

Broadling—A Promising New Technique in Paddy Cultivation

MUHANDIRAM EDWIN A. PEIRIS, Senior Agricultural Assistant, Department of Agriculture, Ceylon

Received 17.8.56.

DURING YALA 1953, the sample harvesting of transplanted and adjacent broadcast fields in the Kalutara District was conducted by the Statistician of the Department of Agriculture. He recorded a significant average increase in yield of 17 bushels per acre in the transplanted plots. But though "there was no significant depression of yield in any Range in the transplanted plots", there was no significant difference in yield between transplanted and broadcast plots in some Ranges. A few observation plots were therefore laid out in *maha* 1954-55 in the same district to determine the influence of depth of transplanting on the growth and yield of paddy. Transplanting was done at depths of 1, 2 and 3 inches and, in addition, seedlings were broadcast on the surface (broadling). It was found that the broadled plots gave unexpectedly good yields.

This method of paddy cultivation (broadling), is suitable for any type of soil other than infertile sandy soils. It is, moreover, definitely advantageous on marshy soils as the plants do not sink when broadled as when transplanted.

As in the case of transplanting, only varieties over four months of age should be selected for broadling. *Murunga-*

kayan and *Samba* varieties were noted to respond well to this technique. *Podiwi* A.8 and *Ptb.* 16 have also given good results.

Plants should be raised in nurseries as for transplanting, preferably on high land, as such nurseries produce strong and vigorous seedlings with a short but plentiful root system. Such plants when broadled put out new roots and shoots sooner than plants raised on mudland nurseries. Plants are uprooted at three weeks as for transplanting. The roots need not be thoroughly washed before broadling.

The field is prepared in the normal way as for broadcasting and the soil is well puddled. Water is drained out just before broadling and an average of two seedlings are broadcast at distances of 4-6 inches depending on the fertility of the soil.

Broadling should not be done when there is heavy rain as plants are dislodged. In case there is rain within the first three days of broadling the inflow of water from other *liyaddas* should be stopped. Even if the whole *liyadda* were to be flooded and plants were to float on the surface, they will quickly settle on the soil when the water is gradually drained off. With favourable

weather conditions plants have been observed to strike root within three days, during which period no irrigation water should be let into the fields. Thereafter, normal irrigation may be given, gradually increasing the depth of water.

Generally tillering commences about a week after broadling, although it has been observed to take place even earlier in some cases. In 2-3 per cent. of the seedlings, the mother plant dies leaving only the subsequent growth of tillers, whereas in the rest of the seedlings the mother plant raises itself erect and throws out tillers from its base at the same time. These tillers were noticed to have leaves broader and darker green in colour than the original mother plant and were more vigorous in appearance and growth. Up to 28 tillers have been counted on a single plant within one month of broadling.

Broadled plants respond well to judicious manuring and liberal applications of compost or cattle manure may be applied before and after broadling. As, in the early stages, the root system is very superficial, it is in a better position to utilize a larger portion of the manure in suspension in the upper layers of soil, unlike in transplanted seedlings. The following fertilizer mixture recommended by the Director of Agriculture was found to give good results :—

Sulphate of Ammonia	..	75 lb .
Concentrated Superphosphate	..	75 lb.
Muriate of Potash	..	25 lb.
		—————
Per acre	..	175 lb.
		—————

Half the quantity may be applied a few hours before broadling and the balance three weeks later after weeding. One month before flowering, a further application of 50 lb. of Sulphate of Ammonia as a top dressing gives beneficial results.

To facilitate cultural operations, broadling may be done at distances recommended for the Japanese method of transplanting, say 11 to 12 inches between rows and 4 inches within the row. This method is being tried out this season and the response so far is good, although it is too premature to express a definite opinion on yields as the crop is still in the growing stage.

During *yala* 1955, the writer had demonstrations of 8 broadled plots with adjacent transplanted fields—seven in Kalutara District and one in Colombo District. The average yields recorded at crop sample harvest were :

Broadled	..	75.7 bushels per acre.
Transplanted	..	61.9 " "

At most locations the difference in yield exceeded 15 bushels in favour of the broadled plot.

The results of trials conducted by the writer during *maha* 1955-56 and sample harvested by the Agricultural Statistician are shown in Table 1.

The results of systematic trials conducted by the Botanist & Senior Agricultural Research Officer at Bombuwela and Panagoda Paddy Stations to compare broadling with transplanting at different depths are shown in Tables 2 and 3 respectively.

TABLE 1

Range	Location	Yield (bushels per acre)	
		Broadled	Transplanted
Horana ..	Kanawela ..	69.4	69.4
Panadura ..	Mawela ..	54.4	49.2
Kalutara ..	Maggon (St. Vincent's Home)	65.0	38.8
	Mean yield ..	62.9	52.5

TABLE 2—Bombuwela Paddy Station

	Mas M 24 Yala 1955 Bushels/Acre	Murungakayan 303 Maha 1955-56 Bushels/Acre
Surface planting (broadling) ..	62.8	57.3
Transplanting at 1" depth ..	60.5	46.1
Transplanting at 2" depth ..	54.4	44.6
Transplanting at 3" depth ..	49.2	35.8

TABLE 3—Panagoda Paddy Station

	Mas M 24 Yala 1955 Bushels/Acre	Murungakayan 303 Maha 1955-56 Bushels/Acre
Surface planting (broadling) ..	39.7	53.3
Transplanting at 1" depth ..	47.4	53.3
Transplanting at 2" depth ..	42.8	51.7
Transplanting at 3" depth ..	41.6	50.4

A trial on broadling paddy also conducted by the D. A. O., Sabaragamuwa, during *maha* 1955-56 on one acre of paddy at Karapincha Agricultural Station, using *Siam* 29, gave a yield of over 53 bushels. The cost of production having been Rs. 304.40, the cost per bushel worked out at Rs. 6.35. The D. A. O. observed that "whereas it takes about 12 to 16 transplanters, it takes about 4 to 6 labourers to broadle an acre".

It will thus be noted that the trials carried out under varying conditions showed that this system of paddy

cultivation was definitely advantageous, particularly where transplanting is not possible as in marshy, ill-drained fields.

The general advantages of broadling over transplanting are as follows:—

1. Seed paddy requirements are lower.
2. It is possible to adopt this method on a wide range of soils.
3. The labour required is reduced by two-thirds. As such it is an economical method of paddy cultivation within the reach of the masses.

4. The rate of tillering is quicker and the number of tillers is also greater, thus increasing yields.

5. It requires neither specialized knowledge nor experience and even children can broadle.

Some of these broadled plots have been seen by distinguished experts in paddy from foreign countries, viz., Mr. D. Rhind, member of the Anglo-Australian Rice Commission and a former Director of Agriculture, Dr. K. Ramiah, Rice Expert, F. A. O., and Prof. S. Mitsui of the Faculty of Agriculture, Tokyo University, and Dr. T. Morinaga, Director of the National Institute of Agricultural Sciences, Japan, and they have all been impressed with the originality of the techniques and of its possibilities.

If broadling is adopted on a large scale, certain areas that now cannot be transplanted can be usefully converted into good yielding fields at little extra cost to the cultivator.

As the writer has retired from the Department of Agriculture, he has no facilities to carry out extensive trials. He, however, strongly recommends that further intensive trials be conducted by the Department of Agriculture over a continuous period of time on this technique, which he is confident should prove of distinct benefit to paddy production.

Acknowledgments

I have to express my indebtedness to a number of gentlemen who have collaborated with me in testing out this technique on their paddy fields in the Kalutara and Colombo Districts, and to the Director of Agriculture, Dr. A. W. R. Joachim, and Dr. M. F. Chandraratne, Assistant Director of Agriculture (Technical), and others in the Department for their advice and encouragement in this work.