

SPAD 502 and LCC values of wetseeded hybrid rice CORH 2 influenced by seed rates and nitrogen management

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ABSTRACT

Field studies were conducted at Agricultural College and Research Institute, Madurai during *rabi* 1999-2000 and 2000-2001 to find out the effect seed rates, dhaincha intercropping and urea applicator on leaf colour intensity which is directly related to leaf chlorophyll content of hybrid rice measured by SPAD 502 and Leaf Colour Chart. The experiments were laid out in split plot design replicated thrice. Seed rates of 12, 16, 20 and 24 kg/ha were compared with and without green manure dhaincha intercropping in the main plots. Application of 75 per cent and 100 per cent N through urea applicator compared with application of 100 per cent N as broadcast formed the sub plot treatments. At all stages SPAD 502 reading remained unaffected by varying seed rates, but distinctly differed between dhaincha intercropped rice and sole rice. Nitrogen management also had a significant effect on this parameter. Leaf Colour Chart (LCC) values varied mainly due to dhaincha intercropping and N management and was not affected by seed rate. Positive and significant correlation was seen between LCC value and SPAD 502 value with grain yield. Grain yield was higher in seed rate of 24 kg/ha with dhaincha intercropping (6600 and 6421 kg/ha) during the two years. Application of 100 per cent N through urea applicator recorded the higher grain yield. Sole cropping or dhaincha intercropping using the same seed rate of rice did not seem to affect harvest index of hybrid rice.

Key words : Seed rate, N management, SPAD 502, LCC value, Hybrid rice yield.

INTRODUCTION

Paddy is a versatile crop in the sense that it is cultivated by different methods in various parts of the country. By and large, transplanting is the dominant system of rice culture in India. However, in recent years many factors such as scarcity and rising cost of labour, uncertainty in water release in canal etc., have encouraged many rice farmers to switch over from transplanted to wetseeding (De Datta and Flinn, 1986). Studies in Tamil Nadu have been conducted on wetseeding of conventional inbred rice varieties and the results have indicated the high yield potential of wetseeded rice system on par with or even higher than transplanted system (Rachel and Martin, 1995). However hybrid rice has not yet been tested under wetseeding in Tamil Nadu. The obvious reason for this is the non-availability of management technology package for wetseeded hybrid rice. Growing hybrid rice is a complex process since agronomic management of hybrid rice differs considerably from that of conventional inbred varieties. Among the agronomic requirement for successful hybrid rice culture, plant densities play an important role, which is the major yield determinant in any system of rice culture (Wahab, 1994). And also nutrient requirement of hybrid rice especially nitrogen is higher than that of conventional inbred varieties. Application of nitrogenous fertilizer at initial stages of crop growth is very essential in wetseeded rice. Though there are many methods available to analyse the plant nitrogen content, they are laborious and time consuming. To determine the N content, SPAD 502 and LCC (Leaf colour chart) are the modern technique employed to assess the N content. SPAD meter and LCC are portable diagnostic tools for maintaining plant N status *in situ* in field and to plan N application so as to synchronise with crop demand. (Balasubramanian *et al.*, 2000 a).

In this background, an investigation was carried out on seed rate, dhaincha intercropping and N management through urea application in the performance of wet seeded hybrid rice CORH 2.

MATERIALS AND METHODS

Field experiments were conducted at Agricultural College and Research Institute, Madurai during *rabi* 1999-2000 and 2000-2001 to evaluate the effect of varying seed rates, dhaincha intercropping and N placement through urea applicator on the nitrogen content and

leaf colour intensity which is directly related to leaf chlorophyll content of hybrid rice CORH 2 measured by SPAD 502 and Leaf Colour Chart. The soil of the experimental fields was Typic haplustalf with a surface texture of sandy clay loam. The soil pH was 7.0 and 6.8 and low in available N, medium in available P and high in available K. The organic carbon content was 0.43 and 0.41 per cent in the two experimental seasons respectively. The experiments were laid out in split plot design replicated thrice. Rice seed rates of 12, 16, 20 and 24 kg/ha were compared with and without dhaincha intercropping in the main plots. Application of 75 per cent and 100 per cent Nitrogen (N) through urea applicator and application of 100 per cent N as broadcasting formed the sub plot treatments. Wetseeding of hybrid rice and green manure were sown by using paddy cum dhaincha drum seeder. Dhaincha seeds were sown in 25 cm inter space between rice rows and the green manure biomass was incorporated on 45 DAS using Cono weeder. N was applied as urea as per the treatment in four splits at 30, 45, 70 and 95 DAS. Phosphorus was applied as uniform basal and Potassium was applied along with first 3 splits of N. SPAD 502 (SPAD 502 - Soil Plant Analysis Development section, Minolta Camera Co. Ltd., Japan) measurements were made as described by Peng *et al.* (1993). A Leaf Colour Chart (LCC) developed from a Japanese prototype (Furuya, 1987) was used to record the leaf colour intensity which is directly related to leaf chlorophyll content and leaf nitrogen status. The different colour strips in LCC are numbered from one to six and the number of strips matching the colour of sampled leaf was noted as its LCC value. The reading was recorded on the upper most fully expanded leaves in five randomly selected plants at 60, 90 and 105 DAS.

RESULTS AND DISCUSSION

SPAD 502 reading :

At all stages, SPAD 502 readings remained unaffected by varying seed rates, but distinctly differed between dhaincha intercropped rice and sole cropped rice. Irrespective of the seed rate, intercropping and incorporation of dhaincha in hybrid rice recorded significantly higher values of SPAD reading of 39.9 to 39.3 and 39.9 to 39.3 at 60 DAS, 42.4 to 41.6 and 42.4 to 41.5 at 90 DAS, 42.2 to 42.9 and 42.4 to 42.2 at 105 DAS for the two years respectively. In sole cropping the SPAD 502 recorded lower values during the two years (Table 1). SPAD threshold value for wetseeded rice has been fixed around 32 for inbred rice varieties (Balasubramanian *et al.* 2000 a). Nitrogen management also had a significant effect on SPAD value.

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