**International Archive of Applied Sciences and Technology**
Int. Arch. App. Sci. Technol; Vol 11 [1] March 2020 : 46-49
© 2020 Society of Education, India
[ISO9001: 2008 Certified Organization]
www.soeagra.com/iaast.html

IAAST
ONLINE ISSN 2277- 1565
PRINT ISSN 0976 - 4828

CODEN: IAASCA ORIGINAL ARTICLE

DOI: .10.15515/iaast.0976-4828.11.1.4649

# Different levels of Nitrogen on Crop growth of finger millet

**Sima Kumari, Rajnish Anand, Deeba Hassan and C.S. Singh**
Birsa Agricultural University, Ranchi, Jharkhand 834006

**ABSTRACT**
*The experiment was conducted at Birsa Agricultural University Farm Ranchi, during kharif (rainy) season of 2009. The experiment was conducted in Randomized Block Design with three replications and twenty treatment combinations consisting of four nitrogen levels (0, 20, 40 and 60 kg N/ha) and two medium duration finger millet genotypes (RAU-8 and BM-2). Finger millet genotypes respond positively to nitrogen levels and application of 40 kg N/ha manifested significantly higher grain yield (20.71 q/ha) and straw yield (54.12q/ha) of finger millet also improved significantly only upto 40 kg N/ha resulting is significantly higher plant height (104.95 cm) and dry matter accumulation (20.50 g/plant). Among genotypes, BM-2 was found superior comparable to RAU-8. Genotype BM-2 has outstanding performance in respect plant height (95.21cm) and dry matter accumulation (19.76 g/plant), grain yield (19.54 q/ha) and straw yield (52.44 q/ha).*
***Key words :*** *Nitrogen levels, Varieties, Plant growth and yield.*

Received 30.04.2019 Revised 16.05.2019 Accepted 04.06.2019

**CITATION OF THIS ARTICLE**
Sima Kumari, Rajnish Anand, Deeba Hassan and C.S. Singh. Different levels of Nitrogen on Crop growth of finger millet. Int. Arch. App. Sci. Technol; Vol 11 [1] March 2020 : 46-49

## INTRODUCTION
Finger millet ranks fourth in productivity after wheat, rice and maize. Finger millet poses considerable production potential in less fertile, intense probably heat and chronically moisture deficit area. This might be due to deeper root system, better extraction of soil moisture, efficient photo-synthetic mechanism and rapid transfer of nutrient from source to sink. Finger millet contains 9.2 per cent protein, 76.32 per cent carbohydrates, 6.24 per cent minerals and 3.6 per cent fiber. No finer cereal is as rich as finger millet in its nutritive qualities. It is good for person suffering from diabeties. These millet are with high fiber content, protein quality and mineral composition contribute significantly to their nutritional security of some of the most disadvantaged groups of people. They are rich source of phytochemicals and micro-nutrients also so are aptly termed as 'nutri cereals'. Epidemiologically,millets are beneficial for management of diabetes mellitus, cardiovascular disease and gastrointestinal tract related disorders. Thus, millets are strategic in terms of their food, nutritional and livelihood security and their role in local agro-ecosystems. Cultivation of right type of genotype is a first step to increase the low production of finger millet in this region, where 75 per cent of farmers still use traditional low yielding local varieties. The high yielding new genotypes are more responsive to heavy fertilizer application. After harvest of short duration finger millet genotypes, second crop of rabi can be grown on residual soil moisture. However, the basic information available is inadequate on medium duration new genotypes of finger millet at different nitrogen levels particularly for Jharkhand in rainfed condition.

## MATERIAL AND METHODS
The experiment was conducted during kharif (rainy) season of 2009 at Birsa Agricultural University Farm Ranchi, on a representative upland sandy loam soil in texture and acidic in reaction pH (5.30) with poor fertility organic carbon (0.30%), available nitrogen

(182.2kg/ha) phosphorus(8.96 kg/ha) and potassium (92.70 kg/ha) representing major soil group of Jharkhand. The total annual rainfall of about 1350 mm, 85 percent is of which received between mid June to mid September. The experiment was laid out in randomized block design comprising twenty treatment combination replicated thrice. Under this investigation, four levels of nitrogen (0, 20, 40 and 60kg N/ha) with five medium duration finger millet new genotype ($V_1$-TNAU-1022, $V_2$-OEB-219, $V_3$-KMR-204, $V_4$-RAU-8 and$V_5$-BM-2). The details of the treatment combination are enlisted below: $T_1$ - $V_1N_0$, $T_2$ - $V_1N_{20}$, $T_3$ - $V_1N_{40}$, $T_4$ - $V_1N_{60}$, $T_5$ - $V_2N_0$, $T_6$ - $V_2N_{20}$, $T_7$ - $V_2N_{40}$ and $T_8$ - $V_2N_{60}$, . The experimental plot was ploughed with tractor drawn disc plough followed by harrowing and planking. Finger millet was sown at 30 cm row spacing with seed rate of 10 kg/ha in the first week of July ($4^{th}$). The soil was treated with BHC 10% dust at the rate of 25 kg/ha to guard against termite. In finger millet, full dose of 40 kg $P_2O_5$ and 25 kg $K_2O$/ha along with half dose of nitrogen as per treatment was applied at the time of sowing. Remaining half dose of nitrogen was applied after weeding (30 days after sowing) as per treatment. One interculturing operation at 15 days and one hand weeding at 30 days after sowing was done.

**RESULTS AND DISCUSSION**

The data revealed that plant height and dry matter accumulation increased gradually with increasing crop age and the values being maximum at harvest. The plant height (cm) of finger millet improved with corresponding increase in nitrogen levels. The maximum plant height (104.95 cm) was recorded with 60 kg N/ha at maturity which was comparable to 40 kg N/ha (103.47 cm). However, significant improvement in plant height was noticed only upto 40 kg N/ha at all the growth stages. Raj *et. al.* [5] also reported that increasing nitrogen rate increase plant height. The maximum plant height (99.78 cm) was recorded with BM-2 which was comparable to RAU-8 at all the growth stages. Favourable influence of nitrogen fertilization on crop growth on different varieties have also been reported by Pradhan and Ghosh [4]. It is apparent from the data (Fig.-1) that nitrogen levels significantly affected dry matter accumulation at all the plant growth stages. The maximum dry weight/plant (20.50 g) was recorded with 60 kg N/ha which was significantly superior to 20 kg N/ha and control (16.49 and 11.54 g/plant) but on a par to 40 kg N/ha (19.76 g/plant) at maturity. It is evident from the data that the highest dry weight/plant was recorded under BM-2 which was comparable to RAU-8 at all the growth stages. Borale *et. al.* [1] also reported that higher total dry matter accumulation was found at harvest in varieties PR-202 and Dapoli-1.

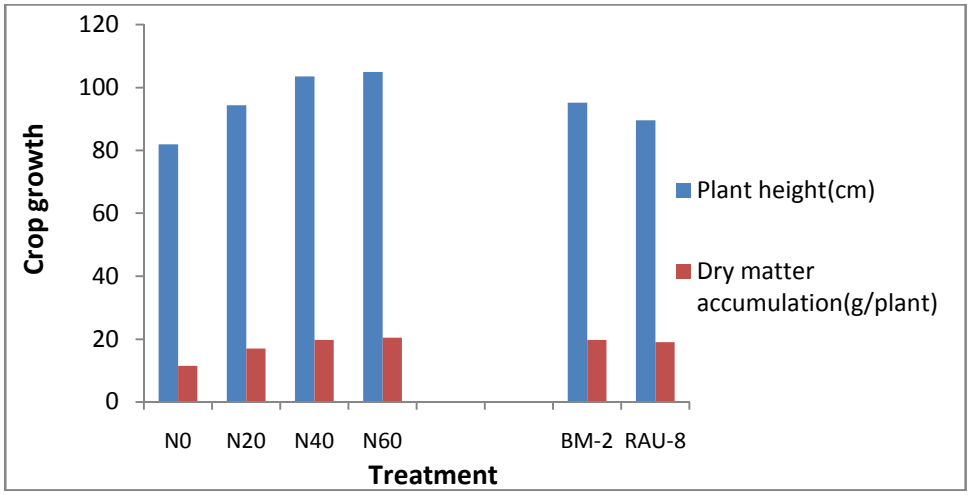


**Fig.- 1 Crop growth of finger millet, as influenced by nitrogen levels and varieties.**

Data pertaining to yield attributing characters i.e. effective tillers/meter row length fingers/ear, ear length(cm), weight/ear number of grain weight/ear and test weight(g), as affected by nitrogen levels and genotypes have been presented in Table 4.8. Examination of the data in (Fig.-2.) revealed that number of effective tiller/meter row length differed

significantly due to nitrogen levels and maximum number of effective tillers(30.88)/meter, finger/ear (7.52), ear length (7.15 cm),weight (6.40g)/ear and number of grains/ear (1865) were recorded with 60 kg N/ha. This is in conformity with findings of Pradhan & Ghosh [4] and Dubey and Shrivas [2]. Kulmi and Soni [3] also reported that yield attributes increased significantly with the increasing levels of fertility upto $N_{60}$, $P_{40}$ and $K_{20}$ kg/ha in kodo millet. The number of effective tillers/meter row length improved significantly with each successive increment in nitrogen levels upto 40 kg N/ha and further increase in nitrogen level upto 60 kg N/ha failed to cause significant effect on effective tiller/meter row length. The maximum number of effective tiller/meter row length (29.40 cm) finger/ear (7.47), ear length (6.51), weight (6.26g)/ear and number of grains/ear (1853) were recorded with BM-2 which was comparable to RAU-8.

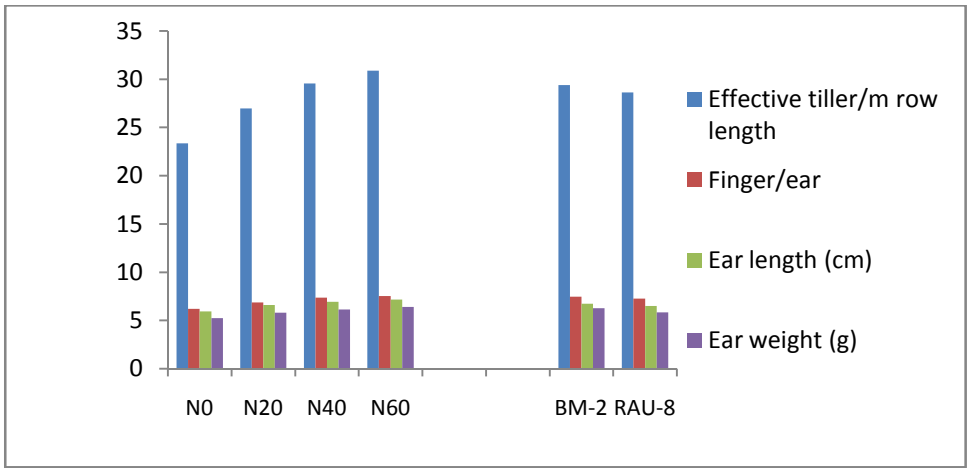


**Fig.- 2 Yield attributes of finger millet, as influenced by nitrogen levels and varieties.**

It is evident from the data (Fig.- 3.) that nitrogen levels caused significant variation in grain yield. The grain and straw yield of finger millet increased with increasing nitrogen levels and the maximum grain and straw yield (21.68 and 56.85 q/ha)) was recorded at 60 kg N/ha. However, significant improvement in grain and straw yield (20.71 and 54.12 q/ha) could be observed only upto 40 kg N/ha. There was an increase of about 48.93 and 18.80, 77.46 and 32.68, 85.77 and 39.37 per cent in yield due to application of 20, 40 and 60 kg N/ha, respectively as compared to control. The maximum grain and straw yield (19.54 and 52.44 q/ha) was recorded with BM-2 which was comparable to RAU-8(18.53 and 51.04 q/ha). This is in conformity with the findings of Sharma *et al.,* [8], Singh *et al.,* [9], Saini *et al.,* [7] and Roy *et al.,* [6].

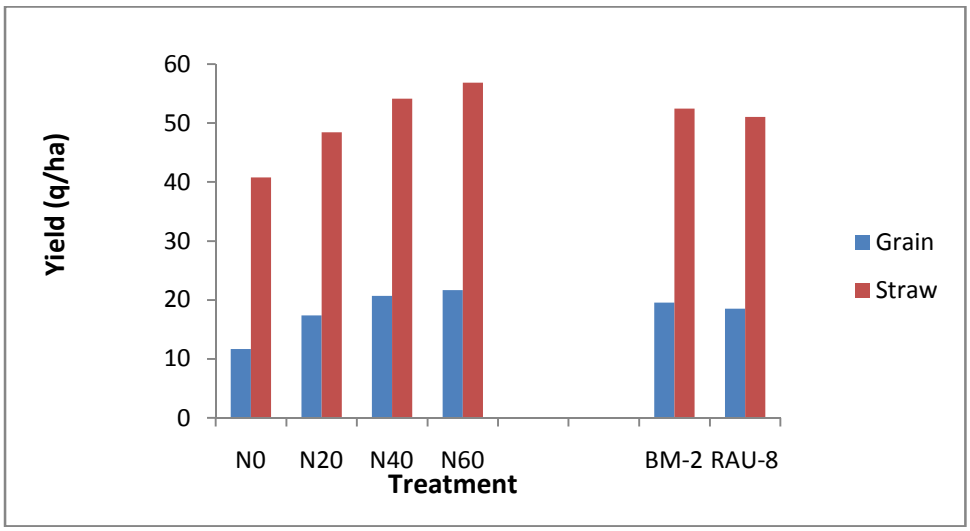


**Fig.- 3 Yield (q/ha) of finger millet, as influenced by nitrogen levels and varieties.**

## REFERENCES

1. Borale, J.S., Patil, T.R., Kagane, B.V. and Mahalle, A.M. (2002). Dry matter accumulation and its distribution in various plant parts in finger millet (Eleusine coracana Gaerth); *J. Soils and Crops,* 12(1): 46-48.
2. Dubey, O.P. and Shrivas, D.N. (1999). Response of finger millet (Eleusine coracana) genotypes to nitrogen. *Indian J. Agron.* 44(3): 564-566.
3. Kulmi, G.S. and Soni, S.N. (1997). Response of kodo millet varieties to sowing method and fertility levels under rainfed condition. *Indian J. Agron.*42 (1):116-119.
4. Pradhan, A.C. and Ghosh, D.C. (1986). Growth and yield variation of figer millet varieties due to nitrogen fertilization. *Indian J. Agron.* 31(1):63-68.
5. Raj, K.G., Patil, V.C. and Redder, G.D. (1979). Effect of nitrogen levels in *Setaria Italica. Bulletin of Maharashtra Agric. Univ.* 3(12):169-165.
6. Roy, D.K., Maitra, S., Saren, B.K., Chakraborty, A. and Chakraborty, P.K. (1996). Response of finger millet varieties to levels of nitrogen under rainfed red laterite zone. *Environ. and Ecol.* 14(2): 367-370.
7. Saini, J.P., Negi, S.C. and Singh, C.M. (1996). Response of finger millet genotype to N application under cold desert conditions. *Indian J. Agron.* 41(1): 61-64.
8. Sharma, R.B., Jain, V.K. and Verma, S.K. (1988). Influences of different levels of N on yield and protein of different varieties of finger millet grown under rainfed conditions. *Agric Sci. Digest.* 8(3): 161-164.
9. Singh, R.V., Arya, M.P.S. and Dwivedi, G.K. (1995). Effect of nitrogen on the yield of different varieties of finger millet under rainfed conditions; *Bhartiya Kri Anusa.Patrika.* 10(4): 197-203.