Cultivation Practices with Sweet Potato

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SWEET POTATO (*Ipomoea batatas*) is the major crop of subsistence gardeners in the Highlands and is also important as a cash crop, particularly for rations for plantation and Administration workers. Work has been carried out at the Highlands Agricultural Experiment Station, Aiyura, to determine whether some cultivation techniques are superior to others, irrespective of the variety of sweet potato used and of soil variations and climate differences in the Highlands.

Three different soil types were used, typical of soils used in the Highlands for sweet potato cultivation. Seven different cultivation treatments were included. Within each row, cuttings were planted 15 inches apart.

Treatments

1. Flat land, with cuttings planted in rows 25 in. apart.

2. Small ridges, 6 in. high and 25 in. apart. Cuttings were planted along the ridges.

3. Intermediate-sized ridges, 9 in. high and 25 in. wide at the base. Distance between the centres of ridges was 42 in. Cuttings were planted in two rows 18 in. apart.

4. Large ridges 9 in. high and 30 in. wide, flat on top with angled sides. These were formed by combining alternate ridges of Treatment 2 above. The distance between the centres of the ridges was 50 in.

5. Small mounds 6 in. high and 27 in. in diameter. These were formed from the small ridges of Treatment 2 above. Two cuttings were planted per mound.

6. Intermediate-sized mounds, made from the ridges of Treatment 3 above. Height of each mound was 9 in. and diameter 30 in. Three cuttings were planted per mound.

7. Large mounds 10 in. high and 34 in. in diameter. Four cuttings were planted per mound.

Four trials were laid down, using the varieties Merikan, Serenta, Gonimi, Naveto and Yamandi. The following treatments were used:

Trial No.	Treatments
1	1, 2, 4, 5, 7
2	2, 4, 5, 7
3	All treatments
4	All treatments

Tubers were harvested after 7 to 9 months.

Results

The results are tabulated in order of decreasing yield of marketable tubers in each trial (*Table* 1). All tubers harvested were weighed and sorted according to size. Those 4 in. or more long and 2 in. or more wide were counted as being marketable. Smaller ones were considered to be stock-feed and were not included in the yield figures given.

Although there were some minor differences in the relative response of varieties between treatments, on the whole all varieties used responded similarly to the various treatments and for this reason, varieties are not shown in the table. In other words, the result depended on the treatment, not on the varieties used.

Throughout the trials, the flat land yields were always lowest, so there is no doubt that mounding or ridging is worth the trouble.

In all trials, mounds gave higher yields than ridges of comparable size and in three of the four trials, large mounds gave bigger yields than small mounds. The exception was in

Table 1.—Yields of Marketable Tuber (in lb per acre)

Trial 1			Trial 2		
Treatment No.	Treatment		Treatment No.	Treatment	
5	small mounds	21435	7	large mounds	13982
7	large mounds	15866	5	small mounds	13430
2	small ridges	15412	4	large ridges	13206
4	large ridges	13191	2	small ridges	9674
1	flat land	11087			

Trial 3			Trial 4		
Treatment No.	Treatment		Treatment No.	Treatment	
7	large mounds	11347	7	large mounds	7278
5	small mounds	8937	6	intermediate mounds	5251
4	large ridges	8312	5	small mounds	5339
6	intermediate mounds	8234	4	large ridges	5283
2	small ridges	8044	3	intermediate ridges	4010
3	intermediate ridges	6839	2	small ridges	3290
1	flat land	6498	1	flat land	1239

Trial 1 in which small mounds gave better results than large mounds or ridges. Among the mound treatments therefore, large mounds generally seemed to yield more, but where soil structure and drainage are ideal as in the first trial, small mounds may be superior, possibly because of the more even spacing which they give for an equivalent plant density. It must be admitted, however, that conditions of ideal soil structure and drainage are not common in the Highlands.

Economic Results

Since there is more work involved in building mounds than ridges, an analysis of costs was made. At present rural wage levels, it was found that the extra cost of mounding instead of ridging was $13 per acre. At a net return of 1 cent per lb for marketable tubers, an additional 1300 lb per acre would need to be obtained and sold to justify the extra expense of mounding. At a net return of 0.75 cents and 0.50 cents, an increase of 1733 lb and 2600 lb per acre respectively would be required.

Tables 2A and 2B give comparisons of financial returns for large mounds as against large ridges and small mounds as against small ridges. At a net return of 1 cent per lb, the two tables show that in six cases out of eight the extra expense of mounding was justified and in the remaining two cases the difference was only marginal. Where the net return falls to 0.75 cents per lb, there still seems to be an overall advantage in mounding, but at 0.5 cents per lb on the whole there is little or no justification.

The main advantage of ridges over mounds lies in their convenience in commercial production and for this reason some large-scale producers would prefer them.

Table 2A

	Trial 1	Trial 2	Trial 3	Trial 4
Large mounds yield (lb)	15866	13982	11347	7278
Large ridges yield (lb)	13191	13206	8312	5283
Gain in production due to mounding (lb)	2675	776	3035	1995
Gain in money due to mounding @ 1c	$26.75	$7.76	$30.35	$19.95
@ 0.75 cents	$20.07	$5.97	$22.77	$14.97
@ 0.5 cents	$13.38	$3.88	$15.18	$9.98
Less extra cost of mounding	$13.00	$13.00	$13.00	$13.00
Net gain @ 1c	$13.75	—$5.24	$17.35	$6.95
@ 0.75c	$7.07	—$7.03	$9.77	$1.97
@ 0.50c	$0.38	—$9.12	$2.18	—$3.02

Table 2B

	Trial 1	Trial 2	Trial 3	Trial 4
Small mounds yield (lb)	21435	13430	8937	5339
Small ridges yield (lb)	15421	9674	8044	3290
Gain in production due to mounding (lb)	6014	3756	893	2049
Gain in money due to mounding @ 1c	$60.14	$37.56	$8.93	$20.49
@ 0.75 cents	$45.10	$28.17	$6.72	$15.37
@ 0.50 cents	$30.07	$18.78	$4.47	$10.25
Less extra cost of mounding	$13.00	$13.00	$13.00	$13.00
Net gain @ 1c	$47.14	$24.56	—$4.07	$7.40
@ 0.75c	$32.10	$15.17	—$6.28	$2.37
@ 0.50c	$17.07	$3.78	—$8.53	—$2.75