Indian Methods of "Beushaning" the Growing Rice Crop

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Introduction

IN areas and with varieties in which transplanting is either impracticable or unprofitable, the practice of harrowing the growing crop (Wickramasekera 1940) is widely adopted in Ceylon. The present paper describes comparable methods that have been practised in various parts of India for many decades. Probably the best known of these methods is the one referred to as " beushaning " in Orissa and " biasi " in Madhaya Pradesh.

In India about 70-75 per cent. of the rice acreage is broadcast. In these broadcast areas, three methods of cultivation prevail. In one unsprouted seed is sown dry and the crop is treated later as a wet-land one. This system is comparable to the *manawari* cultivation in the Northern and Eastern Provinces and the *kekulan* cultivation in certain other parts of Ceylon. In another, the dry-sown seed continues to grow as an upland crop, which is similar to the *elwi* cultivation in this country. In the third method, sprouted seed is sown in puddled fields, as it is commonly done in Ceylon. It is in the first and the third methods of cultivation that the crop is subjected to " beushaning " in India. The second type of crop too is sometimes harrowed with an implement called a " bidha ", in which closely spaced iron tines are fixed to a wooden log.

" Harrowing " with the Country Plough

The usual seed rate for a broadcast crop in India is about 80 pounds per acre, but a slightly higher seed rate of about 100 pounds per acre is used where " beushaning " is practised. In this method an ordinary country plough is worked through the standing crop, when the seedlings are 4-8 weeks old, depending on the age of the variety, maintaining about 3-4 inches of standing water in the field. The type of plough used for this purpose in India (Photograph 1) is essentially similar to the country plough in Ceylon. The country plough of course, has no mould-board, does not invert the soil and really functions as a single toothed harrow. In this method of harrowing the growing rice crop, the furrows are run within a few inches of one another. If the stand of the crop is very thick a second harrowing is sometimes done crosswise. While this operation is in progress a team of women follow, re-distributing the seedlings from the thicker to the thinner sown patches. In doing this, the seedlings are picked up with the mud adhering to the roots and dropped in vacant spots as they go along. No attempt is made to erect the fallen plants, except when quite necessary. While on this work they trample into the mud any weeds they come across. It is essential that a few inches of water are retained in the field for about a week after this operation, to help the rice plants to recover and at the same time to submerge the weeds. After about a week, normal irrigation is resumed.

An additional operation which is done in certain parts of India is to run a " beam " or " ladder " over the crop soon after harrowing. This presses down both the rice plants and the weeds, but the former quickly erect themselves, while the latter remain buried. This

implement, which is more commonly used for levelling the soil, is made up of two parallel beams, each about 6 ft. long × 3½ in. broad × 1½ in. thick, fixed together with a 6 in. space in between them. The implement is similar to that shown in photograph 2. It is worked by a man with a pair of bullocks. In place of this implement, cultivators more often use two bamboos tied together. If necessary the operator rides on the " beam " to give added weight.

Green Manuring Simultaneous with " Beushaning "

A refinement of the " beushaning " technique is the sowing of Daincha seed (*Sesbania aculeata* Pers.) at the rate of 10-15 pounds per acre mixed with the seed paddy (2). As a result of harrowing the standing rice crop, most of the Daincha plants die and those that survive are pulled out and trampled into the mud. The subsequent operation of " beaming " further helps to bury in the Daincha plants more completely. This crop of Daincha produces about 5,000 pounds of green material per acre, when 4-8 weeks old and provides a very good green manure. Daincha has been found useful to reclaim saline lands where other green manure crops will not grow. It is also said to be drought resistant and able to withstand wet conditions (3).

Advantages of " Beushaning "

Varieties that have a sowing-to-harvest duration of less than four months are generally not subjected to " beushaning ". Practically all varieties are stated to benefit by " beushaning " and no differential varietal response has been recorded (4). Top dressing with sulphate of ammonia, if considered necessary, is done at the time of " beushaning ".

This technique facilitates weed control and thins the crop, but all the factors that contribute to the response of this treatment are not fully known. It can be said that one of the factors which gives particular benefit is the incorporation of the surface growth of blue-green algae into the soil. Pearsall (5) has shown that when rice soil is submerged or water-logged, reductive conditions develop and that only the surface layer in contact with air or oxygen-containing water is oxidative. In the flooded rice soils of the tropics luxuriant growth of nitrogen-fixing blue-green algae occurs in the oxidative layer. Hence this surface layer becomes enriched with quantities of easily decomposable organic matter, composed of the cells of living and dead algae. When " beushaning " or similar operations are done, the mixing of the soil layers would, according to Japanese workers, incorporate the easily decomposable organic matter of the oxidative layer into the reductive mass, where it is quickly decomposed by the heterotrophic micro-organisms. As a result, much ammonium nitrogen is produced.

Literature Cited

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