STANDARDISING CRITICAL LEAF COLOUR CHART VALUES FOR TRANSPLANTED RICE IN CAUVERY NEW DELTA

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ABSTRACT

Results of experiments conducted to standardise the critical leaf colour chart values in comparison with SPAD based N management techniques for transplanted rice (in Cauvery new delta zone) indicated that in dry season leaf colour chart colour shade 4 based nitrogen management and in wet season leaf colour chart colour shade 5 based nitrogen management recorded higher grain yield and found comparable with SPAD 37 based nitrogen nitrogen management.

Blanket or package fertilizer recommendations over large areas are not efficient because indigenous nutrient supply varies widely among rice soils of Asia (Dobermann and White, 1999). This means that the rice crop requires different amounts of N in different soil conditions. Moreover nitrogen (N) applied in excess or at the wrong time is subject to losses through volatilization, denitrification and leaching/percolation (Singh and Buresh, 1994). Farmers benefit significantly if they can adjust the N inputs to actual crop conditions and nutrient requirements. For example, the chlorophyll meter can be used to monitor plant N status in situ in the field and to determine the right time of N top dressing to rice. By using this tool we can synchronize fertilizer N application to actual crop demand. Since the chlorophyll meter is costly and cannot be handled easily by the farmers, a Leaf Colour Chart (LCC) with six shades of green colour starting from light yellowish green (No.1) to dark green (No.6) was devised for comparing the greenness of leaf for topdressing N to rice. It is a simple, easy to use and inexpensive tool to determine the time of N topdressing in rice crops. The current study evaluates the critical LCC values for inbred and hybrid rice varieties in irrigated transplanted rice (TPR).

Field experiments were conducted at the Soil and Water Management Research Institute, Kattuthottam, Thanjavur during dry (Kuruvai - June to September) and wet (Thaladi - October to February) seasons of 1999-2000. Soil at SWMRI farm was a sandy loam and comes under Alfisol containing organic carbon 5.6 g/kg of soil with pH 7.6, low status of available N and K (119 and 52 kg ha$^{-1}$ respectively) and high status of available P (Bray P-126 and Olsen P-78 kg ha$^{-1}$). The experiment was conducted in split plot design with three replications. The main plot consists of two short duration varieties and one hybrid during dry season with N management practices Zero N, Leaf Colour Chart 3 based nitrogen management, LCC 4 based nitrogen management, LCC 5 based nitrogen management, SPAD37 based nitrogen management and Local N recommendation in the sub plots. In the wet season two long duration varieties were tested. LCC reading and SPAD readings were taken at weekly intervals from 14 DAT to flowering. Nitrogen fertilizer was applied when the mean SPAD or LCC values fell below the set critical values.

In Kuruvai (Dry Season), three weeks old seedlings were transplanted. P and K fertilizers were applied as per the local recommendation (50 kg P$_2$O$_5$ : 50 kg K$_2$O ha$^{-1}$), entire P fertilizer and 50% K fertilizer were applied as basal before planting and remaining
50% of K fertilizer was applied at panicle initiation. Zinc sulphate @ 25 kg ha\(^{-1}\) was applied before planting. Fertilizer nitrogen was applied when the SPAD or LCC values observed was below the threshold level as in the treatment schedule.

In \textit{Thaladi} (Wet Season), four weeks old seedlings were transplanted. Application of P, K and Zn at 60, 60 and 25 kg ha\(^{-1}\) respectively was done as per the practice in dry season. Fertilizer nitrogen was applied when the SPAD or LCC values observed was below the threshold level as in the treatment schedule. The chlorophyll content of leaves was monitored through SPAD meter and LCC at weekly intervals on 10 top most fully expanded leaves from 14 DAT (Days after transplanting) onwards up to 70 DAT.

Results revealed that during both seasons (dry and wet) significant variation in grain yield was noticed. The yield obtained from SPAD based N applied plots were comparable with blanket recommendation and LCC 4 threshold based N management recorded highest grain yield and comparable to SPAD optimum treatment. Absolute check recorded the least yield in both the seasons.

During dry season (\textit{Kuruva}), among the three varieties, ADT 43 recorded highest yield followed by ADTRH 1. During wet season (\textit{Thaladi}), CR 1009 recorded higher yield than ADT 44.

\begin{table}
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\begin{tabular}{lcccccccc}
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N management technique & Kuruvai (OS) & & Thaladi (WS) & & & & & \\
& ADT 42 & ADT 43 & ADTRH 1 & & & & & \\
\hline
Zero N & 3.23\(^d\) & 3.31\(^c\) & 3.02\(^d\) & 3.19\(^c\) & 3.06\(^d\) & 3.43\(^c\) & 3.24\(^c\) & \\
LCC 3 & 4.05\(^c\) & 4.76\(^d\) & 4.61\(^c\) & 4.47\(^d\) & 4.39\(^c\) & 4.59\(^c\) & 4.59\(^c\) & \\
LCC 4 & 6.56\(^a\) & 6.25\(^a\) & 6.48\(^b\) & 6.33\(^c\) & 5.82\(^b\) & 5.63\(^c\) & 5.78\(^b\) & \\
LCC 5 & 6.15\(^b\) & 6.46\(^c\) & 6.39\(^b\) & 6.33\(^c\) & 5.82\(^b\) & 5.63\(^c\) & 5.78\(^b\) & \\
SPAD 37 & 6.64\(^a\) & 7.08\(^b\) & 6.75\(^a\) & 6.82\(^a\) & 5.56\(^b\) & 5.27\(^a\) & 5.41\(^b\) & \\
Local N & 6.28\(^b\) & 6.54\(^c\) & 6.63\(^a\) & 6.48\(^a\) & 5.16\(^c\) & 4.86\(^b\) & 5.00\(^a\) & \\
\hline
\end{tabular}
\caption{Grain yield (t ha\(^{-1}\)) of rice as influenced by SPAD and LCC based nitrogen management techniques}

\begin{itemize}
\item In a column, mean followed by a common letter are not significantly different at 5% level by DMRT.
\end{itemize}

\begin{tabular}{lcccc}
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Sub at main & SEd & LSD (5\%) & SEd & LSD (5\%) \\
\hline
0.08 & 0.15 & 0.15 & 0.33 & \\
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\end{tabular}

REFERENCES