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A Comparative Study on the Pests and Diseases in Different Strains of Groundnut

by

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Introduction: Pests and diseases take a heavy toll on the yield of groundnut in India. Besides the overall reduction in yield, the quality of the produce is also affected to a considerable extent. Of the different measures taken to control these pests and diseases, cultivation of resistant varieties has been realised to be the most effective, ideal and economic method of reducing crop losses (Stakman and Harrar, 1957). Evolution of pest and disease resistant varieties is one extreme in plant breeding, the other and most important, being the increase in production and plant breeders throughout the world are striving to reach these ends. But so far no strain completely resistant to any of the major pests and diseases has been evolved.

In the present investigations the following groundnut strains viz. TMV.1, TMV.2, TMV.3, TMV.4, TMV.6, TMV.7, and TMV.8 released from the Regional Agricultural Research Station, Tindivanam, Tamil Nadu; Asiriya mwitunde, an imported variety from Tanganika, Ah.8059, another very promising strain to be released from this Station as well as the local variety were studied intensively under field conditions for their varietal performance against some of the major pests and diseases. The data on the extent of incidence and the damage caused by each of the pests and diseases on the different strains, collected over two years 1968 and 1969 are presented in this paper.

Materials and Methods: The varieties mentioned above were studied for their relative susceptibility to the three major pests viz. Leaf folder (Surul)–*Stomopteryx subsecivella* Zell., Red hairy caterpillar–*Amsacta albistriga* M. and Earwig–*Euborellia stali* D., as well as the two important diseases viz. 'tikka' leaf spot–*Cercospora personata* (B & C) Ell. & Eve. and Root rot–*Rhizoctonia bataticola* (Taub) Butl.

The trials on leaf folder, 'tikka' and root-rot were laid out in simple randomised block design, replicated three times during the rainfed season i. e. July-December of 1968 and 1969, while the trial on ear wig was conducted for

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one season only in 1969. The trial on red hairy caterpillar was laid out in a student's paired plot design for one season in 1969.

Surul infestation was expressed as percentage of leaflets damaged and the incidence of tikka as 'leaf disease index'. In the case of root-rot the percentage of wilted plants in each plot was recorded. Regarding earwig infestation, the percentage of pods infested was assessed at the time of harvest. For assessing the extent of damage due to red hairy caterpillar, the percentage of leaflets consumed after two days (based on the area of leaflets consumed) by equal number of caterpillars on 10 plants per plot was taken. All the data collected were statistically scrutinised and interpretted.

Results: 1. *Leaf folder (Surul) – Stomopteryx subsecivella* Zell. The data on surul infestation attained the level of significance in both the trails. The bunch varieties TMV.2 and TMV.7 were significantly more susceptible than all the semi-spreading and spreading varieties. The infestation was found to be lowest in TMV.3 and TMV.4. The relevent data are presented in table 1.

TABLE 1. *Table of means – surul infestation (transformed values)*

Treatments (Varieties)	Years		Mean surul infestation (transformed values)	S.E.	C.D.	Mean surul infestation (percentage)
	1968	1969				
TMV.2 (Bunch)	21.90	19.17	20.54			12.3
TMV.7 (Bunch)	22.43	18.50	20.47			12.3
TMV.6 (Semi-spreading)	19.40	13.07	16.24			7.8
TMV.8 (Semi-spreading)	19.43	14.10	16.77			8.4
Ah.8059 (Semi-spreading)	20.77	13.63	17.20	0.73	2.11	8.7
Asiriya mwitunde (Semi-spreading)	19.17	13.50	16.34			7.9
TMV.1 (Spreading)	19.67	12.83	16.25			7.9
TMV.3 (Spreading)	18.33	12.17	15.25			7.0
TMV.4 (Spreading)	18.97	11.70	15.34			7.0
Local (Spreading)	20.17	13.60	16 89			8.4
Mean	20.02	14.23				
S.E. = 0.33 C.D. = 0.97						

Comparing the mean values of surul infestation with the C.D. obtained in table 1, it was found that the varieties TMV.7 and TMV.2 were significantly more susceptible than the rest.

The 'Treatment × Years' interaction did not prove to be significant, meaning thereby that there was no significant variation in the incidence of the pest over the two years.

2. *Earwig – Euborellia stali* D. The data on earwig infestation was found to be significant. The summary of results pertaining to this trial conducted during the year 1969 is furnished in table 2.

TABLE 2. *Summary of results – Mean infestation of pods (Transformed values)*

Varieties	Mean pod infestation (Transformed values)	Mean pod infestation (Percentage)
TMV.2	6.87	1.4
TMV.7	6.63	1.3
TMV.6	13.53	5.5
TMV.8	14.80	6.5
Ah.8059	18.93	10.5
Asiriya mwitunde	25.40	18.4
TMV.1	14.10	5.9
TMV.3	13.67	5.6
TMV.4	18.23	9.8
Local	18.43	10.0
S.E. = 2.07	C.D. = 6.15	

From the above table, it could be seen that Asiriya mwitunde was significantly more susceptible to earwig infestation than all the other varieties. The bunch varieties viz. TMV.7 and TMV.2 had recorded the least infestation

3. *Red hairy caterpillar – Amsacta albistriga* M. The data on red hairy caterpillar infestation was not statistically significant, indicating that there was no significant difference in the damage caused by the pest. All the varieties were found to be equally susceptible to the pest and there was no varietal preference.

4. *Root-rot – Rhizoctonia bataticola* (Taub.) Butl. The data on root-rot incidence, on statistical scrutiny were found to be significant and are presented in table 3.

TABLE 3. *Table of means – Root-rot incidence (Transformed values)*

Treatments (varieties)	Years		Mean root rot incidence (Transformed values)	S.E.	C.D.	Mean percentage of root rot
	1968	1969				
TMV.2	12.0	14.3	13.15			5.2
TMV.7	14.7	11.2	12.95			5.0
TMV.6	17.9	14.9	16.40			8.0
TMV.8	6.5	9.1	7.80			1.8
Ah.8059	13.0	14.7	13.85			5.8
Asiriya mwitunde	8.1	8.9	8.50	1.56	4.52	2.2
TMV.1	4.1	9.9	7.00			1.5
TMV.3	12.1	13.4	12.75			4.9
TMV.4	15.1	19.1	17.10			8.6
Local	17.1	14.2	15.65			7.3
Mean	12.06	12.97				
S.E. = 0.70	C.D. = 2.07					
C.D. for interaction = 2.39						

It was seen from the combined analysis that with respect to the intensity of infection, there was no significant variation among the years. The treatment differences proved to be significant on testing against 'Y × T'. The varieties TMV.1, TMV.8 and Asiriya mwitunde were least susceptible to root-rot.

5. *Tikka leaf spot - Cercospora personata* (B&C) Ell. & Eve. The data on the incidence of tikka were also significant and the same are presented in Table 4.

TABLE 4. *Table of means – Incidence of tikka (Disease index)*

Treatments (Varieties)	Years		Mean tikka leaf disease index	S.E.	C.D.
	1968	1969			
TMV.2	35.67	83.00	59.34		
TMV.7	33.67	76.33	55.00		
TMV.6	35.00	56.33	45.62		
TMV.8	29.33	50.33	39.83		
Ah.8059	26.33	48.33	37.33	2.85	8.27
Asiriya mwitunde	35.00	55.33	45.17		
TMV.1	30.33	54.00	42.17		
TMV.3	29.00	53.00	41.00		
TMV.4	26.67	55.67	41.17		
Local	33.33	62.00	47.67		
Mean	31.43	59.43			
S.E. = 2.13	C.D. = 6.32				
C.D. for interaction = 3.94					

The interaction 'Y×T' did not prove to be significant, showing that the disease intensity on the different varieties was not influenced by the seasonal variations. The sum of squares for 'Y×T' and the three factor interaction 'Y×R×T' were therefore, pooled and on testing the treatment M.S. against this pooled error, it was found to be significant. Thus, the varieties were significantly different in their susceptibility to the disease irrespective of the seasonal variations. Among all the varieties Ah.8059 was the least susceptible to tikka, followed by TMV.8, TMV.3, TMV.4, TMV.1 and Asiriya mwitunde. The bunch varieties TMV.2 and TMV.7 were highly susceptible to tikka.

Discussion and Conclusion: A perusal of literature showed that not much work had been done on the varietal performance of different strains of groundnut against pests and diseases. Unlike in some of the major commercial and food crops, varieties of groundnut resistant to any of the major pests and diseases had not been evolved so far. In the present investigations also all the

varieties released from this Station for their specific agronomic qualities or economic values, as well as the imported variety tried were found to be susceptible to all the major pests and diseases to varying degrees. Asiriya mwitunde which was claimed to be tolerant to tikka (Kulkarni, 1965) was also found to be susceptible to the disease recording 32.5 % of leaf infection.

A close study of the results indicated that the bunch varieties were more susceptible to the leaf pest *viz.* sural and the leaf disease *viz.* tikka. This might probably be due to the comparatively more tender and succulent nature of the leaves in these varieties. But in the case of the leaf eating pest *viz.* red hairy caterpillar, there seemed to be no preference to any of the varieties tested.

As regards the pod pest vis. earwig, the bunch varieties were found to be the least susceptible. This might be due to the fact that the pods remain inside the soil for much shorter a period than in the case of semi-spreading and spreading varieties, thereby decreasing the chances of infestation to a considerable extent. Among the semi-spreading varieties, Asiriya mwitunde was more susceptible than the rest.

Minimum root-rot infection was obtained in the case of TMV.1 and TMV.8, followed by Asiriya mwitunde. The other varieties were more susceptible to this disease. There seemed to be no specificity of the disease to either the bunch or spreading varieties.

The importance of the present investigations are highlightened by the fact that, in the absense of any resistant varieties, it is imminent that proper plant protection measures should be taken to ward off the menace posed by these pests and diseases.

Summary: Field trials were conducted to evaluate the varietal performance of some of the popular varieties of groundnut against the major pests viz. leaf folder – *Stomopteryx subsecivella* Z., earwig – *Euborellia stali* D., and red hairy caterpillar – *Amsacta albistriga* M. and important diseases viz. tikka leaf spot – *Cercospora personata* (B & C) Ell. & Eve. and root-rot – *Rhizoctonia bataticola* (Taub.) Butl. for two years (1968 and 1969) at the Regional Agricultural Research Station, Tindivanam, Tamil Nadu. It was found that none of the varieties tested were resistant or tolerant to any of the pests or diseases mentioned above. The bunch varieties TMV.2 and TMV.7 were found to be highly susceptible to tikka leaf spot and leaf folder infestation, while Asiriya mwitunde was highly susceptible to earwig infestation. All the varieties were found to be susceptible to root-rot diesease to varying degrees. Red hairy caterpillar had no preference to any of the varieties in particular. It was suggested that in the absence of resistant varieties regular plant protection

measures should be adopted to combat these pests and diseases thereby enhancing the yield.

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Iron Chlorosis in Soybean and Maize in Central Farm, Agricultural College and Research Institute, Coimbatore

by

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Introduction: Micronutrients play a very important role in crop growth and animal nutrition. With the introduction of new crops and high yielding varieties along with intensive use of fertilizers for increasing production in multiple and relay cropping, the role of micronutrients assumes greater importance.

Among the micronutrients, iron is closely concerned with chlorophyll formation and activation of several enzyme systems. A continuing supply of iron is essential to the welfare of the green plant. Any factor that interferes with absorption or utilization of iron may cause the plant to become iron deficient and chlorosis to develop. Iron chlorosis refers to the yellowing of plants which can be alleviated by suitable iron compounds.

Review of Literature: Several reviews of iron metabolism, including iron chlorosis, have been published recently. Brown (1961) had reviewed in detail the causes for iron chlorosis in plants. Among them (a) low iron supply, (b) calcium carbonate in soil, (c) bicarbonate in soil or irrigation water, (d) over-irrigation or high water condition, (e) high phosphate, (f) high levels of heavy metals such as manganese, copper and zinc, (g) low or high

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