



## Survey on Groundnut (*Arachis hypogaea* L.) Collar Rot Disease Incidence in North Coastal Zone of Andhra Pradesh

T Rajasekharam, C Subba Reddy, K V M Krishna Murthy and V Rama Subba Rao  
Department of Plant Pathology, Agricultural College, Bapatla - 522 101, (A.P), India.

### ABSTRACT

A Field survey was conducted on incidence of groundnut collar rot during *rabi* 2003-04 in the North Coastal Zone of Andhra Pradesh. The disease incidence ranged from 0.3 to 10.52 per cent. Highest mean incidence of 6.04 per cent was recorded in the uplands of East Godavari District followed by Vizianagaram (4.53%). Least incidence of 2.3 per cent was recorded in Srikakulam District. The disease incidence is predominant in light textured soils cultivated with Spanish bunch cultivars.

**Key words :** Collar rot, Cultivars, Light textured soils, Spanish bunch.

Groundnut is a predominant oil seed crop grown in almost all parts of the world. In Andhra Pradesh is grown over 16.98 lakh ha with annual production of 12.50 lakh tonnes. In North Coastal Zone groundnut is a principal oilseed crop with acreage of more than one lakh ha. However the productivity in this zone is considered low which is around 8-9 q ha<sup>-1</sup>. Low plant population is considered as one of the major factors leading to the lower yields. It could be due to low seed rate (Sankar Reddi and Adivi Reddy, 1979) and / or due to pre and post emergence seed and seedling diseases (Chohan, 1969; Mc Donald, 1978).

Collar rot of groundnut caused by *Aspergillus niger* van Tieghem is one of the major soilborne diseases limiting the groundnut yield considerably, which accounts for seedling losses up to 50 per cent (Chohan, 1969; Mc Donald, 1978). Collar rot is characterized in the field by the wilting and death of groundnut seedlings accompanied by rotting of the hypocotyls. This hypocotyl rot is characterized by a yellow brown lesion extending into tissue with profusely sporulating growth of *A. niger* (Gibson, 1953). This disease is supported by the warm and humid environment prevailing in the coastal zone.

### MATERIAL AND METHODS

To assess the extent and variation in the incidence of groundnut collar rot disease in North Coastal Zone of Andhra Pradesh extensive field survey was under taken during *rabi*, 2003-04. Fields for the study were selected at random in major groundnut growing areas of respective districts. Observations on plant stand and disease incidence were made at five places (one sq m each) depending

on the extent of area, at random on diagonal lines of the field. Observations were made on the spot and information gathered from the cultivator was recorded in a proforma. Textural type of soil was identified based on feel method. Disease incidence (DI) was calculated using the following formula.

$$DI (\%) = \frac{\text{No. of infected Plants}}{\text{Total no. of Plants}} \times 100$$

The data recorded during survey was further, analysed based on agro-ecological factors *viz.*, soil type, cultivars and age of the crop on the distribution and occurrence of collar rot incidence.

### RESULTS AND DISCUSSION

A total number of 145 fields spread over in 29 villages of four districts were surveyed. The varieties sown were mostly JL 24, TMV 2, TAG 24 and Kadiri 3. Seed treatment with fungicides was not followed and the plant population sub-optimal (33/sq m). The low population (20/sq m) recorded in some of the fields could be due to low seed rate as observed by Sankar Reddi and Adivi Reddy (1979) and / or due to pre and post emergence seed and seedling losses due to fungal infections (Chohan 1969; Mc Donald, 1978).

The results (Table 1) indicated that mean incidence of collar rot in *rabi* 2003-04 ranged between 0.3 per cent in Mahadevipuram village, Vajrapukotturu mandal of Srikakulam district to 10.52 per cent in Vadisaluru village, Rangampeta mandal of East Godavari district with an average of

Table 1: Collar rot incidence of groundnut caused by *Aspergillus niger* in North Coastal Zone of Andhra Pradesh during *rabi* 2003-04

Name of the District	Name of the Mandal / Village	Soil Type	Variety	Age of crop	Mean population (per sq m)	Per cent collar rot incidence	Average	
							Mandal	District
SRIKAKULAM	<b>Vajrapukotturu</b>							
	Mahadevipuram	Clay loam	TMV 2	30	33.3	0.30	0.87	2.32
	Peddabanapuram	Sandy clay loam	TMV 2	17	34.2	1.50		
	Bhendi	Clay loam	TMV 2	25	32.7	0.80		
	<b>Laeru</b>							
	Laveru	Sandy clay loam	JL 24	18	30.2	2.62	2.43	
	Bejjapuram	Sandy clay loam	JL 24	23	31.8	2.84		
	Tallavalasa	Clay loam	JL 24	22	28.9	1.83		
	<b>Ranastalam</b>							
Ranastalam	Sandy clay loam	JL 24	27	30.5	3.52	3.68		
Bavarajupalem	Sandy clay loam	JL 24	19	25.2	4.12			
Kosta	Sandy clay loam	JL 24	25	28.9	3.41			
VIZIAAGARAM	<b>Bhogapuram</b>							
	Ravada	Sandy loam	JL 24	33	26.7	4.21	3.90	4.64
	Chakivalasa	Sandy loam	JL 24	32	24.8	5.32		
	Polipalli	Sandy loam	TAG 24	28	23.4	3.84		
	A.Rayavalasa	Sandy clay loam	TAG 24	36	23.5	2.24	5.38	
	<b>Denkada</b>							
	Denkada	Sandy clay loam	JL 24	24	25.6	2.53		
Akkivalasa	Sandy loam	JL 24	22	20.4	7.26			
Golagam	Sandy loam	TAG 24	18	22.8	6.38			
VISAKHAPATNAM	<b>Bheemunipatnam</b>							
	Yathakumripalem	Sandy loam	JL 24	28	28.2	5.30	3.69	3.13
	Sangivalasa	Sandy loam	JL 24	25	24.4	3.52		
	Tallavalasa	Sandy loam	TAG 24	18	26.2	4.24		
	<b>Anandapuram</b>						2.58	
	Anandapuram	Sandy loam	TMV 2	36	27.50	2.62		
Peddivalasa	Sandy loam	K 3	28	30.24	2.00			
Dakamari	Sandy loam	JL 24	22	29.80	3.12			
EAST GODAVARI	<b>Peddapuram</b>							
	Nagaram	Loam	TMV 2	23	28.6	4.61	6.54	6.04
	Naikampalli	Sandy loam	TMV 2	17	24.5	9.31		
	Katravulapalli	Sandy loam	JL 24	19	26.5	8.82		
	Yellamilli	Loam	TMV 2	35	29.8	3.42	5.53	
	<b>Rangampeta</b>							
	Rangampeta	Loam	TMV 2	34	23.4	3.50		
Vadisaluru	Sandy loam	JL 24	17	20.8	10.50			
Subdrampeta	Sandy clay loam	K 3	30	30.3	2.60			

Table 2: Influence of soil type, cultivar and age of crop on groundnut collar rot incidence in North Coastal Zone of Andhra Pradesh.

Character	Number of villages	Mean disease incidence (%)
<b>Soil type</b>		
Sandy loam	15	5.49
Loam	3	3.84
Sandy clay loam	8	2.64
Clay loam	3	0.97
<b>Cultivar</b>		
JL-24	14	4.75
TAG-24	4	4.39
TMV-2	9	3.26
K-3	2	2.30
<b>Age of crop</b>		
15-20	8	5.93
20-25	4	3.74
25-30	9	3.49
30-35	5	3.18
35-40	3	2.75

4.07 per cent. Among the four districts surveyed, highest mean incidence of 6.04 per cent was recorded in uplands of East Godavari followed by Vizianagaram (4.64%). The lowest mean incidence of 2.32 per cent was recorded in Srikakulam district.

In the present study differences in the collar rot incidence were observed in respect of soil type, cultivars and age of the crop on the distribution and occurrence of groundnut collar rot. The results (Table 2) showed that sandy loam soils recorded maximum collar rot incidence (5.49%) followed by loams (3.84%) and sandy clay loams (2.64%) whereas, clay loam soils recorded lowest collar rot incidence (0.97%). Incidence of collar rot due to *A. niger* was reported to be generally high in light sandy soils and similar results were also reported by Gibson (1953) and Chohan (1969). Heavy soils were reported to be least favourable for seed rot and collar rot diseases of groundnut (Ashworth *et al.*, 1964). The aeration of the soil will be influenced by soil texture and the amount of free oxygen available obviously decides the activity of soil borne fungus. A critical stage of oxygen competition between plants and microorganisms arises during seed germination. Sandy soils with more number of macropores compared to clay soils, can hold adequate air though they are poor in water holding capacity (Baver *et al.*, 1962). This could be the probable reason for high percentage of collar rot incidence in sandy loams when compared to clay loams. Reduction in

population of groundnut due to collar rot incidence in sandy loam soils of Nellore and Chittoor districts of Andhra Pradesh was also earlier reported (Anonymus, 1982).

With respect to cultivar, maximum collar rot incidence was recorded in Spanish bunch cultivars like JL 24 (4.75%) followed by TAG 24 (4.39%) and TMV 2 (3.26%) whereas, Virginia bunch type cultivar (K 3) showed less incidence (2.3%). Mixon (1980) observed less seed colonization by *A. niger* in varieties resistance to collar rot disease than susceptible varieties. Differences in the incidence of aflatoxigenic fungi in different varieties of groundnut were reported earlier (Verma *et al.*, 1996). Differences among the varieties in respect of the collar rot incidence caused by *A. niger* observed in present study may be attributed to differences in the varietal characters and in structural and biochemical features of different plant parts.

The reaction of the host plant to infection by a pathogen varies with plant age. Data presented in Table 2 revealed that highest mean disease incidence (5.93%) was recorded during the early period of crop growth (15-20 days), whereas, during the 35-40 days period of crop growth less disease incidence (2.75%) was recorded. It is obvious that the young plants were more prone to disease than aged plants. The findings of the present study were corroborated by Dange and Saradava (1987) who reported that groundnut seedlings at 2<sup>nd</sup> week were

more prone to the attack by *A.niger* than old seedlings. Gibson (1953) found that the peak death rate occurred about 17<sup>th</sup> day after planting and that period of dying of emerged plants extended from about 10-30 days due to collar rot incidence.

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