

RICE BREEDING FOR THE POORLY DRAINED SOILS OF THE LOW-COUNTRY WET ZONE

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In 1958 H4 was released as a general recommendation for the entire country. Like IR 8 in South East Asia, H4 brought about the so-called "green revolution" in Sri Lanka. H4 gave spectacular yields both in the dry and intermediate zones. However, the performance of H4 in the low-country wet zone was below expectations. This failure was due largely to climatic and soil problems peculiar to this region. The same fate befell other new improved high yielding varieties such as Bg II-II and Bg 90-2 which followed H4.

Consequently, the low-country wet zone was "written off" as a low potential area for rice production, until the Land Resources Capability Survey identified the existence of different land systems with different production potentials, and high-lighted the need for different varieties to meet the specific requirements pertaining to these particular systems. Since then the earlier concept of releasing one master variety as a blanket recommendation for all areas was dropped and the rice breeding priorities have been reoriented to meet the specific problems obtaining in different regions.

LOW-COUNTRY WET ZONE

In the low-country wet zone which includes the Kalutara, Galle and Matara Districts, and certain parts of the Colombo and Ratnapura Districts, flash floods in the inland valleys and soil problems such as coastal salinity, iron toxicity and ill-drained conditions have been the chief constricting factors to adopting the new improved varieties emanating from the Batalagoda Research Station, which was concerned mainly in producing improved varieties for the stable ricelands where climate, water and soil were not stress factors. These varieties did not perform well in the abnormal conditions obtaining in the low-country wet zone. It was necessary therefore to determine a varietal improvement program with different priorities, namely the development of:

1. tall to medium-statured varieties which could tolerate flash floods and submergence, and have the ability to germinate and give reasonably good yields under standing water;
2. early seedling vigour and weed competitive ability;
3. tolerance of adverse soil conditions such as salinity, iron toxicity and poor drainage;
4. red pericarped rice which is popularly demanded in this region; and
5. relatively easy to manage rice crops with only moderate inputs to match the socio-economic conditions of farmers in the area, who treat rice

cultivation only as a subsidiary occupation, since they are already engaged in other employment which assures them a regular monthly wage.

VARIETAL IMPROVEMENT

The first stage of the rice breeding program was directed at developing 4-4 1/2 months varieties with some or all of these priorities under moderate management conditions. LD 66, BW 78 and BW 100 with a yield potential of 3-4 t/ha were released in 1971, 1974 and 1976 respectively. The second stage was aimed at developing improved varieties in the 3-3 1/2 months age group. Three new selections were approved by the National Seeds Committee: BW 272-6B (3 months), BW 267-3 (3 1/2 months) for the Galle and Kalutara Districts, and BW 266-7 for the Ratnapura District.

BW 272-6B, in particular, has had a very encouraging farmer response because it is a short-aged variety producing a red rice of equal acceptance with the popularly cultivated indigenous variety Herath Banda. Yields of over 2 t/ha have been taken with this variety in contrast to 1.4 t/ha from Herath Banda under farmer managed conditions.

The third stage of rice breeding is directed at replacing the older 4-4 1/2 months improved varieties (LD 66, BW 78 and BW 100) with more productive selections. BW 271-1, BW 293-2, BW 295-4 and BW 295-5 have all recorded yields of over 100 bushels per acre (5 t/ha) in research trials, which is a record for this region.

BW 271-1 shows the greatest promise because it is a non-lodging red rice with a high level of farmer acceptance. It also has a very high seedling vigour which permits greater weed control than in the other selections. This is an important qualification in this region where weed competition is a major constraint, and where weed control with chemical weedicides is not always successful because of the uncertain weather conditions. Plant characteristic and agronomic traits of the latest 3-3 1/2 months varieties released for cultivation, and the promising new 4-4 1/2 months varieties which are expected to replace the old recommendations are given in Table I.

FUTURE EXPECTATIONS

Although the poorly drained low-country wet zone ricelands produce only 20% of the national rice output at present, they serve the most populated parts of the country. As such they cannot be "written off" as a negligible low producing area. With the new improved varieties that are now being developed at the Regional Research Centre, Bombuwela, this region could be made to play a far more important role in the national food production program.

On an estimated basis as shown in Table 2 and Figure 1, the poorly drained ricelands of the low-country wet zone should be able to produce enough rice to support the population in this region.

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TABLE 1: PLANT CHARACTERS AND AGRONOMIC TRAITS OF BW VARIETIES RELEASED FOR CULTIVATION IN 1982 AND PROMISING NEW LINES

Station Number	Parentage	Blast	Seed Spotting	Bronzing	Gall midge	Culm length (cm)	Rice Colour	Protein (%)	kg/ha yield potential	Age Group (months)
BW 272-6B	BW 239-3/BW 242-5-5	HR	MR	MS	ME	80.0	Red	10-12.7	4446	3
BW 286-7	BW 242-5-5/0b 677 Bg 90-2	R	R	MR	ME	70.0	White	10.34	5285	3 1/2
BW 267-3	LD 125 BW 248-1	MR	R	R	MR	74.0	White	7.93	5730	3 1/2
PLANT CHARACTERS AND AGRONOMIC TRAITS OF PROMISING BW LINES										
BW 271-1	BW 239-4/BW 100	MR	R	R	S	92.6	Red	8.67	5091	4
BW 238-1	Bg 90-2/Bg 401-1	R	MS	MS	MR	71.6	White	6.51	6092	4-4 1/2
BW 293-2	IR 2071-586/Bg 400-1	MR	MR	R	MR	71.6	White	—	6979	4
BW 295-4	cb 678/BW 254-1	R	MR	R	MR	70.5	White	—	7145	4-4 1/2
BW 293-5		MR	MR	R	MR	68.5	White	—	6530	4-4 1/2
BW 295-6		MR	MR	MR	MR	84.5	White	—	5529	4-4 1/2
BW 297-2	Bg 400-1 Bg 11-11	MR/MS	MS	MR	MR	78.0	White	—	5223	4-4 1/2
BW 293-2	Bg 400-1 BW 254-1	MR/MS	MS	MR	MR	82.3	White	—	5494	4-4 1/2

FUTURE PROSPECTS FOR RICE IN LOW-COUNTRY WET ZONE

(1)	(2)	(3)	(4)	(5)			(6)	(7)
Year	Population increase calculated at 1.7%	Consumption in mt rice at 100 kg/person/year	Calculated asweddumized area 121,457 ha	Yield/ha/yr. (mt.)			Projected production of rice (mt.)	Shortfall or overproduction
			75% asweddumized area	Experiments yield paddy (A)	Farmers yield paddy (B)	Rice yield (C)	Column (4)x5(c)	Column (3)-(6)
1982	6,281,742	628,174	91,093	5.928	4.15	3.112	283.500	—344,674
1985	6,607,587	660,758	91,093	7.904	5.928	4.446	404.999	—255,759
1990	7,188,652	718,865	91,093	14.128	10,572	7.929	722,249	+ 3384

Rice yield calculated at 75% of paddy yield using "single pass rice husk fired parboiler dryer"

Average annual rice production for 5 years from 1971 :— 2.59 mt/ha.

After introduction of the restructured plant type and other improved agronomic practices rice production in 1982:— 3.112 mt/ha

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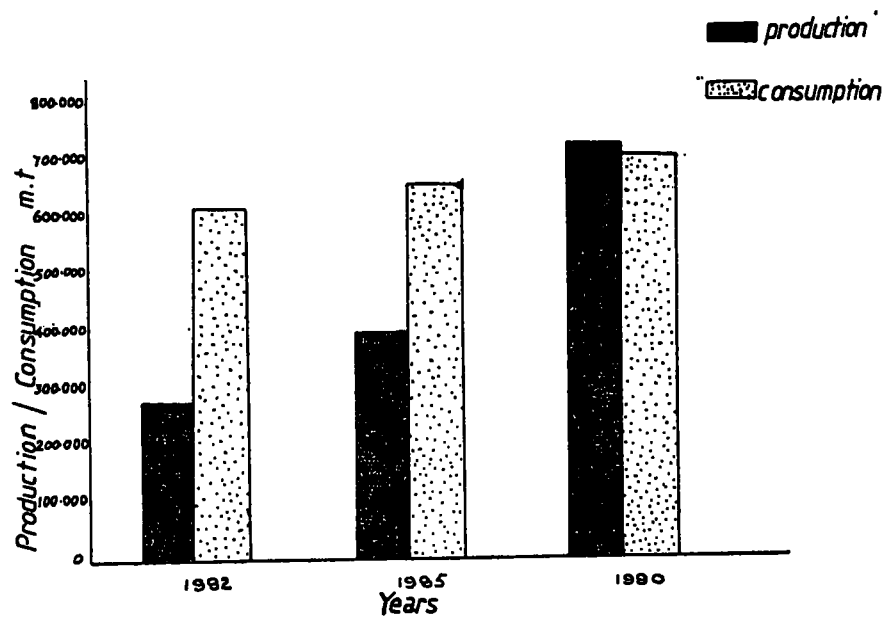


Figure 1. Future Prospects for Rice Production in Lowcountry Wetzone