

BREEDING FOR PHOTOSENSITIVE HIGH YIELDING RICE VARIETY

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Abstract: An ideal rice variety with high grain and straw yield, adaptability to the rabi season and consumer preference was evolved at the Regional Agricultural Research Station, Pattambi from the cross between Co 25, Triveni and Vellathil Kolappala. This variety called Nila (Ptb 48) combines in itself high grain and straw yield under average management conditions, adaptability to the season and tolerance to most of the pests and diseases.

Key words: Rice breeding, Ptb 48, Nila, rice variety

INTRODUCTION

Productivity during the rabi (mundakan) season is the lowest among the three major rice growing seasons in Kerala. High yielding variety programme for the last 25 years did not succeed in increasing the coverage or the productivity of high yielding varieties during this season. One of the reasons for the low spread of high yielding varieties during rabi season is their low productivity due to non-adaptability to this particular season and poor straw yield. The development of a high yielding photosensitive rice variety specifically suited for the season having good grain and straw yields will go a long way in increasing the production and productivity during rabi season. The paper presents the results of a successful breeding programme in this direction.

MATERIALS AND METHODS

The parents selected were Triveni and Vellathil Kolappala. Triveni is a high yielding variety adapted to the three seasons of Kerala and Vellathil Kolappala is a sturdy local variety with flood tolerant and nonlodging habits. One of the promising F_2 progenies of the cross between these two was then utilised for hybridisation with Co 25 - a tall high yielding variety adapted to the rabi season. Tall and photosensitive progenies with good growth and yield attributes were subsequently selected from the segregating generation. The process of single plant selection and progeny testing was continued till unifor-

mity was achieved. The resultant tall, high yielding season bound cultures were compared with Ptb 4 and Rasmi in replicated yield trials under a fertilizer schedule of 40:20:20 kg N, P_2O_5 and K_2O per hectare during rabi season of 1985 and 1986 in plots of 10 m^2 . Adaptive trials were conducted in plots of 400 m^2 during 1987.

RESULTS AND DISCUSSION

Taichung (Native 1), IR 8 and their hybrid derivatives were the gene sources most extensively used for developing improved rice varieties. Hargrove *et al.* (1979) forecasted that percentage of these semi-dwarf parents in the total gene pool is so high that continued use of these as parents in breeding programmes will lead to genetic erosion. This emphasises the need for utilising locally adapted and improved genetic stock for developing high yielding varieties specific to seasons and locations. While breeding rice varieties for the second crop season, which is very specific to its varietal requirements, this aspect was particularly taken care of and more emphasis was given for locally adapted genotypes. Nila, an ideal rice variety for second crop is the product of such a breeding programme in which locally adapted and improved strains were given more importance. Fig.1 clearly projects the preponderance of locally adapted genotypes in the parental composition of Nila which make it highly adapted to the rabi season of Kerala.

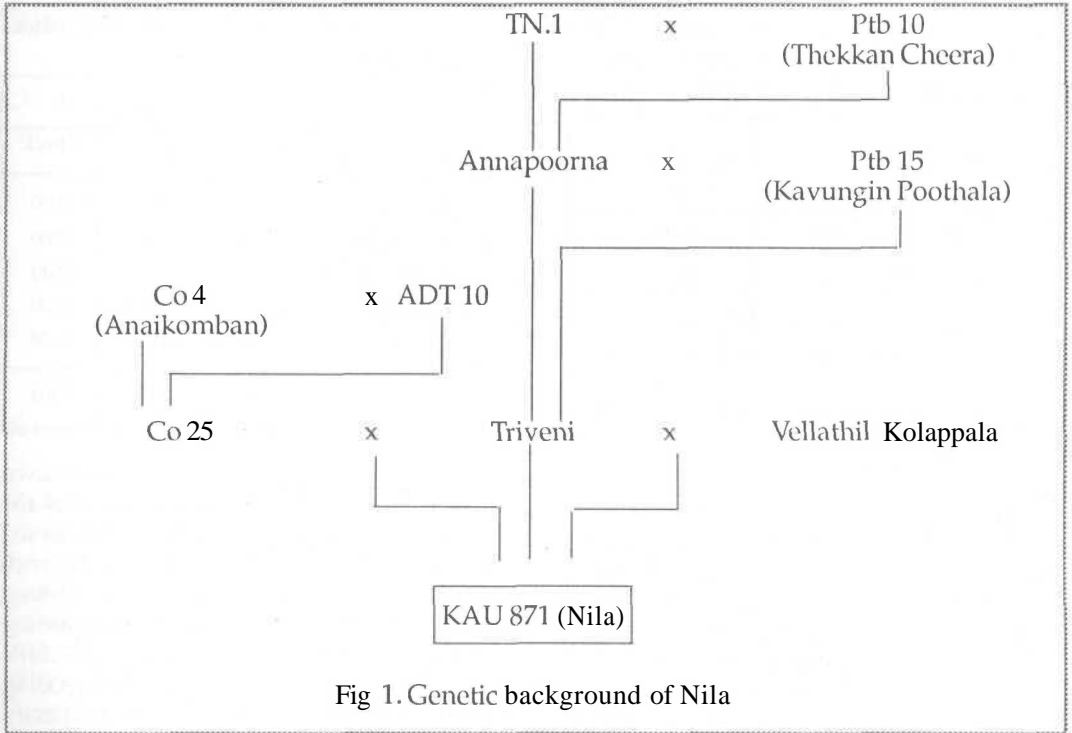


Table 1. Comparative performance of Nila at the Regional Agricultural Research Station, Pattambi (mean of two seasons)

Culture variety	Days to 50% flowering	Plant height (cm)	Tiller number/hill	Grain yield kg ha^{-1}	Straw yield kg ha^{-1}
Cul 845	140	115	6.2	3422	7231
Cul 847	143	125	5.6	2581	6051
Cul 848	144	135	4.9	1998	5328
Nila	145	125	6.3	3598	8919
Ptb 4	142	113	9.4	2809	6301
Rasmi	140	130	8.0	3154	7977
CD (0.05)				616	

This variety is tall (125 cm) season bound and has red rice. It possesses stiff and hardy stem and hence only minimum

lodging was noticed at maturity. Grain yield data during 1985 and 1986 (Table 1) revealed the superiority of Nila recording

Table 2. Grain yield (kg ha^{-1}) of Nila and promising variety at the Regional Agricultural Research Station, Pattambi

Year	Nila	Local check (Ptb4)
1985	3950	2660
1986	3237	2958
1988	4309	3416
Mean	3832	3011

an yield increase of 28 and 14 per cent over Ptb 4 and Rasmi (local checks) respectively. The data on grain yield from on-station trials for three years (Table 2) as well as farmers field trials (Table 3) showed 27 and 20 per cent increase over check varieties respectively. The specific advantage of Nila is its extremely high straw almost equal to local varieties and double to that of high yielding varieties.

The average grain yield of high yielding rice varieties during rabi season is 3002 kg ha^{-1} in Kerala under fertilizer schedules of 90:45:45 or 70:35:35 kg N, P_2O_5 , K_2O per hectare. Nila recorded an average yield of 4547 kg ha^{-1} in the farmers' fields under low fertilizer dose of 40:20:20 kg NPK per hectare. This demonstrates the ability of the new variety to yield high under low fertility situations indicating high nutrient use efficiency and economy in fertilizer use. Alexander *et al.* (1990) have reported that the improper integration of weather brought about by untimely commencement of rice cropping with photosensitive varieties is the main factor responsible for low yield during second crop season. This can be eliminated to a great extent by the use of photosensitive varieties like Nila which are capable of producing reasonably high yield under low management practices.

Table 3. Performance of Nila in farmers field (rabi 1986-87)

Location	Grain yield, kg ha^{-1}		
	Nila	Cul.841	Check
Palakkad	3720	2800	3000
Akathethara	5200	4800	4000
Pattancherry	5721	5090	4840
Kollengode	4440	3925	4000
Pattambi	3653	2800	3178
Mean	4547	3883	3803

Nila is highly tolerant to brown plant hopper and tolerant to most of the pests and diseases commonly observed during rabi season. Panicles are long with thickly packed short bold grains. Milling and cooking qualities of this variety are excellent with milling recovery of 73.5%. Nila is the successful culmination of a breeding programme to evolve a rice variety specifically suited for the rabi season. This new variety with its high grain and straw yield, high nutrient use efficiency and tolerance to most of the pests and diseases can increase the productivity of rabi season, where most of the presently recommended high yielding varieties cannot express their production potential.

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