals.

Cumulative disease incidence in the selected genotypes is shown in Table 1. Average disease incidence was 52.7% in the susceptible control Chico and 32.1% in the local cultivar Ly. Average incidence in the test entries ranged from 0.2% in ICG 8666 to 7.7% in ICG 8637. Except for ICG 8637 and ICG 8654, seed of the remaining genotypes has been increased for an assessment of agronomic traits during the 1995/96 winter-spring season in southern Vietnam. ICG 8666 was also reported resistant to bacterial wilt in a sick-plot test conducted at Habac in northern Vietnam (Hong et al. 1994).

**Table 1. Bacterial wilt disease incidence in 13 groundnut genotypes evaluated over 3 seasons, Cuchi, southern Vietnam.**

Genotype	Wilt incidence (%) <sup>1</sup>			Average
	Winter-spring 1993/94	1994/95	Autumn 1994	
ICG 8666	0.00	0.64	0.00	0.21
ICG 8625	0.00	0.00	3.33	1.11
ICG 5313	0.00	0.62	3.00	1.21
ICG 8632	0.00	1.63	3.03	1.55
ICG 8627	0.00	4.55	0.73	1.76
ICG 8626	0.00	4.90	2.01	2.30
ICG 8645	2.56	3.77	0.74	2.36
ICG 8675	4.65	0.00	3.42	2.69
ICG 8630	0.00	3.80	7.00	3.60
ICG 8638	8.00	0.71	2.38	3.69
ICG 8662	8.00	3.46	1.10	4.18
ICG 8654	8.51	3.22	8.33	6.68
ICG 8637	8.69	6.63	7.78	7.70
<b>Controls</b>				
Chico	70.43	48.02	39.63	52.69
Local Ly	52.17	25.09	19.68	32.13

1. Nonreplicated trials during the 1993/1994 winter-spring and 1994 autumn seasons.

We are collaborating with Dr Hong of the National Institute of Agricultural Science (INSA), Hanoi, to test these genotypes under northern Vietnamese conditions.

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