THE EFFECT OF DEFOLIATION ON THE YIELD OF COCOYAMS

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SUMMARY

Removal of any leaf of *Xanthosoma cocoyams* before the plant attained the age of 23 weeks significantly lowered cormel production. After 23 weeks, up to 4 leaves could be removed without any significant reduction in yield. Two clones showed differences in response.

RESUME

Le retrait de feuille du tarot *Xanthosoma* avant que la plante n'ait 23 semaines, entraîne une baisse appréciable de production de la tige bulbeuse. Après 23 semaines on peut enlever jusqu'à 4 feuilles sans que le rendement ne soit réduit de facon sensible. Deux clónes ont montré des différences de réponse.

RESUMEN

La remoción de cualquier hoja de *Xanthosoma* yautía antes de que la planta alcance la edad de 23 semanas redujo significativamente la produccion de cormillos. Despues de 23 semanas, se pudieron remover hasta 4 hojas sin alguna reducción significativa del rendimiento. Dos clones mostraron diferencias en su respuesta.

INTRODUCTION

In Ghana, cocoyam (*Xanthosoma* spp and *Colocasia* spp.) known as tannia and dasheen respectively, are vegetable as well as root crops. The leaves are nutritious food[4]. When the leaves are picked periodically for food, corm yield may be slightly reduced and there may be a critical intensity of leaf picking beyond which corm yields will be drastically affected. No previous critical study has been made to establish the nature of the relationship between leaf picking and corm yield.

MATERIALS AND METHODS

Two cultivars of cocoyam were used in this study, Mankani fufuo (i.e. white cocoyam) and Mankani pa (good cocoyam) also known as Mankani koko (red cocoyam). These were assigned separately to the subplots. Mankani pa has been grown in this country for a long time but Mankani fufuo has only recently been brought into cultivation.[3]

Corm setts weighed 140—150 gms each and were obtained from healthy growing mother corms. Two adjacent areas termed A and B measured 120 m x 120 m. In each area there were 4 plots (replicates) of 60 x 60 m each with each plot further divided into two sub-plots (cultivars) of 30 x 60 m each. Within each sub-plot, there was a further sub-division into 9 equal parts (degrees of defoliation, including a zero defoliation control) each of 6.6 x 30 m.

Planting was on the square, with 1 m spacing between adjacent plants. Each sub-plot carried approximately 180 plants. Leaves numbering 1—8 were removed from plants in each sub-plot at regular intervals of 2 weeks. In the plot A leaf removal was started on 3rd June, 1970, when plants were 10 weeks old. The last picking was done on 9th September. In plot B leaf removal started when the plant was 23 weeks old, and the last picking was done on 30th December 1970.

The plants were harvested on 20th April, 1971 (55 weeks after planting) when the tubers were taken. At each harvest records were taken of the fresh weight of cormels for each treatment.

RESULTS

There were significant yield differences due to cultivars, to the degree of defoliation and also to the interactions between cultivars and degree of defoliation.

Yields are summarized in Table 1 and Table 2 and Fig. 1.

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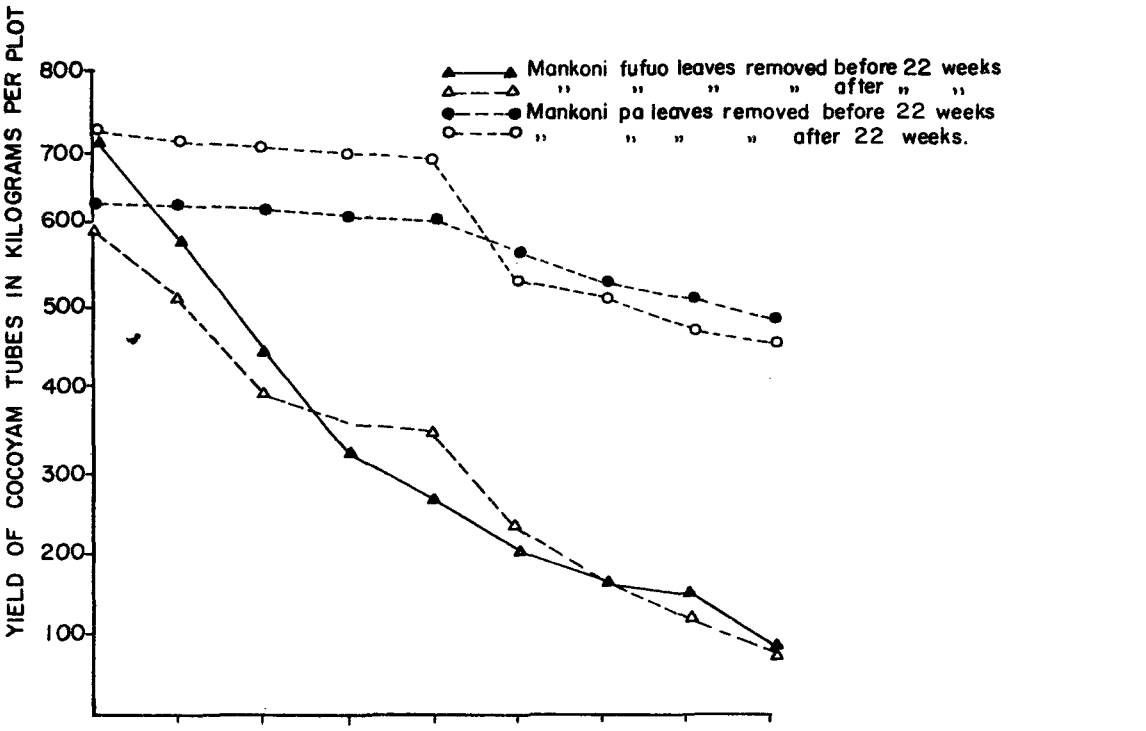

Fig.1. NUMBER OF LEAVES REMOVED AS AGAINST YIELD OF COCOYAM PER PLOT

In the area where the leaf removal treatments occurred on plants less than 23 weeks old, yield difference for defoliation treatments and for the interaction of cultivar and defoliation were significant at 1 percent.

In area B, where leaf removal only started after the plants were 23 weeks old, significant reduction in tuber yield only occurred when more than 4 leaves were removed.

DISCUSSION

Enyi[2] found that cormels are not produced until 19 weeks after planting. It seems that any defoliating before the plants attain the age of 23 weeks retarded cormel formation, and hence impairs sink capacity. After 23 weeks, cormel initiation would have been almost completed and so leaf removal would not alter 'sink capacity' but may cause only a reduction in yield only when it is sufficiently severe to reduce the production of assimilates to a level too low to fill the available initiated cormels.

REFERENCES

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TABLE 1

The effect of defoliation before 22 weeks on the yield of two cultivars of cocoyam

Kilograms of cormels per plot

Cultivar	Number of leaves removed per plant									Cultivar mean
	0	1	2	3	4	5	6	7	8	
Mankani fufuo	602	516	508	362	350	236	161	148	80	317
Mankani pa	708	588	450	329	270	200	166	120	78	323
Degree of defoliation mean	655	552	424	346	310	247	164	134	79	

L.S.D. 5% for interaction 9.86; average effect of cultivar 3.27; average effect of defoliation 5.66.
L.S.D. 1% for interaction 13.15; average effect of cultivar 4.37; average effect of defoliation 8.76.

TABLE 2

The effect of defoliation after 22 weeks on yield of two cultivars of cocoyam

Kilograms of cormels per plot

Cultivar	Number of leaves removed per plant									Cultivar mean
	0	1	2	3	4	5	6	7	8	
Mankani fufuo	630	628	624	617	611	565	530	512	488	578
Mankani pa	716	609	702	694	681	530	514	476	455	609
Degree of defoliation mean	673	669	663	656	649	548	523	494	472	

L.S.D. 5% for interaction 8.67; average effect of cultivar 2.89; average effect of defoliation 7.13.
L.S.D. 1% for interaction 11.56; average effect of cultivar 3.85; average effect of defoliation 8.18.