

All the reciprocal hybrids were also found to be susceptible to this viral infection and the grades were between 66.33 (CoBG 302 × Vamban 1) and 93.33 per cent (CoBG 9 × PDU 1). These results have indicated very clearly that susceptibility of these genotypes was dominant over resistance to yellow mosaic virus disease and controlled by oligogenes with no maternal influence as shown by the reciprocal crosses. Similar dominance nature of susceptibility over resistance for viral infection was reported by many authors (1, 5-7). Contrary to the present report, susceptibility was identified as recessive character in blackgram varieties (8).

1. Dwiveri, S. and Singh, D. P. *Z. Pflanzenzucht.* 95 : 281-284 (1985).
2. Gurna, S. N., Misra, D. P. and Kamthan, K. P. *Madras agric. J.* 69 : 436-438 (1982).
3. Nair, N. G. Ph.D. Thesis, U.P. Agric. Univ., Pant Nagar (1971).
4. Nariani, T. K. *Indian Phytopath.* 13 : 24-29 (1960).
5. Sandhu, T. S., Brar, J. S., Sandhu, S. S. and Verma, M. M. *J. Res. PAU* 22 : 607-611 (1985).
6. Shukla, G. P. and Pandya, B. P. *SABRAO J.* 17 : 165-171 (1985).
7. Verma, R. P. S. and Singh, D. P. *Theor. Appl. Genet.* 55 : 233-235 (1980).
8. Verma, R. P. S. and Singh, D. P. *Theor. Appl. Genet.* 72 : 737-738 (1986).

Received for publication January 9, 1990.

Effect of bud necrosis disease on the yield of groundnut under field condition

K. GOPAL AND H. D. UPADHYAYA

*All India Coordinated Research Project on Oilseeds
Regional Research Station, Raichur 584 101*

Keywords : Bud necrosis, Groundnut, Tomato spotted wilt virus

Bud necrosis disease is caused by tomato spotted wilt virus (4) and is one of the most important diseases of groundnut. The incidence of the disease in Raichur (Karnataka) varied from 5 to 75 per cent and the incidence was found to be more in *rabi* than *kharif* season. However, if planting is delayed in *kharif* upto 15 July, the incidence increased. The disease is known to cause yield loss upto 50 per cent depending on the plant growth stage at the time of infection. Under field conditions, the quadrifoliate leaf below the terminal bud shows distinct chlorotic ring spots or chlorotic speckling and often becomes flacid. Terminal bud is necrosed followed by proliferation of small shoots with mottled leaves of much reduced size. In advanced stage of disease, the whole plant becomes bushy and stunted when compared to healthy plant, and plant death is quite common. The pods produced by affected plants are distorted and reduced in size (3). The appearance of this disease in relation to age of the crop is important in terms of loss in yield. Therefore, an attempt was made to estimate the loss due to bud necrosis disease in relation to age of the crop.

TABLE 1: Effect of bud necrosis infection at different stages on pod yield and other characters of KRG-1 variety of groundnut

Stage of symptoms* (days after sowing)	1	2	3	4	5	6	7	8	9
Plant height (cm)		12.0	3.2	12.2	1.2	3.0	0.7	18	13.20
Number of branches		14.2	3.8	15.2	1.4	3.8	1.5	25	13.70
Fresh plant weight		16.2	4.2	17.4	1.8	6.0	2.3	29	14.50
Number of filled pods		17.8	4.4	22.6	2.2	7.2	2.7	43	17.20
Number of unfilled pods		24.0	5.6	40.8	10.4	9.4	4.3	47	18.60
Dry pod yield (g)		30.4	6.0	60.4	14.8	9.6	7.2	62	22.30
Shelling (per cent)		34.6	6.0	78.8	18.8	9.3	9.1	70	25.20
100 seeds weight (g)									
Healthy control		37.6	6.0	84.8	21.8	9.0	10.3	73	27.00
GM		23.875	—	41.525	9.05	—	4.763	—	—
SEM		2.266	—	5.588	1.328	—	0.161	—	—
CD at 5%		6.54	—	16.12	3.832	—	1.037	—	—

*Five infected groundnut plants were examined at each stage.

A susceptible cultivar, KRG-1, of groundnut was sown in a 200 square metre area during first week of January 1989. In this plot, 5 bud necrosis infected plants were tagged randomly at an interval of 10 days starting from 30 days after sowing upto 90 days. The crop was harvested at 115th day and observations on plant height, number of branches, fresh plant weight, filled and unfilled pods, dry pod yield, 100 seeds weight and shelling percentage were recorded.

The results indicate that the plant height was reduced in all the stages of bud necrosis infection, however, significant differences were observed when the disease appeared at 70 days or earlier (24.0, 17.8, 16.2, 14.2 and 12.0 cm at 70, 60, 50, 40, and 30 days after sowing, respectively) (Table 1). There was no significant difference in plant height when the plants were infected between 80th and 90th days after sowing (34.4 and 34.6 cm respectively) as compared to healthy control (37.6 cm). Similar results were obtained by Rao *et al.* (1979). There was gradual reduction in number of branches upto 70th day infection. Thereafter, there was no reduction in number of branches. There was significant reduction in fresh weights when the plants were infected 30, 40, 50, 60, and 70 days after sowing.

There was heavy reduction in number of pods/plant when the plants were infected 30, 40, 50 and 60 days after sowing. There was no significant reduction in pods when the plants were infected 70 days after sowing. Number of unfilled pods were less in early infected plants compared to late infected plants. There was significant reduction in dry pod yield (0.7 to 4.3 g) and 100 seeds weight (13.2 to 18.6 g) when the plants were infected 30, 40, 50, 60 and 70 days after sowing. There was no significant reduction in dry pod yield and 100 seed weight when the plants were infected 80 to 90 days after sowing. Similar results have been reported by Rao *et al.* (2). Shelling percentage reduced gradually in all infections, but heavy reduction was noticed at 30th (18 per cent) to 70th day (47.0 per cent) infection.

The results clearly indicate that the early infection caused heavy reduction in yield compared to late infection. Therefore, it is necessary to reduce the spread of the disease in early stages of the crop to prevent considerable loss through control of vectors *Frankliniella schultzei* and *Scirtothrips dorsalis* by spraying systemic insecticides (1). The use of resistant/tolerant genotypes like ICGS-11, which showed less infection of bud necrosis disease, may be popularised. The efforts are being made to breed the varieties which can withstand bud necrosis disease infection in rabi summer and late kharif conditions.

1. Amin, P. W., Reddy, D. V. R., Ghanekhar, A. M. and Reddy, M. S. *Plant Dis.* 65 : 663-665 (1981).
2. Rao, R. D. V. J. P., Raghunathan, V., Rao, M. V. and Joshi, N. C. *Indian J. Plant Prot.* 7 : 161-164 (1979).
3. Seetharama Reddy, K., Appa Rao, A. and Reddy, D. V. R. *Andhra agric. J.* 25 : 40-48 (1978).
4. Sugunakara Reddy, M., Reddy, D. V. R. and Appa Rao, A. *Plant Dis. Repr.* 52 : 494-495 (1968).

Received for publication June 8, 1989.