Two known resistant genotypes (ICGV 87165 and ICGV 8650) showed significantly low incidence compared with the susceptible control (TMV 2) thus confirming their reaction (Table 1). Most Spanish bunch cultivars of Karnataka State (TMV 2, JL 24, Dh 40, KRG 1, R 8808) and germplasm lines (ICG 5125 and ICG 5247) were susceptible (>57.2%) as they recorded significantly more disease than the resistant controls. Dh 8, a Spanish bunch cultivar was, however, comparable or superior to resistant controls. Foliar disease-resistant Spanish bunch mutants, such as VL 1-28-2, VL 1-45, and VL 1-110 also exhibited susceptible reactions to *S. rolfsii.* Among them, VL 1-45 (81.4%), was extremely susceptible to the disease. The genotype R 8808 recorded lower disease incidence in the postrainy (49.6%) than in the rainy season (83.0%) indicating a need for multiple evaluations for confirming the resistance and its stability. The resistant sources identified in the present study could be used in future breeding programs.

Table 1. Response of groundnut genotypes to Sclerotium rolfsii inoculation.

	Disease incidence (%)		
Genotype	Postrainy season	Rainy season	Pooled
Dh8	22.3a[1]	22.9ab	22.6a
KRG I	50.6cd	65.3ef	57.9c
JL24	50.2cd	64.3e	57.2c
R8808	49.6cd	83.0i	66.3f
ICG 5125	50.1 ed	78.2hi	64.1def
ICG 5247	61.8 ef	52.3d	57.0c
Dh 40	67.2f	65.1e	66.1ef
VL 1-45	76.9g	85.7j	81.4g
VL 1-28-2	55.9e	65.0e	60.5cde
VL 1-110	50.2cd	67.1efg	58.7cd
Resistant controls			
ICGV 86590	32.2b	22.5a	27.4a
ICGV 87165	43.4c	30.6c	37.0b
Susceptible control			
TMV 2	57.1de	72.1fgh	64.6ef
Mean	51.36	59.56	55.46
SE	±3.28	±2.40	±2.03
CD (P = 0.05)	9.41	6.88	5.70
CV (%)	9.03	5.70	7.33

1. Figures with same letters are not significantly different at (P = 0.0 5).

References

Abeygunawardena, D.V.W., and Wood, R.K.S. 1957. Factors affecting the germination of sclerotia and mycelial growth of *Sclerotium rolfsii* Sacc. Transactions of the British Mycological Society 40:221-230.

Mehan, V.K., Mayee, C.D., Benneman, T.B., and McDonald, D. 1995a. Stem and pod rots of groundnut. Information Bulletin no. 44. Patancheru, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 19 pp.

Mehan, V.K., Mayee, C.D., McDonald, D., Ramakrishna, N., and Jayanthi, S. 1995b. Resistance in groundnut to *Sclerotium rolfsii* caused stem and pod rots. International Journal of Pest Management 41:79-83.

Sherwood, J.L., Beute, M.K., Dickson, D.W., Elliott, V.J., Nelson, R.S., Opperman, C H., and Shew, B.B. 1995. Biological and biotechnological control advances in *Arachis* diseases. Pages 160-206 *in* Advances in peanut science (Patte, E.H., and Stalker, H.T., eds.). Stillwater, USA: American Peanut Research and Education Society, Inc.

Screening of Groundnut Genotypes for Resistance to Kalahasti Malady and Late Leaf Spot Diseases

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Kalahasti malady, a pod disease caused by a stunt nematode (*Tylenchorhynchus brevilineatus*), was first reported during the 1975/76 postrainy season on groundnut in the Srikalahasti area in Chittoor district, Andhra Pradesh (Reddy et al. 1984). Yield losses of 20-50% are common in severely infected fields. Sources of resistance to this disease have been identified (Siva Rao et al. 1986, Mehan and Reddy 1988, Harinath Naidu 1996). The late leaf spot disease (LLS) caused by *Phaeoisariopsis personata* is an important constraint to groundnut production and sources of resistance have been identified (Subrahmanyam

et al. 1982, Harinath Naidu 1997). This paper reports results of screening of 42 groundnut genotypes for resistance to kalahasti malady and late leaf spot.

Experiments were conducted during the 1995-97 postrainy seasons in kalahasti malady-infected soils at a farm of Andhra Pradesh State Seed Development Corporation (APSSDC), Srikalahasti, Andhra Pradesh. A randomized block design (RBD) was followed with two replications. Each genotype was sown in two 5 m-long rows. The test genotypes were sandwiched by rows of a susceptible control, JL 24. The rows were 30 cm apart with a plant-to-plant distance of 10 cm. All the genotypes were screened for late leaf spot severity at the Regional Agricultural Research Station (RARS) farm, Tirupati, during the rainy seasons of 1995 and 1996 in addition to testing them in the postrainy seasons at APSSDC farm, Srikalahasti. The late leaf spot severity was recorded at 90 days after sowing on a a 1-9 scale (Subrahmanyam et al. 1982). The genotypes were harvested at maturity and 25 randomly-selected plants of each genotype were scored for kalahasti malady severity on a 1-5 scale (Reddy et al. 1984). The observations on number of pods and pod yield were recorded (Table 1).

Of the 42 genotypes screened for kalahasti malady, 29 showed a significantly lower disease score than the control, JL 24. Three genotypes, ICGV 92195, ICGV 92268, and ICGV 92269 produced a significantly greater number of pods (12.2 to 12.5) and higher pod yield (9.9 to 10.6 g plant^{-1}) than the control. Among the 10 moderately-resistant genotypes (2.0-3.0 disease score) ICGV 93370 and ICGV 92196 produced a significantly greater number of pods (11.8 to 12.4) and higher pod yield (9.1 to 10.6 g plant^{-1}).

All the 42 genotypes screened against LLS were found susceptible to LLS with a disease score of 7.5 to 9.0.

The three resistant genotypes, ICGV 92195, ICGV 92268, and ICGV 92269, which gave significantly better pod yields, may be considered for recommendation to farmers in the nematode affected areas.

Table 1. Reaction of 42 short-duration groundnut genotypes to kalahasti malady and late leaf spot diseases.

Genotype	Kalahasti malady severity (1-5 scale)[1]	LLS severity (1-9 scale)	Number of pods plant^{-1} (g)	Pod yield plant^{-1} (g)
ICGV 93370	2.6	8.8	12.4	10.6
ICGV 93373	3.3	9.0	9.4	7.6
ICGV 93379	3.1	9.0	8.0	11.5
ICGV 93383	3.0	9.0	7.5	6.5
ICGV 93407	2.9	8.8	8.1	7.1
ICGV 93411	3.9	8.0	10.0	6.2
ICGV 93420	2.8	9.0	9.1	7.3
ICGV 93433	3.4	7.8	7.4	6.2
ICGV 93433	3.9	8.7	7.0	6.5
ICGV 93436	3.0	9.0	7.4	6.0
ICGV 93437	3.0	8.7	8.1	6.2
ICGV 93438	3.2	8.8	11.4	6.7
ICGV 92195	2.0	9.0	10.0	9.1
ICGV 92196	2.8	8.7	11.8	9.1
ICGV 92199	4.0	7.7	12.6	7.4
ICGV 92209	3.3	7.5	9.7	6.9
ICGV 92212	3.3	8.8	8.7	5.7
ICGV 92216	2.9	6.8	10.8	8.2
ICGV 92218	4.0	7.8	9.0	7.0
ICGV 92222	2.6	8.3	7.0	6.5
ICGV 92224	2.8	9.0	6.7	6.2
ICGV 92229	4.5	9.0	7.4	7.4
ICGV 92242	2.4	7.8	6.1	5.9
ICGV 92243	2.7	9.0	8.0	6.3
ICGV 92247	2.9	8.8	10.9	7.4
ICGV 92255	4.6	9.0	12.1	8.9
ICGV 92261	3.8	8.5	9.1	6.8
ICGV 92268	2.0	8.8	12.5	9.9
ICGV 92269	2.0	8.8	12.2	10.6
ICGV 91109	3.2	8.8	10.4	7.6
ICGV 91112	4.4	9.0	10.4	7.4
ICGV 91114	3.4	9.0	10.1	6.6
ICGV 91116	3.8	9.0	10.7	7.4
ICGV 91117	3.1	8.8	9.8	7.9
ICGV 91118	3.2	8.7	8.9	5.1
ICGV 91123	3.2	8.0	10.4	5.2
ICGV 91124	3.6	8.0	8.5	5.0
ICGV 91151	3.9	8.8	4.9	4.5
ICGV 91155	3.7	9.0	6.6	5.6
ICGV 89023	3.5	8.7	8.6	5.9
ICGV CHICO	4.3	8.7	7.1	4.8
JL 24 (Control)	4.5	9.0	8.2	6.2
CD (P = 0.05)	0.8	0.5	2.8	2.3
CV (%)	12.6	3.7	15.8	17.1

1. Disease scale (1 = No disease symptoms, 2 = Pods normal in size with a few small dark brown to black lesions covering 1-25% of pod surface, 3 = Pods normal in size with lesions covering 25-50% of pod surface, 4 = Pods smaller in size with lesions covering 50-75% of pod surface, 5 = Pods much smaller in size with lesions covering more than 75% of pod surface).

References

Harinath Naidu, P. 1996. Etiology and management of Kalahasti malady in groundnut. Ph.D. thesis, Andhra Pradesh Agricultural University, Rajendranagar, Hyderabad 500 030, Andhra Pradesh, India. 272 pp.

Harinath Naidu, P., Vasanthi, R.P., Rajagopal, N., Sudhakar Rao, A., and Papa Rao, A. 1997. Screening of groundnut genotypes to late leaf spot. The Andhra Agricultural Journal 44:94-98.

Mehan, V.K., and Reddy, D.D.R. 1988. Investigations on a nematode disease of groundnut caused by *Tylenchorhynchus brevilineatus*. Groundnut Pathology Progress Report no. 19, Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 160 pp.

Reddy, D.D.R., Subrahmanyam, P., Sankara Reddy, G.H., Raja Reddy, C., and Siva Rao, D.V. 1984. A nematode disease of peanut caused by *Tylenchorkynchus brevilineatus*. Plant Disease 68:526-529.

Siva Rao, D.V., Srinivasan, S., and Raja Reddy, C. 1986. Reaction of selected groundnut cultivars to nematode infection *(Tylenchorhynchus brevilineatus)* under field conditions. Tropical Pest Management 32:167-170.

Subrahmanyam, P., McDonald, D., Gibbons, R.W., Nigam, S.N., and Neviil, D.S. 1982. Resistance to rust and late leaf spot diseases in some genotypes of *Arachis hypogaea*. Peanut Science 9:6-10.

Effects of Some Chinese Strains of Peanut Stripe Virus (PStV) on Groundnut Cultivars and Other Plants

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Peanut stripe virus (PStV) is an economically important virus infecting groundnut *(Arachis hypogaea)* in Southeast Asia. It is widely distributed in all groundnut production areas in China (Xu et al. 1984). Peanut stripe virus has assumed economic importance because of its potential to cause significant reductions to crop yields and in quarantine because of its relatively high frequency of transmission through groundnut seed. The virus has been reported to occur as distinct strains on the basis of symptoms in groundnut and host reaction (Wongkaew and Dollet 1990). During surveys in China wide variation in symptoms was noticed in PStV-infected groundnut. In this paper symptoms, seed transmission frequency, and pod losses due to some PStV isolates occurring in China are reported.

Symptomatology. Five isolates of PStV were collected from groundnut in Wuhan (PStV-W1, W2, N), Guangzhou (PStV-G) and Tansan (PStV-T). They were maintained on groundnut cv Honghua No. 1 in a glasshouse. Extracts from each isolate were mechanically sap inoculated on to different groundnut genotypes and on to a range of indicator plants (Table 1). On the basis of symptoms produced on various groundnut genotypes they were divided into three groups. Isolates included in group I caused mild mottling symptoms and very little stunting (PStV-WI and T). Isolates in group II (PstV-W2 and G) caused blotches and relatively more stunting than the isolates in group 1. Isolates in group III (N) were distinguished on the basis of necrosis of veins, severe mosaic symptoms, and stunting. All isolates in the three groups caused systemic mosaic on *Glycine max, Cassia occidentalis* (PStV-N not tested) and *Nicotiana benthamiana;* local lesions on Chenopodium *amaranticolor*, Cassia tora (PStV-N not tested), and cowpea. All isolates failed to infect *Sesbania exalta* and Phaseolus vulgaris cv Topcrop. None of the diagnostic hosts was suitable for distinguishing the isolates.

Effect on plant growth and pod yield. Two widely-distributed isolates in China (W1 and G) were chosen to study their effect on growth and yield of groundnut cultivars Zhonghua Nos. 1, 3, and 4 and Luhua No. 11, under glasshouse conditions. PStV-WI caused 1.4% to 6.4% reduction in height and G caused 9.2% to 16.3% reduction. Losses in pod yields due to PStV-WI ranged from 20.8% to 36.6% and decrease in pod yields due to PStV-G ranged from 29.8% to 55%. The cultivars Zhonghua Nos. 3 and 4 suffered maximum losses in pod yields by both the PStV isolates.

Seed transmission frequency. Nearly 1000 seeds were used to determine the rate of transmission to seed. PStV-WI was transmitted to 20.9% and PStV-G to 6.1% of seed of cv Zhonghua No. 3. However in cv Zhoughua No. 4 seed transmission rate was lower than that observed for Zhonghua No. 3 (6.1% for WI and none for G).

Aphid transmission. All five PStV isolates were transmitted by *Aphis craccivora* from groundnut to groundnut. The efficiency of transmission was 4.2% (1/24) for PStV-N, 12.0% (3/25) for PStV-G, 20.0% (5/25) for PStV-WI, 22.2% (6/27) for PStV-W2, and 44.0% (11/25) for PStV-T.

Conclusions

Five PStV isolates collected from various parts of China could be classified into three distinct groups on the basis