

EFFECT OF DIFFERENT PLANTING METHODS AND SEED SIZES ON THE GROWTH AND YIELD OF COLOCASIA (*Colocasia esculenta* (L.) Schott)

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In Colocasia, different methods of planting are adopted. Tubers are either directly planted in pits made on flat beds or in ridges or in furrows. It was found that the response of the crop under different methods of planting was not uniform under all conditions. Ezumah and Plucknett (1972) studied the effect of ridging on the plant development and corm yield of *Colocasia esculenta* and found that there was no loss in yield due to ridging. Mathur *et al.* (1966) reported that the highest yield of colocasia was obtained by using the biggest seed. Since in Colocasia, planting materials are the edible tubers, an attempt to find out the optimum seed size will be of immense help to the farmers. Hence the present investigation was undertaken to find out the effects of different methods of planting and sizes of seed material for upland cultivation.

Materials and Methods

An experiment was conducted in the uplands of the Agricultural College Farm, Vellayani, Kerala, during 1978-79. The soil of the experimental field was red loam with pH 5.4, total nitrogen 0.045 per cent, total P_2O_5 0.050 per cent and total K_2O 0.030 per cent. The trial was laid out in a split plot design replicated thrice with methods of planting in main plots and sizes of seed material in sub plots. The treatments consisted of three methods of planting (pit, ridge and furrow) and four sizes of planting material (small cormels of 15-25g size, medium cormels of 35-45g size, large cormels of 55-65 g size and corms of 60-70 g size). The most popular variety Thamarakkannan was used in the trial. The spacing given was 60 cm x 45 cm. Usual Package of practices were followed except for the treatments. The crop was planted on 25th December 1978 and harvested on 27th May 1979. The general performance of the crop was satisfactory.

Results and Discussion

Observations were recorded on germination percentages, plant height, number of leaves, LAI, number of corms, average weight of corm, corm yield and tuber yield. The results of analysis of the data are given in Table I.

There was significant difference in the germination percentage due to the methods of planting. Furrow method was found to be better when compared to pit and ridge methods. The very low rate of emergence of tubers recorded in the ridge method of planting as compared to the furrow method brings to light the

deleterious effects of planting colocasia tubers in ridges in uplands during the summer season. The planting materials in ridges would have received lesser moisture when compared to other treatments.

Effect of sizes of planting material on the germination percentage was significant on the 30th and 45th days after planting. Larger planting materials favoured earlier germination percentage. Enyi (1967) and Ahmad and Quasem (1968) also reported earlier germination with bigger planting materials in different tuber crops.

Significant differences in plant height were noticed due to methods of planting. The lowest height was recorded by plants grown in ridges. There existed more or less a dry weather during the growth period and there was much difficulty for retention of moisture in the ridges which resulted in a comparatively lesser water availability to the plants. This might have resulted in the delayed establishment and poor stand of the plants in ridges.

The plant height differed significantly due to the sizes of seed material and it was found that large sized seed material increased the plant height. The superiority of the large sized planting material over the smaller ones might be due to the greater reserve of food materials which boosted the initial growth of plants. The larger planting materials germinated faster and established earlier due to their initial meristematic activity and the early seedling vigour. Similar results were earlier reported in other tuber crops by Lee (1974) and Randhawa and Mishra (1974).

The highest LAI was recorded by plants in furrows. The emergence of seed materials in the furrow and pit methods of planting were better when compared to the ridge method of planting. Further, the conditions for absorption of water and nutrients in the furrow and pit methods were more favourable while the plants in ridges might have experienced more moisture stress and consequently decreased nutrient uptake. Again, the increased number of leaves, per plant in the furrows also might have contributed to the greater LAI.

Sizes of planting material had no significant influence on the number of leaves or on the LAI.

Though the different methods of planting had no significant influence on the number of corms, the average weight of corm differed significantly due to the treatments. Furrow method was significantly superior to the ridge method. The former was on par with the pit method of planting. The increased weight of corm in these methods of planting was due to the greater leaf area, and the favourable soil conditions in the furrows and pits which might have contributed to greater photosynthesis and consequent accumulation of carbohydrates.

Table 1

Germination percentage and other plant characters as influenced by the methods of planting and sizes of seed material

	Germination %			Plant height on 120th day (cm)	No. of leaves per plant on 120th day	LAI on 120th day	No. of Corms per plant	Average weight of corm (g)	Corm yield per plant (g)	Tuber yield (Q/ha)
	19th day	30th day	45th day							
Pit	17.77	41.21	57.74	81.00	10.44	2.49	1,23	48.24	59.49	113.2
ftidge	11.08	32.52	52.52	71.65	8.99	1.93	1.22	40.10	49.35	105.8
Furrow	23,35	52.69	72.17	89.05	10.56	2.76	1.27	49.30	63.48	124.0
C D (0-05)	4.80	3.14	2.34	9.16	NS	0.58	NS	6.83	11.17	NS
Small cormel	15.16	37.90	58.42	76.04	9.15	2.24	1.10	43.59	49.12	92.1
Medium „	16.97	40.46	57.87	81.43	10.31	2.46	1.28	46.98	60.48	128.0
Large „	17.77	42.92	61.44	81.56	9.56	2.22	1.33	43.96	58.26	119.7
Corm „	19,69	47.28	65.51	83.24	10.96	2.67	1.26	49.00	61.90	117.0
CD (0.05)	NS	2.57	3.06	3.19	NS	NS	NS	3.33	NS	16.43

Similarly, the different sizes of planting materials had no significant influence on the number of corms but there was significant influence on the average weight of corm. The large corms and medium sized cormels were found to be better. In these cases, the number of corms was less and this might have helped to store more food in the corms which in turn increased the average corm weight.

Ridge method of planting was found significantly inferior to the furrow method of planting with regard to the corm yield per plant. The number of corms per plant and the average corm weight were found to be the highest in furrows which in turn resulted in an appreciable increase in the total yield of corms per plant.

Sizes of planting material did not influence the corm yield significantly. However, medium sized cormels and corms recorded higher values.

The different methods of planting were statistically alike in the total tuber yield. However, the plants in furrows gave higher yield (124 q/ha) due to the increased tuberisation in this method of planting. The higher photosynthetic ability of the plants in the furrows due to increased leaf area and the resulting storage of assimilates in the tubers might have been the major causative factors for higher yield of tubers in these plants. The increased amount of photosynthates produced under such circumstances might have been translocated and stored in the corms and cormels resulting in an increased total yield of tubers. Onwueme (1978) reported that planting of colocasia in ridges need not necessarily give higher yield always and he recommended planting in holes dug in unploughed land or on the flat or on beds for upland culture.

The sizes of planting material had a significant effect on the tuber yield of Colocasia. Plants from the small sized cormels had a poor growth and hence the yield was significantly inferior to the other seed sizes. The medium sized planting material contributed to the highest tuber yield of 128 q/ha. Similar results were reported by Gustaffson (1963), Enge (1970) and Grewal *et al.* (1976).

Summary

A field experiment was conducted during 1978-79 at the Agricultural College Farm, Vellayani, Kerala, to study the effect of different methods of planting (pit, ridge and furrow) and sizes of planting materials (small cormels of 15-25 g size, medium cormels of 35-45 g size, large corms of 55-65 g size and corms of 60-70 g size) on the growth and yield of colocasia (*Colocasia esculenta* (L.) Schott). Among the different methods of planting, furrow method hastened germination and increased the plant height, leaf area, LAI, average weight of corm and total tuber yield. Among the different sizes of planting material, larger size groups hastened germination and increased the plant height. Average corm weight and total tuber yield were the maximum in the case of medium sized cormels.

സംഗ്രഹം

കരച്ചേമ്പ് കൃഷിയിൽ കൂടുതൽ വിളവ് ലഭിക്കുന്നതിനു പാറിയ നടീൽരീതി ഏതെന്നറിയുന്നതിനും വിവിധ വലിപ്പത്തിലുള്ള വിത്തുകൾ നടുന്നത് വിളവിനെ എങ്ങനെ ബാധിക്കുന്നു എന്ന് മനസ്സിലാക്കുന്നതിനും വേണ്ടി ചെള്ളായണി കാർഷിക കോളേജിൽ 1978-79ൽ ഒരു പരീക്ഷണം *rosiwr^dJicaj^sngJSD'i*. ഇതിൽനിന്നു ഏറ്റവും കൂടുതൽ വിളവിന് കരച്ചേമ്പ്, ചാലുകളിൽ നടുന്നതാണ് ഉത്തമമെന്നും നടുന്ന ചേമ്പ് 1ൻ വി OTTO 1ന് 35 മുതൽ 45 ഗ്രാം വാരതുകമുണ്ടായിരിക്കണമെന്നും വ്യക്തമാക്കപ്പെട്ടു.

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