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ASSESSMENT OF YIELD LOSS FROM BUD NECROSIS DISEASE OF GROUNDNUT IN ANDHRA PRADESH, INDIA, IN THE RABI 1981-82 SEASON

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Bud necrosis disease (BND) has become one of the most important virus diseases of groundnut in India. Survey throughout India showed BND to be widely distributed (Amin and Mohammed, 1980). The crop loss due to BND has been estimated to be 1500 tonnes of groundnut valued at about Rs. 4.5 crores (45 million).

The Bud necrosis disease in caused by tomoto spotted wilt virus (Ghanekar *et al.*, 1979) and transmitted by thrips, mainly *Frankliniella schultzei* (Amin *et al.*, 1981) and important in Andhra Pradesh.

A survey of rabi groundnut growing areas in 10 districts of Andhra Pradesh was conducted in the end of March, and the first week of April 1982, to record the incidence and severity of BND. The period for survey was chosen because in rabi season the thrips population declines after February and as such very little disease spread occurs after March. The thrips migration does not depend upon the age of crop and thus even in young crop further disease spread after March is not likely to occur.

Methodology

In all the areas surveyed, a local variety of Spanish type referred to as TMV-2 was cultivated. In each district a minimum of six fields of 1 ha or more, located in major groundnut growing areas, were chosen. For recording observations, an area of 10 sq m. at 3-5 locations in a field was chosen in a diagonal fashion and number of healthy and infected plants, and approximate age of crop was recorded. Infected plants were grouped into two categories: those showing early infection (symptoms including stunting, axillary shoot proliferation, leaf deformity and death of the plant) or late infection (symptoms including ring spots on young leaves and necrosis of the terminal bud). In order to estimate yield loss all early infected plants were regarded as contributing to the yield loss to the extent of 90%; and the late infected plants to the extent of 50% (Prasad Rao *et al.*, 1980). (Table-1)

The information on area under groundnut was obtained from the officials of the Department of Agriculture. The yield was determined on the basis of five year's average from the data supplied by the Directorate of Oil seeds Research, ICAR, Hyderabad.

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Results

District-wise losses from BND are given in Table-2. In every district, the disease was present and the majority of plants appeared to be infected when they were 60-70 days old, except in Khammam district in some late sown crops, where more number of plants with early infection were observed. The highest yield loss was estimated from Nalgonda district followed by Kurnool and Mahboobnagar district. The low incidence of BND in Guntur distrist was mainly because of good plant stand resulting from high seed rate with seed dressing and good crop management. In the same district the fields with sparse population had over 50% BND incidence. The disease incidence in Nellore and Chittoor districts was very low irrespective of plant stand and sowing date and the yield loss was negligible. In Nizamabad district, crops sown in the month of December had more incidence of the disease than crops sown in the third week of January. The total yield loss from BND in 7 districts has been estimated to be Rs. 45 million (US $ 4.5 million). Estimates were not made formed for Anantapur district because only 3 locations were visited and they were not considered representative of the district.

Discussion

It is evident from our surveys and calculations that BND causes severe substantial yield loss to postrainy groundnuts in Andhra Pradesh. The crops that were managed properly by using optimum seed rate, and appropriate seed treatment resulting in good plant stand, were least affected by the disease and had minimum yield loss. Such crops were observed in parts of Guntur district. In Nellore and Chittoor districts, the disease incidence was low.

One of the major flaws in calculating yield loss on the basis of incidence and severity of disease alone, and age of the crop as was done in the present case, was that compensation, if any, derived from the healthy plants adjacent to diseased plants has not been taken into consideration. We are currently preparing a field scale for scoring bud necrosis disease which would take into consideration the severity of symptoms, the age of plants at the time of infection and the incidence of disease. We are also currently conducting experiments to estimate the amount of yield compensation in healthy plants adjacent to infected plants in relation to sowing dates and spacing and fertility status of soil. We expect that this information would help to obtain more realistic estimate of yield loss caused by BND.

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Table 1 : Effect of bud necrosis disease on yield of plants infested at different ages under field conditions (Rabi 1980-81).

Crop age in day when symptoms were first noticed	Yield (gm)/plant—1/		% Loss	
	Pods	Kernels	Pods	Kernels
35	0.0	0.0	100.0	100.0
41	0.0	0 0	100.0	100.0
48	00.1	0.0	99.7	100.0
55	4.2	2.3	89.0	90.8
62	10.6	6.0	72.0	76 0
71	19.2	11.5	49.1	53.5
78	24.0	14.8	36.5	40 4
85	26.5	17.1	30.0	31.0
97	32.8	21.8	13.2	12.7
No symptoms	37.8	24.8		

1/ Average for 600 plants in each age group. Experiments were conducted at ICRISAT Center in the 1980-81 rabi season. Row to row spacing was 75cm and plant to plant spacing was 15 cm. The crop was raised in alfisols in high fertility precision fields.

Table 2. Districtwise estimate of yield loss from bud necrosis disease of groundnuts in Andhra Pradesh in Rabi 1981-82 season

District	Area (ha)	Production (tonnes)	Average yield (kg/ha)	Age (days) of crop when visited	Plant population (100000/ha)	BND incidence % Early	BND incidence % late	Expected yield loss %	Amount of crop (loss kg)	Value (million rupees)
Nizamabad	7,000	7500	1050	60-80	2.4	4.4	17.6	13.0	1000	3.0
Khammam	8,000	11200	1460	40-60	3.0	4.0	6.0	7.5	850	2.5
Guntur	30,000	33000	1100	60-80	4.0	0.7	6.3	3.5	1200	3.6
Prakasham	15,000	16500	1100	40-90	3.0	0.7	6.3	3.5	600	1.8
Nellore	20,000	22000	1100	60-90	4.5	0.1	0.9	Negligible	—	—
Chittor	18,000	32000	1775	20-60	4.0	0.3	2.7	1.5	Negligible	—
Ananthapur	20,000	30000	1487	30-70	2.5	2.0	3.0	3.5	Not estimated*	
Kurnool	50,000	67000	1340	60-100	2.2	1.0	9.0	5.4	3600	10.8
Mahboob-nagar	35,000	42000	1200	60-90	2.5	1 0	9.0	5.4	2300	6.9
Nalgonda	25,000	3200	1100	60-80	2.0	10.0	15.0	16.5	5280	16.0
Total									14830	44.4

* Data for only 3 locations

Early infected plants were expected to produce 90% less yield and late infected plants 50% less yield.

Figures on area production were taken from State Agriculture Department and Directorate of Oilseeds Research, ICAR, Rajendranagar, Hyderabad. Yield/ha is based on average of 5 Rabi season yield.

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