NOTE: EFFECT OF SETT SIZE ON THE GROWTH, DEVELOPMENT AND YIELD OF TARO

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ABSTRACT

Size of planting material greatly affected the growth and development of taro. Most of the vegetative characters and main corm yield increased in values as sett size increased. A very strong positive correlation was observed between sett size, and fresh and dry weights of main corms. Regardless of the sett size, growth curves of the different plant components showed similar patterns following the same time course. Progressive reduction in leaf area ensued 5 months after planting thus, corm yield of small setts can not be the same as yield of large setts even if growing period is prolonged.

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KEY WORDS: Taro. Sett size. Corm yield. Growth curves.

Like other root crops, taro [*Colocasia esculenta* (L.) Schott] is vegetatively propagated. Normally, the planting material or sett is composed of the lower 20-25 cm of the petioles plus the upper one or 2 cm of the corm or cormel. Main plants are ideal planting materials because of their bigger size and their ability to grow vigorously within a shorter period of time after planting. However, since it is not practical to use main plants for planting until the corm is ready for harvest, i.e. 7-10 months after planting (MAP); farmers usually plant suckers of various sizes especially when planting materials are scarce. When planting materials of different sizes are used in field experiments without proper grouping or blocking as to their size, high coefficients of variation are usually obtained (Pardales, unpublished). Suckers become as good planting materials as the main plants only when they are as big as the latter.

Various reports (Bourke and Perry, 1976; Ken, 1971; Robinson et al., 1971) indicated that size of planting material influenced taro growth and yield. Large setts generally produced higher main corm yield than smaller setts. However except for differences in agronomic attributes, these reports did not show developmental behavior of the plants to be affected by sett size so as to illustrate variation in corm yield more clearly. Hence, this study was undertaken to determine the dry matter (DM) accumulation patterns of taro plants arising from planting materials of different sizes and any variation in the general developmental behavior existing among them.

Two identical field experiments conducted one at a time were set up using different sett sizes as treatments, i.e. large (100-120 g), medium (50-60 g), small (10-20 g). The setts were obtained either from main plants or suckers depending on their size and weight. Each treatment was replicated three times following a randomized complete block design. PR-G 068 variety of taro was used. Planting was done in furrows at a distance of 75 x 50 cm. Fertilizer at the rate of 30-30-30 kg N, P_2O_5, K_2O/ha was applied in split dose at planting and at 2 MAP.

From 1 to 8 MAP, three sample plants were harvested from each replication and separated into leaves, petioles and main corm. These were dried in a forced-draft oven at 80 ± 5°C until constant weight was attained. Agronomic data like plant height, petiole girth, leaf area per plant, number of leaves and rhizomes per plant, and fresh weight of rhizomes, vegetative parts of main plant and main corm per plant were also recorded at monthly intervals.

The results obtained from the two experiments were substantially similar hence, only the data on agronomic characters from the first planting are presented in detail. Better growth was manifested by plants from larger setts than those from smaller ones. In fact, the sett size was directly related to leaf area, i.e. the larger the sett size, the bigger was the leaf area. The same was true for most of the other vegetative characters and the main corm yield at final harvest (Table 1). Generally, this study confirms the findings of Abenoja and Villamayor (1986) that main plants produced greater leaf area and higher corm yield than suckers with cut or uncut cormels. Apparently, the better growth and yield associated with the use of larger setts could be attributed to the more vigorous initial growth of the roots and the above-ground parts of the individual plant due to greater food reserve in the larger setts. Moreover, the dry matter distribution and accumulation of taro plants shown in Figure 1 indicates that once initial growth advantage is attained, it is maintained all throughout the growing period of the plant. The same was reported in yams by

Table 1. Influence of sett size on the agronomic development of upland taro.

Agronomic Character	Sett Size			F Test[1]	LSD (5%)[1]
	Small	Medium	Large		
Plant height (cm)	89.72	90.00	96.55	ns	ns
Petiole girth (cm)	11.40	12.55	13.50	*	1.28
Leaf area/plant	552.23	673.55	732.67	*	115.51
Number of leaves/plant	2.27	2.57	2.65	*	0.28
Number of rhizomes/plant	10.12	9.62	7.38	*	1.54
Fresh weight of rhizomes (g)/plant	750.00	786.67	813.33	ns	ns
Fresh weight of vegetative parts of main plant (g)/plant	128.33	104.00	168.33	ns	ns
Fresh weight of main corm (g)/plant	310.00	460.00	610.00	**	0.18

[1] **ns, *, ** — not significant, significant at 5% level and significant at 1% level, respectively.**

Nwoke et al. (1984) wherein good initial growth eventually led to higher tuber yield. In the present study, sett size and fresh and dry main corm yields were positively and highly correlated [r = 0.905 and r = 0.910 (n = 9), respectively] suggesting that sett size is a strong determinant of yield in taro.

Although the actual dry matter values in the different plant components differed between the first and the second planting, the growth curve pattern remained very similar. The growth curves of all components of taro also exhibited identical patterns at about the same time regardless of the sett size used (Fig. 1). Moreover, the leaves and petioles reached their peak growth at 5 MAP and gradually declined thereafter until final harvest. This concurs with the earlier observations of Pardales (1985) and Abenoja and Villamayor (1986). However, observations from the present study strongly suggest that yield from small setts can not be the same as the yield from large setts even if the growing period is prolonged because of the progressive decline in leaf area after its peak growth. Since maximum leaf area is normally attained at 5 MAP, it follows that any factor which enhances early development of active leaf area in taro may help increase corm yield further. However, this assumption requires further investigation and hence, future studies along this area are necessary.

Figure 1. Pattern of dry matter distribution in the different plant components of taro as affected by sett size.

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