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Effect of leaf colour chart based nitrogen management on growth and uptake of rice (*Oryza sativa* L.) cultivar in eastern Uttar Pradesh

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Abstract
N urea +LCC<3, 25%N FYM +LCC<4, 25%N urea +LCC<4, 25%N FYM +LCC<5, 25%N urea +LCC<5, along with the recommended dose of NPK (150:60:40 kg/ha) were taken for study. The growth parameters likes, plant height (123.66, 121.14cm), number of shoots (528.25, 523.67), dry matter (842.81, 831.67 g), and Leaf area index (7.14, 6.62) were maximum recorded in PA-6444 which was significantly higher over PHB-71 and NDR-359, respectively. While, PA-6444 recorded highest nitrogen, phosphorus and potassium uptake by grain, straw and total which was significantly higher over the both variety PHB-71 and NDR-359.Among nitrogen levels, 25% N urea +LCC<5 was recorded highest nitrogen, phosphorus and potassium uptake by grain, straw and total. The maximum grain yield was obtained with rice cultivar PA-6444 (65.92-64.51 q/ha) which was superior over NDR-359 (59.01-55.99 q/ha) and at with par PHB-71 (63.85-63.30 q/ha). Among the LCC nitrogen based management. The highest biological yield was recorded under 25% N basal as Urea + LCC<5 which was significantly superior over rest of treatments.

Keywords: NPK, LCC, rice, plant height, dry matter, LAI, nutrient uptake and contain

Introduction
Rice is the bulk of food security of the global population. In 21st century there will be the need of about 250 million tons of food grains to feed the rapidly increasing population. To meet this challenge, intensive cropping pattern were adopted which resulted in decline nutrient status of soil. There is an indication of stagnation on even declining in the production of rice crop; this may be due to decline organic matter, over mining of nutrients reserve, indiscriminate and imbalanced use of chemical fertilizers and continuous mono cropping. Since, fertilizer N losses are estimated to range from 10-65% of the applied N (Cassman *et al.* 1998; Singh & Singh, 2003) [13, 1]. Hence, its management strategies must be responsive to temporal variations in crop N demands and soil N supply in order to achieve supply-demand synchrony for minimizing N losses. When N application is not synchronized with crop N demand, N losses from the soil–plant system are large, leading to low N fertilizer use efficiency. In many field situations, more than 60% of applied N is lost because of the lack of synchrony of plant demand with N supply (Singh and Singh, 2003) [1]. Peng *et al.* (1998) [13] demonstrated that RE (Recovery efficiency) of top dressed urea during panicle initiation stage could be as high as 78%. Hence, plant need-based application of N is important for achieving high yield and high N use efficiency. Improving the synchrony between crop N demand and the N supply from soil and/or the applied N fertilizer is likely to be the most promising strategy to increase nitrogen use efficiency in rice. Current fertilizer recommendations for rice in most rice growing countries of Asia typically consist of fixed rate and timing on a regional scale. Most of the farmers generally apply fertilizer N in several split applications, but the number of splits, amount of N applied per split, and the time of applications vary substantially.

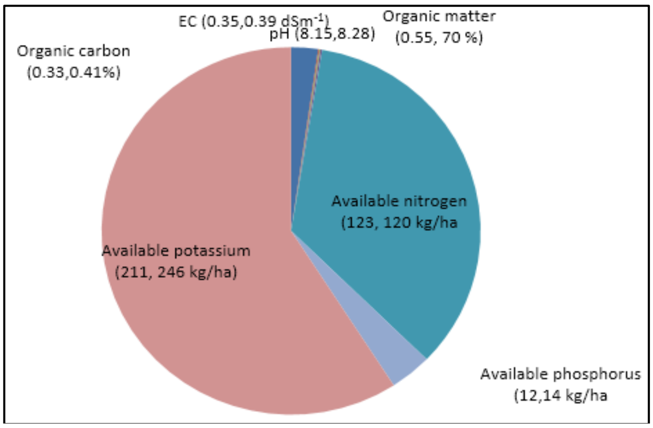
The apparent flexibility of rice farmers in adjusting the time and amount of fertilizer application offers potential to synchronize N application with the real-time demand of the rice crop. Due to enormous farm to- farm variability in soil N supply, blanket recommendations for fertilizer N application for a large region generally lead to low NUE. To avoid the risk of N deficiency, many time farmers apply fertilizer N in excess, which also leads to low N recovery by rice. Real-time N management strategies aim at meeting fertilizer N supply with actual crop demand to maximize crop N uptake and reduce N losses (Balasubramanian *et al.* 2003; Shukla *et al.* 2004) [1, 18]. Hence, indirect measurement of N content through greenness by a chlorophyll meter (SPAD, Soil and Plant Analysis Division, Minolta Co.) and leaf color chart (LCC) provides a simple, quick, and non-destructive methods for estimating the N content of rice leaves and, thus, for determining the right time of N top dressing (Yang *et al.* 2007) [23]. LCC is an easy to use and inexpensive diagnostic tool for monitoring the relative greenness of a rice leaf as an indicator of the plant N status, which is important in improving the balance between crop N demand and N supply from soil and applied fertilizer (Shiga *et al.* 1977; Cassman *et al.* 1994) [17, 5].

The purpose of using LCC is to apply adequate amount of nitrogen and avoid application of fertilizer more than required. The LCC is more relevant in case of cereals like rice, maize, sugarcane which are grown in assured moisture supply condition and the nitrogen need of these crops are more. Rice genotypes and LCC based N management significantly influenced rice yield and yield components. Nagappa *et al.* (2002) [11].

Methods and Material

The student's instructional farm falls in the sub-tropical semiarid tract under Faizabad district of Uttar Pradesh. Faizabad geographically situated at 26.47^0 North latitude and 81.12^0 East longitudes at an altitude of 113meters above the mean sea level in the Gangatic Plain zone of eastern Uttar Pradesh. Summers are very hot and dry and winters are very cold. The monsoon season usually starts from the last week of June to first week of July and extends up to last week of September. Few showers are commonly received during winter season (November to March).

The average annual rainfall of this area is 1021.8 mm and about 90 per cent of it, is received during rainy season. Frost generally occurs at the end of December and sometimes in January. To determine the texture and initial fertility status of the soil, the soil samples were taken from 0-15 cm soil depth with the help of soil auger before laying out the composite soil sample was made from collected samples and analyzed with Glass electrode pH meter (Jackson, 1973) [8] for P^H, Bower and Wilcox (1965) [4] method apply for EC (dsm^{-1}), Walk ley and Black's rapid titration method (Walkely and Black, 1964) for organic matter (%), Alkaline potassium permanganate method (Subbiah and Asija, 1956) [20] applying for calculating available nitrogen (kg/ha), Olsen's method (Olsen *et al*. 1954) [12] used for calculating of available phosphorus (kg/ha) and Flame emission spectrophotometer method (Jackson, 1973) [8] used for calculating of available potassium (kg/ha) The results were depicted in Fig. 1.



Rice cultivars; PA-6444, PHB-71 and NDR-359, Urea, DAP, MOP and FYM. Malathion was used for plant protection. PA 6444 is a hybrid (Parentage-6CO2/6MO5) developed in 2001 by Bayer Bio-Science and released by Central Variety Release Committee (CVRC). It is a semi tall (100-120 cm), medium slender grains with intermediate amylase. It is a medium duration variety and matures in135 days. It has high milling (74%) with 64% HRR. PA 6444 is non-lodging and N responsive variety which is suitable for well drained, irrigated condition of U. P. Tripura, Orissa, A. P. Karnataka, Maharashtra and Uttarakhand. PA 6444 is resistant to neck rot and rice tungro virus. Grain production of PA-6444 is 60-80 q per ha. PHB-71 is a hybrid (Parentage-RF-1301xRM-1401) developed by Pioneer Overseas Corporation (India Branch) released in 1997 by Central Variety Release Committee (CVRC). It is a tall (130 cm) non-shattering, bears long slender grains with intermediate amylase (23%), low ASV (2. 4), high milling (71%) & HRR (59%). It is tolerant to BLB, Blast, BPH, and Gall Midge. It is a medium duration variety maturing in 130-135 days and suitable for growing in irrigated areas of A. P. T. N. Karnataka, Punjab, Haryana and Western U. P. NDR-359 is a high yielding (Parentage-BG-90-2-4X08677) medium short duration (115-125 days) variety, released in 1994 by NDUAT, Kumarganj, Faizabad. It is recommended for cultivation in irrigated ecosystem of eastern UP, Bihar, Odisa & Assam. Plant height varies from 90-95 cm (semi dwarf). It is a variety with short tipped grain, small panicle, dwarf stature, moderate tillering, and sturdy culm. It is resistant to Bacterial Leaf Blight, Brown Spot and moderately resistant to Sheath Rot, leaf streak and lodging. Yield is 50 q ha^{-1}.

Results and Discussion

Growth parameter

Plant height (cm)

The data regarding plant height, which were recorded at harvest as influenced by rice cultivars and different LCC based nitrogen levels are summarized in Table 2. Perusal of the data showed that plant height generally increased with the advancement of crop growth stages during both the year of experimentation. Among rice cultivars, PA-6444 recorded highest plant height (123.66, 121.14 cm) being at par with PHB-71 (122.90, 120.52cm) and found significantly higher over NDR-359 (109.48, 107.00 cm). This might be due to genetic difference under each variety. Sen *et al.* (2011) [16]. All the Nitrogen levels guided by LCC doses increase plant height gradually as the LCC scores increase except as recommended dose in both the years. Whereas the highest plant height (120.33, 118.00 cm) was recorded at 25%N urea+ LCC<5 level and (119.55, 118.00 cm) at 25%N through FYM+ LCC<5 level against the recommended dose of nitrogen level during both the years. Plant height at nitrogen level 25%N FYM+LCC<4, 25%N urea+ LCC<4, was at par with 25%N FYM+LCC<5, 25%N urea+ LCC<5. The minimum plant height 115.88, 114.88 cm and 116.44 and 115.44 cm was noted with nitrogen level 25%N FYM+ LCC<3, 25%N urea +LCC<3 which was found less than recommended dose of nitrogen (150 kg). Alireza and Anthony (2011).

No of shoots

Among all the rice cultivars, PA-6444 recorded highest number of shoots (528.25, 523.67) per m^2 was found significantly higher over NDR-359 (519.10, 504.76) per m^2 being at par with PHB-71(454.77, 448.07) per m^2 during the both the years of crop. Observation on number of shoots as influenced by nitrogen levels through LCC scores was recorded at 30, 60 90 DAT and at harvest indicate that (Table 2) all the nitrogen levels guided by LCC score increased shoot numbers significantly in both the years. Sen *et al.* (2011) [16]. The highest number of shoot m^2 was recorded at 25%N FYM+ LCC<5 level against the recommended dose of nitrogen (150 kg). This might be due to increasing the nitrogen level and leaf scrore. Biloni and Bocchi, (2003) [3]. While the shoot number due to nitrogen level 25%N FYM+LCC<4, 25%N urea+ LCC<4, was at par with 25%N FYM+LCC<5, 25%N urea+ LCC<5. Moreover nitrogen level 25%N FYM+LCC<3, 25%N urea+ LCC<3 could produce significantly less number of shoots over recommended dose of nitrogen during both the years.

Dry matter (g)
Dry matter accumulation as influenced by rice cultivars and different LCC scores differed significantly at all the crop growth stages during both the years. Dry matter (m^2) increased simultaneously with increase the age of crop upto harvest during both the years with all three varieties. Among rice cultivars, PA-6444 recorded highest dry matter (842.81, 831.67 g) which was significantly higher over the NDR-359 (811.95, 802.71 g). This might be due to varietal affect that enhance the chlorophyll content and maximum number of shoots per hill into particular variety results more dry matter. Chaudhary and Crupter, (1985) [6]. An observation on nitrogen levels through LCC scores was recorded at harvest indicates the Table 2. All the nitrogen levels increase with increased the dry matter during both the years under. The highest dry matter was recorded (859.88, 840.89 g) at 25%N urea+ LCC<5 nitrogen level which was significantly higher over rest of the treatments. This might be due to maximum nitrogen levels and leaf area scores. The similarly results were found, Jiang *et al.* (2004) [9].

Leaf area index (LAI) %
LAI as influenced by rice cultivars and nitrogen levels it is clear from the Table 2 that among cultivars PHB-71 produced maximum leaf area index, which was significantly higher over PA-6444 and NDR-359 respectively only in 2013. This might be due to more sun light intercepted by particular variety, which was enhanced the chlorophyll and number of leaves under specific variety results maximum leaf area index. Sen *et al.* (2011) [16]. However in 2014 it was found non-significant. In case of nitrogen level and leaf colour score on leaf area indeed were also recorded non- significant in both years of experiments.

NPK content by grain and straw
The Perusal of the data showed the Table 3. The nitrogen, phosphorus and potash content by grain and straw were found non-significant during both the years.

NPK uptake by grain and straw
Among rice cultivars, PA-6444 recorded highest NPK uptake by grain and straw expressed in Table 4, which was at par with PHB-71 and significantly higher over NDR-359 during both the years. Ravi *et al.* (2007) [14]. This might be due to increase the NPK uptake with NPK rates was almost linear for the modern varieties**.** Similar results were found Roy *et al.* (2004) [15]. Among nitrogen levels 25%N (Urea) +LCC<5 recorded highest nitrogen uptake and was statistically at par with 25%N (FYM) +LCC<5. These both the treatments were significantly higher over rest of the nitrogen levels during both the years. This might be due to LCC based application of amount of nitrogen in different treatments. Bhatia *et al.* (2012) [2]

Biological yield (q/ha)
The data regarding Biological yield (q/ha) which were recorded at harvest as influenced by rice cultivars and different LCC based nitrogen levels are summarized in Table 5. Among rice cultivars, PA-6444 recorded highest Biological yield (149.74, 145.82 q/ha) followed by PHB-71 (146.16 and 144.68 q/ha), while observation clearly indicate that the lowest Biological yield recorded in NDR-359 (137.91 and 132.37q/ha) at the time of harvesting. In case of fertilizer, biological yield (q/ha) indicate that all the levels of nitrogen fertilizer increase. Whereas the highest biological yield (q/ha) was recorded in 25%N (urea) +LCC<5 (149.65, 145.20 q/ha) followed by level 25% N through FYM+ LCC<5 (145.94, 142.94). More ever the level 25%N FYM+ LCC<4 (144.40, 141.31q/ha) 25%N urea+ LCC<4 (145.08, 142.80 q/ha) also indicate highest biological yield comparison to recommended dose of NPK (150:60:40 kg/ha) 142.95 and 138.36 q/ha but other levels 25%N FYM+ LCC<3, showed (141.09, 136.44 q/ha), 25%N urea+ LCC<3, showed (142.68, 139.79 qha). This might be due to increase the levels of nitrogen in different treatments. Kavitha *et al.* (2009) [10].

Grain yield (q/ha)
Grain yield (q/ha) influenced by rice cultivars and different LCC scores. Among rice cultivars, PA-6444 recorded highest grain yield (65.92, 64.51 q/ha) which was significantly higher in all the two varieties followed by PHB-71 (63.30 and 63.85 q/ha), while observation clearly indicate that the lowest grain yield recorded in NDR-359 (59.01 and 55.99 q/ha) at the time of harvesting, Velu *et al.* (2009) [21]. Whatever, among the levels of nitrogen like 25%N FYM+LCC<3, 25%N urea+ LCC<3, 25%N FYM+LCC<4, 25%N through urea+ LCC<4, 25%N through FYM+LCC<5, 25% N through urea+ LCC<5, indicate that highest grain yield was recorded in 25%N thorugh urea+ LCC<5 which was 65.49 in 2013 and 63.64 in 2014, while level of 25%N FYM+LCC<5, 25%N FYM+LCC<4, 25%N urea+ LCC<4, also increase the grain yield comparison to the recommended dose of nitrogen (150 kg/ha) Kavitha *et al.* (2009) [10].

Straw yield (q/ha)
Among rice cultivars, PA-6444 recorded highest straw yield (83.82, 81.32 q/ha) which was significantly higher over the two varieties, PHB-71 (82.86, 80.53 q/ha) and NDR-359, (78.90, 76.38 q/ah) at the time of harvesting. This might be due to varietical difference cause increase the yield attributes parameter in particular cultivar which results enhance the straw yield. Whereas although the levels of nitrogen increase with the increased the straw yield significantly over the recommended dose of nitrogen (150 kg/ha). The highest straw yield (84.16, 81.56 q/ha) was recorded in levels of 5% N through urea+ LCC<5 followed by (82.57, 80.17 q/ha) in level of 25%N FYM+LCC<5. This might be due to enhance the levels of nitrogen application. While level 25% N through FYM+LCC<4 and 25% N through urea+ LCC<4, also increase straw yield (81.66 79.66 q/ha) and (82.08, 80.04 q/ha), respectively. Moreover the lowest straw yield q/ha (80.82, 77.33 q/ha) was recorded in level of 25%N FYM+ LCC<3, and 25%N urea+ LCC<3, (81.00, 78.72q/ha),

respectively over the recommended dose of nitrogen level (150 kg/ha) Ravi *et al.* (2007) [14].

Harvest index (%)

The harvest index (%) significantly influenced only by rice cultivars during both the years. Among rice cultivars, PA-6444 was observed highest harvest index (44.02, 44.23 %) which was significantly higher over PHB-71 (43.30, 44.13%) and NDR-359 (42.78, 42.29 %), respectively. this might be due to increase the biological yield in particular variety results increased the harvest index. In case of nitrogen levels through LCC scores was found non-significant during both the year of experiments. This might be due to none significant difference found in grain yield. Ibrahim *et al.* (2013) [7]

Table 1: growth parameters viz, plant height, no of shoots, dry matte and leaf area index as influenced by leaf colour chart based nitrogen management in rice (*Oryza stiva* L.).

Treatment	2013				2014			
	Plant height (cm) at harvest	No. of shoots (m^{-2}) at harvest	Dry matter (g) at harvest	Leaf Area Index (%) At 90 DAS	Plant height (cm) at harvest	No. of shoots (m^{-2}) at harvest	Dry matter (g) at harvest	Leaf Area Index (%)At 90 DAS
Rice Cultivars								
Pro Agro 6444	123.66	528.25	842.81	7.14	121.14	523.67	831.67	6.62
PHB-71	122.90	519.10	844.28	7.28	120.52	504.76	833.67	6.71
NDR-359	109.48	454.77	811.95	7.19	107.00	448.07	802.71	6.57
SE (d)	0.24	2.37	4.18	0.22	0.31	1.05	4.50	0.06
CD (P=0.05)	0.66	6.55	11.55	N.S.	0.85	2.91	12.44	N.S.
Nitrogen Levels								
Recommended N Dose (150 kg/ha)	116.88	456.77	820.22	7.11	115.67	452.44	807.44	6.44
25% N (FYM)+ LCC< 3	115.88	440.65	809.22	6.88	114.44	437.56	809.56	6.56
25% N (Urea)+ LCC< 3	116.44	448.32	827.22	7.11	115.44	444.11	811.56	6.56
25% N (FYM)+ LCC< 4	118.77	450.42	830.33	7.23	115.78	445.11	827.56	6.56
25% N (Urea)+ LCC< 4	119.88	453.47	838.11	7.25	116.56	447.33	824.56	6.67
25% N (FYM)+ LCC< 5	119.55	455.53	846.11	7.27	118.00	449.33	837.56	6.67
25% N (Urea)+ LCC< 5	120.33	457.55	859.88	7.33	118.00	451.22	840.89	7.11
SE (d)	0.52	2.37	3.93	0.49	0.58	1.11	8.27	0.35
CD (P=0.05)	1.06	6.55	7.97	N.S.	1.18	2.25	16.78	N.S.

Table 2: NPK contains by grain and straw as influenced by different rice cultivars and leaf colour chart based nitrogen management

Treatment	2013						2014					
	Grain			Straw			Grain			Straw		
	N	P	K	N	P	K	N	P	K	N	P	K
Rice Cultivars												
Pro Agro 6444	1.46	0.33	0.43	0.42	0.14	1.40	1.37	0.32	0.41	0.33	0.13	1.36
PHB-71	1.44	0.32	0.42	0.41	0.14	1.34	1.34	0.28	0.38	0.32	0.13	1.34
NDR-359	1.31	0.31	0.33	0.32	0.13	1.33	1.23	0.27	0.35	0.23	0.12	1.32
SE (d)	0.04	0.15	0.015	0.02	0.00	0.02	0.03	0.02	0.02	0.02	0.00	0.03
CD (P=0.05)	0.09	N.S.	0.04	0.05	N.S.	0.05	0.07	N.S.	N.S.	0.04	NS	N.S.
Nitrogen Levels												
Recommended dose N (150 kg/ha)												
25% N (FYM)+ LCC< 3	1.38	0.30	0.37	0.36	0.13	1.33	1.30	0.27	0.34	0.27	0.12	1.31
25% N (Urea)+ LCC< 3	1.40	0.31	0.38	0.37	0.13	1.34	1.31	0.28	0.35	0.28	0.12	1.32
25% N (FYM)+ LCC< 4	1.42	.0.32	0.39	0.38	0.14	1.35	1.32	0.29	0.37	0.29	0.13	1.34
25% N (Urea)+ LCC< 4	1.43	0.33	0.40	0.39	0.14	1.36	1.33	0.30	0.38	0.30	0.13	1.35
25% N (FYM)+ LCC< 5	1.45	0.34	0.41	0.40	0.14	1.37	1.34	0.31	0.39	0.32	0.14	1.36
25% N (Urea)+ LCC< 5	1.36	0.35	0.42	0.41	0.15	1.38	1.35	0.32	0.45	0.32	0.14	1.37
SE (d)	0.04	0.01	0.02	0.02	0.00	0.01	0.04	0.02	0.03	0.02	0.00	0.04
CD (P=0.05)	N. S.	N. S.	N. S.	0.04	N. S.	0.02	N. S.	N. S.	0.05	0.04	NS	N. S.

Table 3: NPK uptake by grain and straw as influenced by different rice cultivars and leaf colour chart based nitrogen management

Treatment	2013						2014					
	Grain uptake			Straw uptake			Grain uptake			Straw uptake		
	N	P	K	N	P	K	N	P	K	N	P	K
Rice Cultivars												
Pro Agro 6444	96.35	22.15	0.43	35.34	11.35	1.40	35.34	20.85	26.56	26.96	10.34	110.36
PHB-71	90.78	20.63	0.42	34.34	10.15	1.34	34.34	18.17	24.06	26.00	10.10	108.02
NDR-359	77.35	18.50	0.33	25.00	9.70	1.33	25.00	15.31	18.33	17.63	9.11	100.76
SE (d)	1.01	0.29	0.015	0.57	0.11	0.02	0.57	0.29	0.14	0.40	0.12	0.81
CD (P=0.05)	2.79	0.80	0.04	1.57	0.29	0.05	1.57	0.79	0.39	1.10	0.35	2.25
Nitrogen Levels												
Recommended dose N (150 kg/ha)	85.93	20.03	0.39	30.69	10.32	1.34	30.69	17.11	22.16	21.77	10.10	103.80
25% N (FYM) + LCC< 3	83.90	18.22	0.37	28.79	8.20	1.33	28.79	16.05	20.46	20.80	9.20	101.09
25% N (Urea) + LCC< 3	86.35	19.14	0.38	29.84	7.80	1.34	29.84	17.17	21.71	22.44	9.30	104.23
25% N (FYM) + LCC< 4	89.14	20.10	0.39	31.41	8.70	1.35	31.41	17.92	22.71	23.49	9.65	106.65

25% N (Urea) + LCC< 4	91.00	20.98	0.40	32.38	9.64	1.36	32.38	18.77	23.62	24.37	10.20	108.36
25% N (FYM) + LCC< 5	91.85	21.56	0.41	33.40	10.80	1.37	33.40	19.37	24.41	25.46	10.50	109.06
25% N (Urea) + LCC< 5	91.86	22.93	0.42	34.41	11.60	1.38	34.41	20.36	25.67	26.38	11.40	111.47
SE (d)	1.43	0.40	0.02	0.82	0.36	0.01	0.82	0.32	0.30	0.51	0.26	1.03
CD (P=0.05)	2.89	0.82	N.S.	1.67	0.72	0.02	1.67	0.65	0.61	1.02	0.55	2.09

Table 4: Biological yield, grain & straw yield and harvest index as influence by rice cultivars and LCC nitrogen based management practice.

Treatments	**2013**				**2014**			
Rice Cultivars	**Biological yield (q/ha)**	**Grain yield q/ha**	**Straw yield q/ha**	**Harvest Index (%)**	**Biological yield (q/ha)**	**Grain yield q/ha**	**Straw yield q/ha**	**Harvest Index (%)**
Pro Agro 6444	149.74	65.92	83.82	44.02	145.82	64.51	81.31	44.23
PHB-71	146.16	63.30	82.86	43.30	144.68	63.85	80.53	44.13
NDR-359	137.91	59.01	78.90	42.78	132.37	55.99	76.38	42.29
SE (d)	0.33	0.28	0.45	0.24	0.70	0.24	0.28	0.18
CD (P=0.05)	0.92	0.77	1.26	0.67	1.92	0.67	0.76	0.50
Nitrogen Levels								
Recommended dose of NPK (150: 60 : 40 kg)	142.95	61.79	81.16	43.22	138.36	60.12	78.24	43.45
25% N (FYM)+ LCC< 3	141.09	60.67	80.42	43.00	136.44	59.11	77.33	43.32
25% N (Urea)+ LCC< 3	142.68	61.68	81.00	43.22	139.79	61.07	78.72	43.68
25% N (FYM)+ LCC< 4	144.40	62.74	81.66	43.44	141.31	61.55	79.76	43.55
25% N (Urea)+ LCC< 4	145.08	63.00	82.08	43.42	142.80	62.40	80.04	44.69
25% N (FYM)+ LCC< 5	145.94	63.37	82.57	43.42	142.94	62.33	80.17	43.60
25% N (Urea)+ LCC< 5	149.65	65.49	84.16	43.76	145.20	63.64	81.56	43.82
SE (d)	0.59	0.78	0.93	0.28	0.88	0.57	0.78	0.44
CD (P=0.05)	1.19	0.77	1.26	0.67	1.79	1.16	1.59	N.S.
Interaction	SIG*	N. S.	N. S.	N. S.	SIG*	NS	N. S.	N. S.

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