

LCC is a Tool for Assessing Nitrogen Content in Plant

Satender Kumar^{1*}, Manju Kumari², Ankush Kamboj¹ and Mamta Rani³

¹Research Scholar, Department of Soil Science, CCS Haryana Agricultural University, Hisar

²Research Scholar, Division of Soil Science and Agricultural chemistry, IARI, New Delhi

³Research Scholar, Department of Botany, Panjab University, Chandigarh



Open Access

*Corresponding Author

Satender Kumar*

Article History

Received: 12. 01.2022

Revised: 19. 01.2022

Accepted: 25. 01.2022

This article is published under the terms of the [Creative Commons Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/).

INTRODUCTION

The LCC had been jointly developed by international Rice Research Institute (IRRI) and Philippines Rice Research Institute from a Japanese prototype, for the purpose of measuring the required quantity of nitrogen to be applied in Rice field and thereby to get a maximum productivity. The LCC is also suitable for maize & wheat providing farmers with a good diagnostic tool for detecting nitrogen deficiency. The LCC relevant to use for Sugarcane, Potato, cotton, Cassava, Vegetable, Mustard, oil palm etc. are under Research and Development in order to maximize the yield of these crops.

The leaf colour chart (LCC) is an innovative cost-effective tool for real time-time or crop need based nitrogen management in Rice, Wheat and Maize. LCC is a visual and subjective indicator of plant nitrogen deficiency and is an inexpensive, easy to use and simple alternative to chlorophyll meter/SPAD meter (Soil plant analysis development). It measures leaf color intensity that is related to leaf N status. LCC is an ideal tool to optimize N use in Rice/Wheat/Maize at high yield levels, irrespective of the source of N applied viz. organic manure, biologically fixed N, or chemical fertilizer. Thus, it is an eco-friendly tool in the hands of farmer.

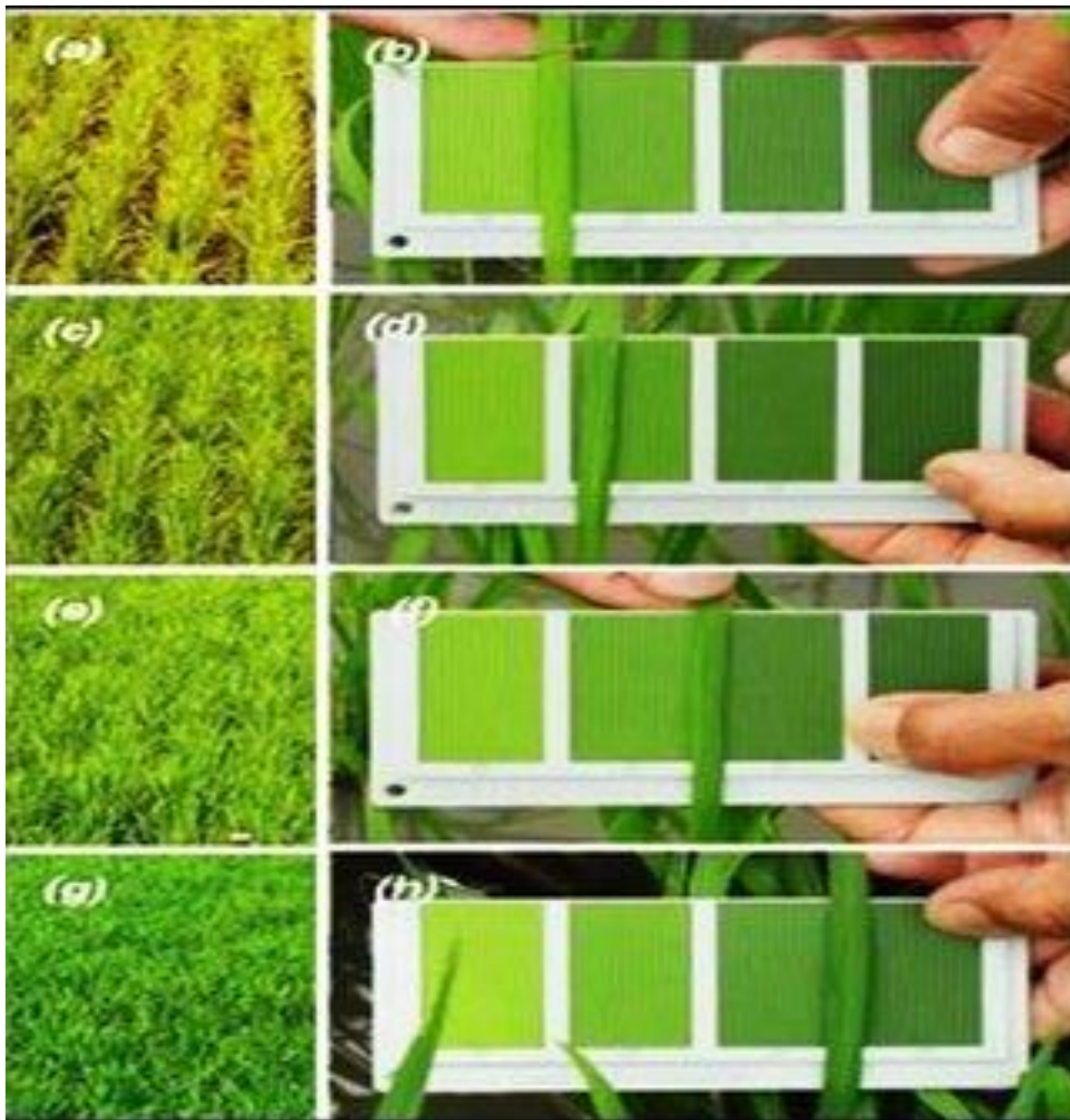
Purpose of using LCC

- Purpose of using LCC is to apply adequate amount of nitrogen and avoid application of fertilizer more than required
- Use of LCC helps to determine nitrogen demand of the crop and guide right time of fertilizer nitrogen application so as to prevent unwanted nitrogen losses and their serious impacts on the ecosystem

How to use the LCC

1. In a field with a uniform plant population, randomly select at least 10 disease-free rice plants or hills.
2. Choose the leaf that is completely extended at the top of each hill or plant. Place the leaf's middle section on a chart and compare the colour of the leaf to the LCC's colour panels.
3. The leaf should not be detached or destroyed.
3. Because direct sunlight influences leaf colour readings, measure the colour of the leaves in the shade of your body. If at all possible, LCC readings should be taken at the same time of day each time.
4. Calculate the average LCC value for the leaves you've chosen.

Making Use of the LCC



Photos from Witt et al. (2002)

The following photographs show how the standardised LCC can be used to assess leaf N status and alter N applications to rice:

Plants that haven't been given any nitrogen are yellowish in photo (a). Because the LCC value is between panels 2 and 3, nitrogen deficit is confirmed in photo (b).

The plants in images (c) and (d) look better with low fertiliser N rates, but the low LCC still shows N shortage. The plants are well established and the canopy is closed in images (e) and (f) with greater N fertiliser rates. For most transplanted rice, the LCC reading falls between panels 3 and 4, which is the crucial range.

Plants with a high N rate are dark green in images (g) and (h). The leaf shade is darker than in LCC panel no. 4, indicating a fertiliser N surplus.

Merits of LCC

LCC is a simple and easy-to-use instrument for farmers to determine the nitrogen status of the leaf and determine when to apply nitrogen to paddy.

LCC is inexpensive and portable, making it simple to transport to the field for determining the leaf's nitrogen status.

It is a non-destructive procedure that does not necessitate laboratory testing.

LCC does not involve any specific expertise or talent because it merely requires comparing the colour and computing the scale of the leaf with a standard chart.

Demerits of LCC

As the colour shades are in between two shades, LCC fails to define minor variations in leaf greenness.

Only when LCC is equated and associated with chlorophyll metre values and appropriately adjusted with plant groups can the relative accuracy of LCC to measure leaf N status be calculated.

LCC is only used to alter the top dressed N, but it does not use the basal N appliance.

LCC may be more suited to a site-specific nutrient management method in which other nutrients are not restricted in order to achieve optimal N fertiliser reaction.

As a result, based on the findings of soil tests, suitable levels of other nutrients must be applied.

Deficits in P or K cause dimmer leaf colour, which leads to inaccurate LCC interpretations.

REFERENCES

Witt C, Pasuquin JMCA, Muters R, Buresh RJ. 2005. New leaf color chart for effective nitrogen management in rice. *Better Crops* 89 (no. 1):36–39.