

EFFECT OF GMV ON GROUNDNUTS AT DIFFERENT GROWTH STAGES

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RINGKASAN

Kesan GMV diatas pokok kacang tanah yang berlainan peringkat hidup (growth-stage) telah diselidik pada peringkat 10, 30, 50 dan 70 hari. Pokok-pokok diperingkat 10 hari yang disuntik dengan GMV telah didapati memberi hasil yang nyata berkurangan daripada pokok-pokok yang disuntik pada peringkat 50 dan 70 hari. Hasil biji kacang yang kering daripada pokok-pokok yang disuntik pada peringkat 10 hari telah berkurangan sebanyak 23% dibanding dengan hasil dari pokok yang tidak disuntik. (Check) Saiz biji-biji kacang juga turut terlibat.

INTRODUCTION

Yield loss of a crop due to a disease is often dependent on the age of the plants when disease infection occurs. KUHN (1969) reported that early infection of groundnut with stunt virus reduced yield, while KLESSER (1968) found that no seeds were produced if young groundnut plants were infected by groundnut rosette virus. Since GEH & TING (1973) reported groundnut mosaic virus (GMV) disease as being the cause of a severe crop loss in West Malaysia, the effect of GMV on groundnuts inoculated at various growth stages was studied and is presented here.

MATERIALS AND METHODS

The experiment, carried out at the Federal Experiment Station, Serdang, Selangor in June 1970, was arranged as an incomplete Latin Square. Two seeds per point were sown on raised beds; planting distance being 0.76 m (2.5 ft) between centres of the beds and 15.24 cm (6 in) within each bed. Plot size was 53.34 m (17.5 ft) by 60.96 m (20 ft).

Sap-inoculation of GMV was done on the first two fully-opened leaflets of the main stem of the groundnut plant (Variety V 13). This treatment was carried out on plants at 4 growth stages, namely, at 10, 30, 50 and 70 days after sowing. A check plot in each replicate was kept where plants were not subjected to any treatment.

For the assessment of vegetative growth, random samples of two plants per plot were taken and measurements were recorded of the length of the first fully-opened leaf* *including the petiole (*Figure 1*). These assessments were made at 6 stages of growth, at 24, 42, 50, 66, 80 and 94 days after sowing. As the treatments involved inoculation at different stages of growth, the assessment of leaf length was made with a variable number of plots and treatments depending on the date of assessment. *Table 1* summarises the number of plots assessed for each growth stage. For example, at the 24-day assessment, there were

*Part of the investigation conducted while authors were in the Department of Agriculture, Kuala Lumpur, Malaysia.

**A leaf is considered to have 4 leaflets.

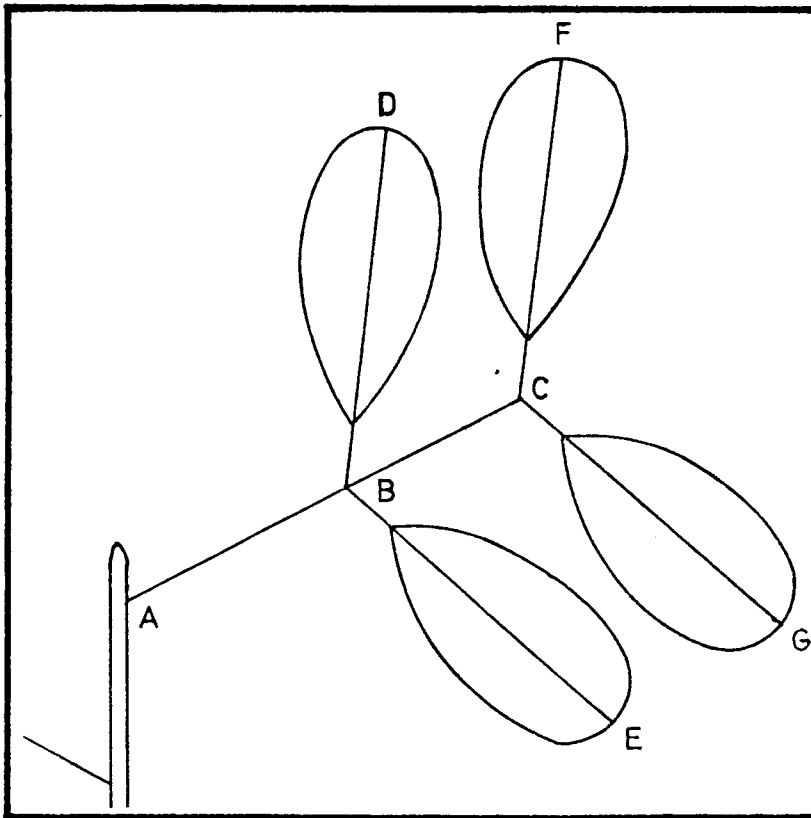


Figure 1. Length of petiole and first fully opened leaf is taken as the sum of $AC + BD + BE + CF + CG$

TABLE 1. NUMBER OF PLOTS IN ASSESSMENT OF LEAF LENGTH

ASSESSMENT OF LEAF LENGTH	DAYS AFTER SOWING				
	24	42	50	66	94
TREATMENT					
CONTROL	16	12	12	8	4
10 DAYS	4	4	4	4	4
30 DAYS		4	4	4	4
50 DAYS				4	4
70 DAYS					4
TOTAL NUMBER OF PLOTS	20	20	20	20	20

only two treatments, the check plots and plots inoculated at the 10-day stage, with 16 untreated plots as check and 4 plots corresponding to treatment at 10 days.

At harvest, yield records were kept of (a) fresh pods per plot (b) dried seeds per plot (c) weight of specific grades of seeds per plot, according to sizes: A (greater than 7.9×7.8 mm), B (between 7.9×7.8 mm and 5.4×5.4 mm), C (less than 5.4×5.4 mm).

RESULTS AND DISCUSSION

Effect on yield

Results as presented in *Table 2*, showed that groundnut plants inoculated at 10 days gave significantly lower yields of unshelled pods and dried seeds than the check and those

TABLE 2. MEAN WEIGHT OF GROUNDNUTS (YIELD/PLOT)

Treatment: Inoculation at days after Sowing	Unshelled pods (fresh weight) Kg/ha	Seeds (dry weight) Kg/ha	Grade A Seeds Kg/ha	Grade B Seeds Kg/ha
Control	3630	1180	421	739
10	2444	904	284	620
30	3079	1150	389	758
50	3772	1261	483	755
70	3612	1200	431	745
	S.E. of mean = \pm 390.4	S.E. of mean = \pm 116.4	S.E. of mean = \pm 59.23	S.E. of mean = \pm 72.50
	L.S.D. 5% = 900	L.S.D. 5% = 268.44	L.S.D. 5% = 136.58	Treatment means
	L.S.D. 1% = 1369	L.S.D. 1% = 390.55	L.S.D. 1% = 198.71	not significant.

inoculated at 50 and 70 days. Production of dried seeds by plants inoculated at the 10-day stage was reduced by 23% when compared to check plants. Quality of seed, as determined by seed size, was also affected as can be seen from the reduced yield of Grade A seeds.

Effect on vegetative growth

Figure 2 illustrates the influence of treatments on the mean length of the petiole and the first leaf at the various stages of assessment. Although the differences in leaf length were not significant at the 5% level, leaf length in the 10-day inoculated treatment was consistently less than in the check and in experimental plants assessed at 24, 42, and 50 days after sowing. Similarly, the leaf length in the 30-day inoculated treatment was less than in the check plots at 42 and 50 days. Differences in length were not significantly different at 66 days.

These results showed that GMV infection of groundnuts at a very early growth stage would reduce yield and also affect seed quality. Infection occurring later than 30 days after sowing did not reduce yield or quality significantly.

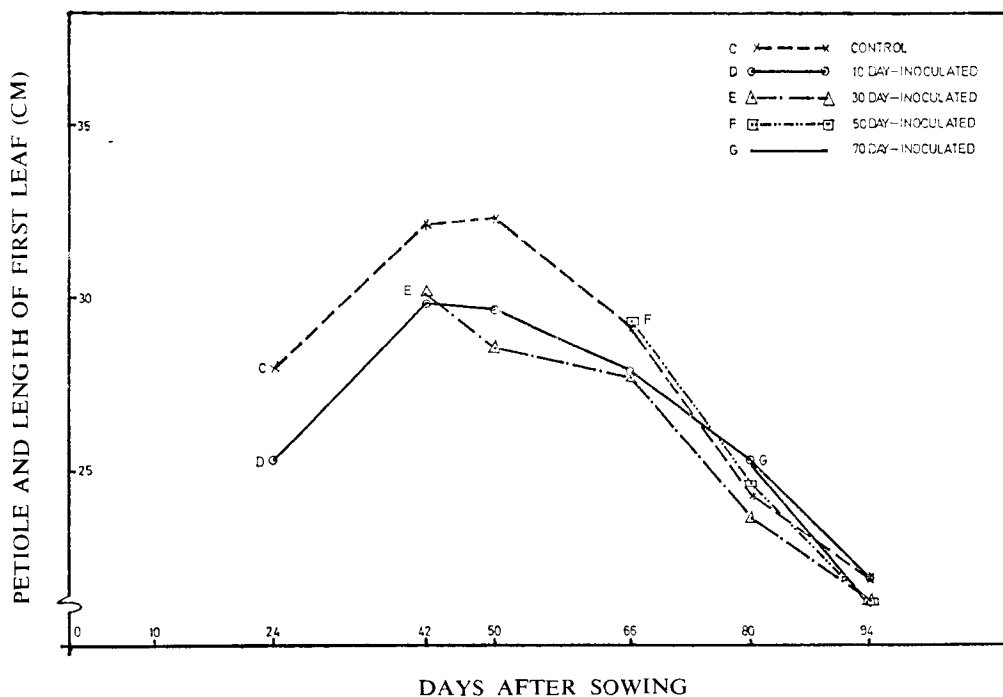


Figure 2.

We can infer from this study that preventive control measures, if needed, should be best attempted in the early growth period of the plants (not later than 30 days). Such yield loss studies could help in appraising the economic significance of diseases as well as contribute to effective control programmes such as the time of chemical spraying.

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SUMMARY

Effect of GMV at different growth stages of groundnuts was investigated at the 10, 30, 50 and 70 day-growth stage. Plants inoculated with GMV at 10 days were found to give significantly lower yields than those inoculated at 50 and 70 days. Yield of dried seeds by plants inoculated at 10 days was reduced by 23% when compared to the check. Size of seeds was also affected.

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