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Anup Kumar Srivastava
M.Sc. Scholar, Department of
Agronomy, Naini Agricultural
Institute, SHUATS,
Prayagraj, Uttar Pradesh,
India

Rajesh Singh
Professor, Department of
Agronomy, Naini Agricultural
Institute, SHUATS,
Prayagraj, Uttar Pradesh,
India

Akankhya Pradhan
Ph.D. Scholar, Department of
Agronomy, Naini Agricultural
Institute, SHUATS,
Prayagraj, Uttar Pradesh,
India

Kumar Raj
Ph.D. Scholar, Department of
Agronomy, Naini Agricultural
Institute, SHUATS,
Prayagraj, Uttar Pradesh,
India

Response of pearl millet (*Pennisetum glaucum* L.) hybrid to nitrogen management practices

Anup Kumar Srivastava, Rajesh Singh, Akankhya Pradhan and Kumar Raj

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Abstract

A field experiment was conducted in Crop Research Farm during *Zaid* Season 2025 to study the “Response of Pearl millet (*Pennisetum glaucum* L.) Hybrids to Nitrogen Management Practices” at SHUATS, Department of Agronomy, SHUATS, Prayagraj (U.P) India. The experiment was laid out in a randomized block design with twelve treatments replicated thrice. The treatment details are as follows T₁-86 M 25 + 100% RDN, T₂-86 M 25 + 75% RDN + Azotobacter seed inoculation, T₃-86 M 15 + 100% RDN, T₄-86 M 15 + 75% RDN + Azotobacter seed inoculation, T₅-US 7306 + 100% RDN, T₆-US 7306 + 75% RDN + Azotobacter seed inoculation, T₇-P A 9666 + 100% RDN T₈-P A 9666 + 75% RDN + Azotobacter seed inoculation, T₉-RBX 6066 + 100% RDN, T₁₀-RBX 6066 + 75% RDN + Azotobacter seed inoculation, T₁₁-MP 7393 + 100% RDN, T₁₂-MP 7393 + 75% RDN + Azotobacter seed inoculation. The soil of experiment plot was sandy loamy in texture, nearly neutral in soil reaction (pH 6.8), low in organic carbon (0.46%), available Nitrogen (225.42 kg/ha), available Phosphorus (38.2 kg/ha) and available Potassium (240.7 kg/ha). The results revealed that significantly higher growth attributes of Pearl millet at 80 DAS viz., Plant height (168.10 cm), dry weight (80.76 g), No. of ear head (71.81), grains/head (3154.59) and yield attributes and yield Grain yield (3.58 t/ha) and Stover yield (4.71 t/ha) were recorded in treatment 3 (86 M 15 along with 100% RDN) compared to other treatments. It performed better in terms of growth and yield.

Keywords: *Azotobacter*, nitrogen, pearl millet, varieties and yield

Introduction

Pearl millet is commonly known in India as Bajra or Bajri also known as ‘cattail’ and ‘bullrush millet’. It is originated from tropical western Africa. It belongs to the family *Gramineae* or *Poaceae*. The cultivated species are *Pennisetum glaucum* L. (2n = 14) used for grain and *Pennisetum purpureum* (2n = 28) used for green and dry fodder. Pearl millet is the fifth most important cereal crop globally after rice, wheat, maize, and sorghum. It is used as a staple food for human consumption and fodder for livestock sector. It is a C₄ plant with higher photosynthetic efficiency, more dry matter production with less inputs and more economic returns (Reddy *et al.* 2022) ^[14]. It is a good source of energy (360 calories) and carbohydrates (67 g) and consist of 12 g protein, 5 g fat and 2 g minerals in 100 gm of bajra seeds (Directorate of Millets Development, 2021-22; Project Coordinator Review, 2022) ^[4, 11]. It is considered as poor man’s food. It is critically important for food and nutritional security as it possess several advantages such as early maturing, drought tolerance, require minimal purchase of inputs and is mostly free from biotic and abiotic stresses. Pearl millet (*Pennisetum glaucum* L.) is most widely grown as staple food by small and marginal farmers in Asia and Africa. It is a C₄ plant having high photosynthetic efficiency, more dry matter productivity and survives under adverse agro-climatic conditions with lesser inputs and more economic returns. The crop is critically important for food and nutritional security of humans and animals in arid and semi-arid regions as Pearl millet is early maturing, drought tolerant, and has inherent ability to endure high temperatures up to 42 °C during reproductive phase enabling it for cultivation in adverse conditions, thus making it a climate resilient crop. Due to its excellent nutritional properties, pearl millet is designated as nutri-cereal (Gazette of India, No.133 dtd 13th April, 2018) for production, consumption, trade and was included in Public Distribution System (PDS).

Corresponding Author:
Anup Kumar Srivastava
M.Sc. Scholar, Department of
Agronomy, Naini Agricultural
Institute, SHUATS,
Prayagraj, Uttar Pradesh,
India

The major production factor to boost up the yield of Pearl millet is fertilizer management, which has contributed to the extent of 27 percent. Nitrogen are major elements required to increase the crop production. Among these elements, nitrogen is one of the decisive as well as expensive inputs which for increasing the efficiency of applied Nitrogen in Pearl millet it is therefore govern the cereal crop production. It has the quickest and the pronounced effect on plant growth. Insufficient nitrogen may reduce yield drastically and deteriorates the quality of produce. Split application of Nitrogen fertilizers commensurate with crop growth stage is a useful approach necessary to judiciously manage the inflow of the nitrogen. Nitrogen is the major nutrient required by Pearl millet and has shown variable growth and yield response to nitrogen application. The content of nitrogen in healthy plants ranges between 1-5% depending up on the species or variety. Thus, it increases growth and development of all living tissues and improves the protein content of food grains and quality of fodder. Generally, Pearl millet has been known for growing under low nitrogen management. But several studies showed that nitrogen application can increases millet production efficiency (Singh *et al.* 2016) ^[18]. The improvement of yield attributes with progressive increase of nitrogen levels was also reported by Sharma *et al.*, (2008) ^[15]. The Nitrogen deficient plants are generally stunted, develop late and produce less flowers as well as shriveled grains. Appropriate use of fertilizer not only increases yield but also improves the quality of forage especially protein contents Arshewar *et al.* (2018) ^[1]. Nitrogen is an essential nutrient for plant growth and development. Nitrogen is a very important constituent of cellular components. Alkaloids, amides, amino acids, proteins, DNA, RNA, enzymes, vitamins, hormones and many other cellular compounds contain Nitrogen as one of the elements. An adequate supply of Nitrogen is associated with vigorous vegetative growth and deep green color also. Judicious and appropriate use of fertilizer not only increases yield but also improves the quality of forage especially protein contents (Ayub *et al.* 2007) ^[2]. Generally, Pearl millet has been known for growing under low N management (Gascho 1995) ^[5] but, several studies showed that N application can increase millet production efficiency (Singh *et al.* 2010) ^[17]. N is the most important nutrient element, while sorghum is known to respond well to N fertilization. Several studies are reporting on the positive effect of N application on the yields of Pearl millet. (Srinivasarao *et al.* 2013) ^[19].

Azotobacter is attributed with varied benefits viz., nitrogen fixation, stimulates the growth of plants and build up the soil matter. Ability of these bacteria to contribute to yields in crops is only partly a result of biological N₂-fixation. The mechanisms involved have a significant plant-growth promotion potential. Economic and environmental benefits can include increased income from reduced fertilizer cost, reduced leaching of Nitrate N to ground water as well as reduced emission of greenhouse gas, the global warming effect of which is 300 times more than CO₂ (Singh *et al.* 2016) ^[18].

Materials and Methods

An experiment was conducted during the Zaid season 2025. In the alluvial soil at the Crop Research Farm, Department of Agronomy, NAI, SHUATS, Prayagraj, U.P. It is situated 98 meters above mean sea level at latitude 25° 24' 42" N,

longitude 81° 50' 56" E. About five kilometres from Prayagraj city, this location lies on the right bank of the Yamuna River beside Prayagraj Rewa Road. At a depth of 0-30 cm, a composite soil sample was taken. It underwent crushing, air drying, and physical and chemical testing. The soil of experiment plot was sandy loamy in texture, nearly neutral in soil reaction (pH 6.8), low in organic carbon (0.46%), available Nitrogen (225.42 kg/ha), available Phosphorus (38.2 kg/ha) and available Potassium (240.7 kg/ha). The seed were sown on 25th March 2025, Pearl millet variety 86M25, 86M15 US 7306, P A 9666, RBX 6066 and MP 739, with spacing 45 cm x 15 cm in line sowing. The experiment was laid out in a Randomized block design with twelve treatments replicated thrice. The treatment details are as follows T₁-86 M 25 + 100% RDN, T₂-86 M 25 + 75% RDN + Azotobacter seed inoculation, T₃-86 M 15 + 100% RDN, T₄-86 M 15 + 75% RDN + Azotobacter seed inoculation, T₅-US 7306 + 100% RDN, T₆-US 7306 + 75% RDN + Azotobacter seed inoculation, T₇-P A 9666 + 100% RDN T₈-P A 9666 + 75% RDN + Azotobacter seed inoculation, T₉-RBX 6066 + 100% RDN, T₁₀-RBX 6066 + 75% RDN + Azotobacter seed inoculation, T₁₁-MP 7393 + 100% RDN, T₁₂-MP 7393 + 75% RDN + Azotobacter seed inoculation. To apply nutrients as a spreading method, 4-5 cm deep furrows were dug along the seed rows using a hand hoeing. Ten days after sowing, the gaps were filled by transplanting once germination took place. Where necessary, seedlings were trimmed out to maintain 25 cm x 10 cm spacing. In order to reduce crop density, weed competition, intercultural operations were carried out between 25 and 45 days intervals. On 18th June 2025, harvesting of the crop was done. At regular intervals from germination to harvest, plant growth parameters such as plant height (cm), dry weight (g/plant), CGR and RGR were assessed. At harvest, yield metrics such as Ear head length (cm), No. of Grains/ear head, test weight (g), seed yield (kg/ha), straw yield (kg/ha), and harvest index (%) were measured at 20, 40, 60 and 60 DAS. Analysis of variance (ANOVA), as it relates to randomized block design, was used to statistically examine the observed data of ten treatments (Gomez and Gomez, 1984 and Mohan *et al.* 2024) ^[6, 10].

Results and Discussions

Growth parameter

The data of growth parameter are presented in Table 1. At harvest maximum plant height of (168.10 cm) was recorded with treatment-3 (86 M 15 + 100% RDN). Whereas, treatment-4 (86 M 15 + 75% RDN + Azotobacter seed inoculation) were statistically at par with the highest. The results indicate that plant height in pearl millet was significantly influenced by both hybrid selection and nitrogen management, as well as their interaction. Differences in plant height among hybrids can be attributed to their genetic makeup, which governs growth rate, internodal elongation, and nutrient-use efficiency. Hybrids with vigorous growth habits exhibited greater plant height compared to less responsive ones, suggesting inherent variability in their ability to utilize available resources. Similar results were also reported by Reddy *et al.*, (2021) ^[13]. Whereas, highest plant dry weight (81.76 g) was recorded in treatment-3 (86 M 15 + 100% RDN). Whereas, treatment-1 (86 M 25 + 100% RDN) and treatment-4 (86 M 15 + 75% RDN + Azotobacter seed inoculation) were

statistically at par with highest. Plant dry weight is a key indicator of vegetative growth and overall crop productivity in Pearl millet. The present findings indicate that increasing nitrogen levels significantly enhanced plant dry matter accumulation, which may be attributed to improved nitrogen availability leading to enhanced cell division, chlorophyll synthesis, and photosynthetic activity and the physiological and metabolic processes and metal activator or enzymes resulting in increased growth and development of plant. Similar results were also reported by Reddy *et al.*, (2021)^[13] and Vinod Kumar *et al.* (2018)^[20]. And maximum crop growth rate was statistical analysis during 60-80 DAS significant highest CGR value (29.46/m²/day) was observed in treatment 3 (86 M 15 + 100% RDN). The enhancement in CGR with higher nitrogen application can be attributed to increased leaf area index, chlorophyll content, and photosynthetic efficiency. Nitrogen, being a major constituent of chlorophyll and proteins, accelerates metabolic activities and biomass production was found to be statistically at par with other treatment. Split application of nitrogen significantly improved CGR compared to single basal application. This could be due to continuous nitrogen availability during critical growth stages, ensuring sustained photosynthetic activity and efficient biomass accumulation was similar to Kumar *et al.* (2015)^[7].

Yield attributes

The data pertaining to yield-attributing characters are presented in Table 2. A significant impact was experiential by the statistical analysis of ear head length (cm). at the time of harvest treatment-3 (86 M 15 + 100% RDN) was recorded highest ear head length (71.15 cm) which was found to be statistically at par to all treatment. The increase in ear head density with higher nitrogen levels may be attributed to enhanced tillering capacity and improved survival of tillers. Nitrogen plays a vital role in promoting vegetative growth, leading to increased formation of tillers, many of which develop into productive ear heads. Sharma *et al.* (2012)^[16] and Sharma *et al.* (2008)^[15]. Significant effect was observed by the statistical analysis of number of grains/ear head. Treatment 3 (86 M 15 + 100% RDN) recorded significant and highest number of grains/ear head (3154.59) were statistically at par with the highest. The improvement in grain number with higher nitrogen application may be attributed to enhanced vegetative growth and better development of reproductive structures. Adequate nitrogen supply during critical growth stages promotes panicle development, floret initiation, and reduces floret abortion, thereby increasing the number of grains per ear head. These results are in agreement with Chouhan *et al.* (2015)^[3]. The statistical analysis on test weight was found to be non-significant. However, highest test weight (16.90 g) was recorded with treatment-3 (86 M 15 + 100% RDN) and lowest test weight (11.21g) was recorded in treatment-8 (RBX 6066 + 75% RDN + *Azotobacter* seed inoculation). Test weight was not influenced by the application of different Varieties and nitrogen effect which might be due to characters highly influenced by its genetic make-up. The increase in grain yield with higher nitrogen levels can be attributed to enhanced vegetative growth, improved leaf area index, and higher photosynthetic activity, which ultimately led to better assimilate production and translocation towards reproductive organs (Malhotra *et al.*, 2018)^[9].

Grain yield

The statistical data in Table 2. A significant impact of experiment by the statistical analysis on grain yield was obtained due to Different hybrid varieties and Nitrogen management treatment combinations. The highest grain yield (3.58 t/ha) was obtained in treatment-3 (86 M 15 + 100% RDN) which was statistically at par highest. These results might be due to better seed germination and a larger root system for nutrient uptake, which are the results of the early nourishment offered to the seeds. Applying nitrogen might be applied to improve vegetative development, probably uptake and utilization of other elements fascinated by its wide root system developed by NPK imitation. The increase in grain yield with higher nitrogen levels can be attributed to enhanced vegetative growth, improved leaf area index, and higher photosynthetic activity, which ultimately led to better assimilate production and translocation towards reproductive organs. Nitrogen also plays a crucial role in the formation of yield-attributing characters such as number of effective tillers, earhead length, and grain weight. Similar findings were previously published by Sharma *et al.*, (2012)^[16] and Singh *et al.*, (2016)^[18].

Straw Yields

The data in Table 2 showed that application of different varieties and Nitrogen management has significantly impact on stover production of the Pearl millet. At treatment-3 (86 M 15 + 100% RDN), the highest stover yield (4.71t/ha) was obtained found to be statistically at par with the highest. The application of nitrogen resulted in significantly higher stover yield this might be due to improved growth in terms of seedling emergence, plant height, and dry matter accumulation, which raises photosynthetic efficiency. Greater photosynthetic accumulation in vegetative components leads to superior vegetative development and hence the stover yield increases is similar to Yadav *et al.* and Mohan *et al.* (2024)^[10]. Application of different varieties and Nitrogen management could be attributed to increase vegetative growth, possibly the result of effective uptake and utilization of other nutrients absorbed through its extensive root system developed under different fertilization. The biological yield is a function of grain and straw yield. Ranjan *et al.*, (2024)^[12] found the same results in their research.

Harvest Index (%)

The data showed in Table 2. Significant difference in harvest index, However, treatment-2 (86 M 25 + 75% RDN + *Azotobacter* seed inoculation) was recorded highest value of (48.44%) and lowest value (39.22%) was recorded in treatment-10 (US 7306 + 75% RDN + *Azotobacter* seed inoculation) respectively. Application of different varieties and Nitrogen management could be attributed to increase vegetative growth, possibly the result of effective uptake and utilization of other nutrients absorbed through its extensive root system developed under different fertilization. The biological yield is a function of grain and straw yield. The increase in grain and stover yields may be attributed to role of varieties as a catalyst or stimulant in most of the physiological and metabolic processes and metal activator or enzymes resulting in increased growth and development of plant. Similar results were also reported by Reddy *et al.*, (2021)^[13] and Kumar *et al.*, (2018)^[20]

Table 1: Response of Pearl millet hybrids to Nitrogen management practices on growth parameters.

S. No.	Treatments	Plant height (cm)	Dry weight (g)	Crop growth rate (g/m ² /day)
		80 DAS	80 DAS	60-80 DAS
1	86 M 25 + 100% RDN	160.86	79.26	27.88
2	86 M 25 + 75% RDN + <i>Azotobacter</i> seed inoculation	160.43	77.89	28.37
3	86 M 15 + 100% RDN	168.10	81.76	29.46
4	86 M 15 + 75% RDN + <i>Azotobacter</i> seed inoculation	167.51	80.95	29.68
5	PA 9666 + 100% RDN	152.92	68.05	25.44
6	PA 9666 + 75% RDN + <i>Azotobacter</i> seed inoculation	153.88	66.32	24.43
7	RBX 6066 + 100% RDN	152.57	64.94	23.28
8	RBX 6066 + 75% RDN + <i>Azotobacter</i> seed inoculation	152.20	62.63	20.03
9	US 7306 + 100% RDN	152.97	71.05	25.18
10	US 7306 + 75% RDN + <i>Azotobacter</i> seed inoculation	153.15	69.53	24.92
11	MP 7793 + 100% RDN	155.12	72.11	23.37
12	MP 7793 + 75% RDN + <i>Azotobacter</i> seed inoculation	155.19	73.32	27.47
	F-test	S	S	S
	SEm(±)	1.18	0.90	1.14
	CD (P = 0.05)	3.47	2.65	3.37

Table 2: Response of Pearl millet hybrids to Nitrogen management practices on yield and yield attribute.

S. No.	Treatment combinations	No. ear head/m ²	Grains/Head (no.)	Test weight (g)	Yield attribute and yield		
					Grain yield (t/ha)	Straw yield (t/ha)	Harvest Index (%)
1.	86 M 25 + 100% RDN	68.26	2974.15	15.24	3.28	4.25	44.27
2.	86 M 25 + 75% RDN + <i>Azotobacter</i> seed inoculation	68.85	2964.36	14.58	3.27	3.75	48.44
3.	86 M 15 + 100% RDN	71.15	3154.59	16.90	3.58	4.71	43.23
4.	86 M 15 + 75% RDN + <i>Azotobacter</i> seed inoculation	70.30	3138.77	15.51	3.47	4.36	45.06
5.	PA 9666 + 100% RDN	65.49	2531.15	12.81	2.35	3.43	46.25
6.	PA 9666 + 75% RDN + <i>Azotobacter</i> seed inoculation	64.35	2448.67	12.06	2.19	2.75	43.78
7.	RBX 6066 + 100% RDN	63.71	2337.46	11.57	1.95	2.71	42.38
8.	RBX 6066 + 75% RDN + <i>Azotobacter</i> seed inoculation	64.17	2275.60	11.21	1.93	2.48	45.11
9.	US 7306 + 100% RDN	66.11	2699.74	14.10	2.50	3.50	48.32
10	US 7306 + 75% RDN + <i>Azotobacter</i> seed inoculation	65.09	2627.33	13.25	2.34	3.23	39.22
11.	MP 7793 + 100% RDN	67.49	2843.50	14.18	2.55	3.57	41.49
12.	MP 7793 + 75% RDN + <i>Azotobacter</i> seed inoculation	67.13	2815.06	14.46	2.39	3.24	43.54
	F-test	S	S	NS	S	S	NS
	SEm(±)	0.40	24.05	1.31	0.12	0.21	2.26
	CD (p = 0.05)	1.19	70.54	-	0.35	0.63	-

Conclusion

From the results, it is concluded that application of 86 M 15 along with 100% RDN in treatment-3 was recorded highest Grain yield, gross return, net return and benefit cost ratio in Pearl millet crop which performed better in terms of yield and economic returns.

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References

1. Arshewar SP, Karanjikar PN, Jadhav GS. Effect of nitrogen levels on growth and forage quality of pearl millet. *Int J Chem Stud.* 2018;6(5):2150-2153.
2. Ayub M, Nadeem MA, Tanveer A, Tahir M. Effect of nitrogen application and harvesting intervals on forage yield and quality of pearl millet. *Pak J Life Soc Sci.* 2007;5(1-2):84-87.
3. Chouhan M, Rana KS, Singh B. Effect of nitrogen and phosphorus fertilization on yield attributes and yield of pearl millet. *Indian J Agron.* 2015;60(3):456-460.
4. Directorate of Millets Development. Annual Report on Millets Development 2021-22. New Delhi: Ministry of Agriculture and Farmers Welfare, Government of India; 2022.
5. Gascho GJ. Nitrogen management in pearl millet under low input conditions. *Agron J.* 1995;87(4):654-658.
6. Gomez KA, Gomez AA. Statistical Procedures for Agricultural Research. 2nd ed. New York: John Wiley and Sons; 1984.
7. Kumar R, Singh R, Yadav P. Effect of split nitrogen application on crop growth rate and productivity of pearl millet. *Forage Res.* 2015;41(2):112-116.
8. Kumar V, Meena BS, Singh D. Influence of nitrogen management on growth and yield of pearl millet. *Int J Curr Microbiol Appl Sci.* 2018;7(6):1205-1211.
9. Malhotra SK, Vashistha RD, Yadav RS. Response of pearl millet to nitrogen fertilization under arid conditions. *Ann Arid Zone.* 2018;57(3):213-218.
10. Mohan Murari, Umesha C, Vaidurya Pratap Sahi, Prashant Kumar Rai, Satyam Ranjan, Priyanka Priya. Comparison of sorghum (*Sorghum bicolor* L. Moench) genotypes grown in Indo Gangetic plain of Prayagraj, U.P. *Ann Agric Res.* 2024;45(3):67-75.
11. Project Coordinator Review. All India Coordinated Research Project on Pearl Millet. New Delhi: ICAR-Indian Agricultural Research Institute; 2022.
12. Ranjan A, Umesha C, Sudhanshu Singh, Abhiranjan Kumar. Determining the effect of potassium and zinc

- on growth and yield of pearl millet (*Pennisetum glaucum* L.). Int J Plant Soil Sci. 2024;36(9):173-178.
13. Reddy BVS, Ramesh S, Sharma R. Growth and productivity of pearl millet hybrids under varying nitrogen levels. J Millets Res. 2021;16(1):45-52.
 14. Reddy BVS, Sharma R, Rao PS. Pearl millet as a climate resilient nutri-cereal for sustainable agriculture. Indian J Agric Sci. 2022;92(4):421-427.
 15. Sharma RK, Gupta RK, Singh P. Effect of nitrogen fertilization on yield attributes and yield of pearl millet. Indian J Agron. 2008;53(2):145-148.
 16. Sharma S, Yadav OP, Rai KN. Nitrogen management in pearl millet for enhanced productivity. Forage Res. 2012;38(1):23-27.
 17. Singh A, Kumar R, Meena LR. Nitrogen response in pearl millet under semi-arid conditions. J Agric Sci. 2010;2(4):112-118.
 18. Singh B, Yadav RS, Verma OP. Effect of nitrogen levels and biofertilizers on growth and yield of pearl millet. Int J Agric Sci. 2016;8(51):2324-2328.
 19. Srinivasarao C, Ramesh G, Venkateswarlu B. Nitrogen fertilization effects on productivity of pearl millet in dryland agriculture. Indian J Dryland Agric Res Dev. 2013;28(1):45-50.
 20. Vinod Kumar, Meena ML, Choudhary R. Effect of nitrogen and biofertilizers on dry matter accumulation in pearl millet. Int J Chem Stud. 2018;6(4):2100-2104.
 21. Yadav OP, Rai KN, Rajpurohit BS. Influence of nitrogen management on fodder yield of pearl millet. Forage Res. 2019;44(3):175-180.