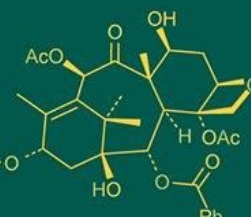
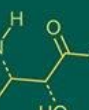
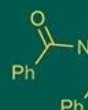


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## Response of finger millet (*Eleusine coracana* L. Gaertn) varieties to nitrogen levels

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### Abstract

A field experiment was carried out during *Kharif* season of 2022 at Research farm, Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (C.G.) to find out the growth characters, yield attributes and yields of finger millet varieties as influenced by different nitrogen levels. The treatments consisted of three varieties viz., Indira Ragi -1, CG Ragi-2 and CG Ragi-3 and three nitrogen levels viz., 40, 60 and 80 kg N ha<sup>-1</sup>. Results indicated that significant increased plant height, yield attributes and grain yield under CG Ragi-2 (3035 kg ha<sup>-1</sup>) followed by Indira Ragi-1 (2782 kg ha<sup>-1</sup>) and lowest under CG Ragi-3 (2625 kg ha<sup>-1</sup>). Application of 80 kg N ha<sup>-1</sup> to finger millet varieties produced taller plants and highest yield attributes and grain yield (2867 kg ha<sup>-1</sup>) and straw yield (5865 kg ha<sup>-1</sup>). The maximum gross return, net return and B:C ratio were recorded under CG Ragi-2 with an application of 80 kg N ha<sup>-1</sup>.

**Keywords:** Finger millet, genotype, nitrogen, yield

### Introduction

India is the leading producer and consumer of millet crops and their products. Millets provide food and fodder security to the dry land areas. They are also being recognized as food grains for nutrition and health. Finger millet (*Eleusine coracana* L. Gaertn) is an important small millet crop grown in India and has the pride of place in having highest productivity among millets. It is also known as ragi, mandua, African millet and Bird's foot millet and an important staple food crop in part of eastern and central Africa and India. In India, it is cultivated in Karnataka, Tamil Nadu, Andhra Pradesh, Orissa, Jharkhand, Uttaranchal, Maharashtra, and Gujarat. A finger millet grain has a high carbohydrate content of 81.5%, protein 9.8%, crude fiber 4.3% and mineral 2.7%. Which is comparable to other cereals like rice and wheat. Among all of the cereals and millets, finger millet has the highest amount of calcium (344 mg/ 100g) and potassium (283 mg/100g). The total ash content found in finger millet is nearly 1.7 to 4.13% which is higher than any other commonly consumed cereal grains. The area under finger millet in India is around 1048.81 thousand ha with a production is 1637.20 thousand tonnes and total productivity is 1561 kg ha<sup>-1</sup>. In Chhattisgarh, finger millet is grown in an area of 6.29 thousand ha with production of 1.42 thousand tonnes and having a total productivity 226 kg ha<sup>-1</sup> (Directorate of economics and statistics, 2021-22).

Nitrogen is the essential elements required for plant growth in relatively large amounts (Dhwayo and whgwin, 1984) [2]. Nitrogen fertilizer is one of the most yield limiting nutrients for crop production and it is applied in large quantity for most annual crops. It plays an important role in building units of proteins in the plant system. Thus, N nutrition not only influences productivity but also quality in finger millet. Nitrogen application has been found to increase the growth, dry matter production and yield under dry/rainfed conditions (Hari Prasanna, 2016) [3].

### Materials and Methods

The experiment was carried-out during *kharif* season of 2021-22 at Research farm, Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (C.G.). The total

rainfall 950 mm was season (July to November 2022). The soil of the experimental field was slightly acidic in received during the crop nature having pH 6.2.

Available nitrogen phosphorus and potash was 241, and 293 kg ha<sup>-1</sup>, respectively. The trial was laid out in factorial randomized block design.

The treatments consisted of three varieties viz., Indira Ragi - 1, CG Ragi-2 and CG Ragi-3 and three nitrogen levels viz., 40, 60 and 80 kg N ha<sup>-1</sup> and replicated three times. The crop was sown on 11th July, 2022. A common dose of 30 kg phosphorus and potash 20 kg ha<sup>-1</sup> and 50% N as per treatments were applied through single super phosphate, muriate of potash and urea, respectively at the time of sowing as basal dose. Remaining 50% N was applied during the active tillering and panicle initiation stage of the crop. The crop was harvested on 16th November, 2022. Observations on growth, yield contributing characters and yields were recorded and analyzed statistically to evaluate the treatment effects on finger millet.

## Results and Discussion

### Effect of varieties

The variable performance of finger millet was recorded with different varieties on growth parameters and yield attributes (Table 1) and yields and economics (Table 2). Variety CG Ragi-2 recorded significantly higher plant height (123.3 cm), number of tillers (42.33) and effective tillers per meter row length (38.22), dry matter accumulation (20.3 g plant-

1), crop growth rate ( 0.303 g plant<sup>-1</sup> day<sup>-1</sup>), number of grains per spike (2335), spike weight (6.7 g), biological yield (8472 kg ha<sup>-1</sup>), grain yield (3035 kg ha<sup>-1</sup>), straw yield (5817 kg ha<sup>-1</sup>) and harvest index (35.81%) over rest of the varieties.

### Effect of nitrogen levels

Different nitrogen levels showed remarkable influence on growth parameters and yield attributes (Table 1) and yields and economics (Table 2) of finger millet. Application of 80 kg N ha<sup>-1</sup> resulted in significantly higher plant height (123.5cm), number of tillers (40.88) and effective tillers per meter row length (36), dry matter accumulation( 19.1 g plant<sup>-1</sup>), crop growth rate ( 0.290 g plant<sup>-1</sup> day<sup>-1</sup> ), number of grains per spike (2211), spike weight ( 6.7 g), biological yield (8411 kg ha<sup>-1</sup>), grain yield (2867 kg ha<sup>-1</sup>), straw yield (5865 kg ha<sup>-1</sup>) and harvest index (34.06%) over 60 and 40 kg N ha<sup>-1</sup>. The present result is in close conformation with Munirathnam and Kumar (2015) [4], Yadav *et al.* (2010) [6].

### Economics

Net returns and B:C ratio were also maximum under CG Ragi-2 and 80 kg N ha<sup>-1</sup> followed by Indira Ragi-1 and 60 kg N ha<sup>-1</sup> and these was lowest under CG Ragi-3 and 40 kg N ha<sup>-1</sup>.

**Table 1:** Growth characters and yield attributes of finger millet varieties as influenced by nitrogen levels

| Treatments                                  | Plant height (cm) at harvest | Number of effective tillers per meter row length at harvest | Crop growth rate (g plant <sup>-1</sup> day <sup>-1</sup> ) | No. of grains spike <sup>-1</sup> | Spike weight (g) | 1000-seed weight (g) |
|---------------------------------------------|------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------|------------------|----------------------|
| <b>Varieties</b>                            |                              |                                                             |                                                             |                                   |                  |                      |
| Indira Ragi-1                               | 121.1                        | 32.11                                                       | 0.010                                                       | 2181                              | 6.5              | 2.82                 |
| CG Ragi-2                                   | 123.3                        | 38.22                                                       | 0.026                                                       | 2335                              | 6.7              | 3.11                 |
| CG Ragi-3                                   | 118.3                        | 31.44                                                       | 0.009                                                       | 2049                              | 6.2              | 2.64                 |
| SEm±                                        | 0.20                         | 0.55                                                        | 0.002                                                       | 2.55                              | 0.04             | 0.12                 |
| CD at 5%                                    | 0.62                         | 1.69                                                        | 0.008                                                       | 7.72                              | 0.14             | NS                   |
| <b>Nitrogen levels (kg ha<sup>-1</sup>)</b> |                              |                                                             |                                                             |                                   |                  |                      |
| 40                                          | 119.7                        | 32.33                                                       | 0.010                                                       | 2164                              | 6.3              | 2.71                 |
| 60                                          | 121.4                        | 33.77                                                       | 0.012                                                       | 2190                              | 6.4              | 2.83                 |
| 80                                          | 123.5                        | 36.00                                                       | 0.022                                                       | 2211                              | 6.7              | 3.03                 |
| SEm±                                        | 0.20                         | 0.55                                                        | 0.002                                                       | 2.55                              | 0.04             | 0.12                 |
| CD at 5%                                    | 0.60                         | 1.69                                                        | 0.008                                                       | 7.72                              | 0.14             | NS                   |
| <b>Interaction(V×N)</b>                     |                              |                                                             |                                                             |                                   |                  |                      |
| SEm ±                                       | 0.35                         | 0.96                                                        | 0.004                                                       | 4.24                              | 0.19             | 0.21                 |
| CD at 5%                                    | NS                           | NS                                                          | NS                                                          | NS                                | NS               | NS                   |

**Table 2:** Yields and economics of finger millet varieties as influenced by nitrogen levels

| Treatments                                  | Grain yield (kg ha <sup>-1</sup> ) | Straw yield (kg ha <sup>-1</sup> ) | Harvest index (%) | Net return (Rs. ha <sup>-1</sup> ) | B:C ratio |
|---------------------------------------------|------------------------------------|------------------------------------|-------------------|------------------------------------|-----------|
| <b>Varieties</b>                            |                                    |                                    |                   |                                    |           |
| Indira Ragi-1                               | 2728                               | 5700                               | 33.71             | 70687                              | 2.04      |
| CG Ragi-2                                   | 3035                               | 5817                               | 35.81             | 79960                              | 2.30      |
| CG Ragi-3                                   | 2625                               | 5438                               | 32.22             | 64823                              | 1.87      |
| SEm±                                        | 17                                 | 22                                 | 0.17              | 629                                | 0.01      |
| CD at 5%                                    | 54                                 | 66                                 | 0.52              | 1902                               | 0.05      |
| <b>Nitrogen levels (kg ha<sup>-1</sup>)</b> |                                    |                                    |                   |                                    |           |
| 40                                          | 2761                               | 5466                               | 33.82             | 69984                              | 2.03      |
| 60                                          | 2814                               | 5624                               | 33.92             | 71872                              | 2.07      |
| 80                                          | 2867                               | 5865                               | 34.06             | 73614                              | 2.10      |
| SEm±                                        | 17                                 | 22                                 | 0.17              | 629                                | 0.01      |
| CD at 5%                                    | 54                                 | 66                                 | 0.52              | 1902                               | 0.05      |
| <b>Interaction(V×N)</b>                     |                                    |                                    |                   |                                    |           |
| SEm ±                                       | 30.51                              | 38.06                              | 0.30              | 1089                               | 0.03      |
| CD at 5%                                    | NS                                 | NS                                 | NS                | NS                                 | NS        |

## Conclusion

From thesis results it may be concluded that maximum and profitable yield of finger millet can be secured by sowing the variety CG Ragi-2 and using the nitrogen levels 80 kg N ha<sup>-1</sup> under prevailing agro climatic conditions.

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