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# Effect of Genotypes and Mother Plant Nutrition on Growth and Yeild Parameters in Makoi (*Solanum nigrum* L.)

**Key words :** Fertilizer Level, Makoi, Medicinal Plant, Yield Paramaeters.

Makoi (*Solanum nigrum* Linn.) is popularly known as Blacknight shade. It is an economically important medicinal crop belonging to family Solanaceae. The plant is native to South America and is found distributed all over plains of India and warm hilly areas up to an elevation of 2,100 m from mean sea level. It is distributed in all temperate and tropical regions of the world (Anonymous,1996). It is also reported that it occur in certain parts of Sri Lanka, China, Guinea, Madgascar, Rhodesia and South Africa. In India, Makoi is referred by several names *viz.,* Kakisoppu, Ganikesoppu and Karikachi (Kannada), Kakamachi (Sanskrit), Piludu (Gujarathi), Gurkama, Makoy and Makoi (Hindi), Manathakkali (Tamil), Kakamanchi, Buddakasa (Telugu) and Gudkamai (Bengali).

It cures the chronic skin disorders, rheumatism, heart diseases and joint pains. It acts as biocide against *Staphylococcus aureus* and *Escherichia coli.*

The present investigation was carried out at Sanjeevini Vatika, Department of Horticulture, University of Agricultural Sciences, Bangalore during June – September 2005. The experimental site is located at an elevation of 930m above the Mean Sea Level on latitude of 12°58' North and longitude of 77°35'. The experiment was laid out in Factorial Randomized Complete Block Design (RCBD). The experiment comprised of three genotypes and five fertilizer levels in three replications. There were fifteen treatment combinations; the details of the treatments were as following.

| | | Genotypes | Source |
|---|---|---|---|
| $G_1$ | : | MG-1 | GKVK, Bangalore |
| $G_2$ | : | MG – 13 | Palakkad, Kerala |
| $G_3$ | : | MG – 14 | Udaipur, Rajasthan |

Fertilizer levels

$F_1$ - 100:50:50kg NPK $ha^{-1}$ + FYM @ 10 t $ha^{-1}$ (RDF)
$F_2$ - 125:75:75kg NPK $ha^{-1}$ + FYM @ 10 t $ha^{-1}$
$F_3$ - 150:100:100kg NPK $ha^{-1}$ + FYM @ 10 t $ha^{-1}$
$F_4$ - 75% of N & P of $F_1$(75 kg N + 37.5kg P kg $ha^{-1}$) + full dose of K + Azatobacter+ PSF + FYM @ 10 $ha^{-1}$.
$F_5$ - 75% NPK of $F_1$ (75 kg N + 37.5kg P kg + 37.5 kg K $ha^{1}$) + 25 % of NPK through poultry manure + FYM @ 10 t $ha^{-1}$

Plot size
Gross Plot = 2.25 x 2.1$m^2$ and Net Plot = 1.35 x 1.5 $m^2$
Spacing = 45cm x 30cm

**Nursery practices**

The seedlings of 3 genotypes were sown in raised nursery beds of standard size. The seeds were soaked in $GA_3$ @ 500 ppm for 12 hours to overcome internal seed dormancy and to ensure good germination. Seed beds were well prepared by thorough mixing of sand, farm yard manure and finally mixed with 0.5 kg of 19:19:19 NPK fertilizer in each bed. The seeds were mixed with equal proportion of fine sand and were sown thinly in lines in seed beds during first week of June, 2005. A thin layer of fine FYM powder was spread over the seedbed and it was mulched with dry coconut fronds. Watering was done daily until seed germination started. After germination, the mulch was removed and general care regarding watering, weeding, *etc.,* were taken. Five weeks old seedlings were transplanted in the main field.

The plant height was measured from base of the plant to growing tip at 70 days after transplanting in each treatment and mean values were computed. The total numbers of branches produced in each plant were counted at 70 days after transplanting and their mean value per plant was computed. Daily counts were made in each plot starting from 25 days after transplanting. The date on which 50 per cent of plants in net plot flowered was recorded. From the date of sowing the number of days taken for 50 per cent flowering was computed. Days to maturity was computed counting the number of days taken from transplanting till the berries in the plants turned to black colour. The number of clusters per plant were computed by selecting five plants in the plot. The freshly harvested ripe berries from each plant

Table 1. Effect of genotypes and mother plant nutrition on plant height (cm) and number of branches at 70 days after transplanting in various genotypes of Makoi

| Genotypes (G) | Plant height (cm) at 70 days | | | | | | Number of branches | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fertilizer dosages | | | | | | | | | | | |
| | **$F_1$** | **$F_2$** | **$F_3$** | **$F_4$** | **$F_5$** | **Mean** | **$F_1$** | **$F_2$** | **$F_3$** | **$F_4$** | **$F_5$** | **Mean** |
| $G_1$ | 77.90 | 92.91 | 85.71 | 78.98 | 80.92 | 83.28 | 26.54 | 35.12 | 29.05 | 28.69 | 29.50 | 29.78 |
| $G_2$ | 77.30 | 82.15 | 88.61 | 71.59 | 79.13 | 79.75 | 31.45 | 31.67 | 33.58 | 28.13 | 29.14 | 30.79 |
| $G_3$ | 71.10 | 86.19 | 78.61 | 74.21 | 77.30 | 77.44 | 30.10 | 33.67 | 33.54 | 31.15 | 31.50 | 31.97 |
| Mean | 75.43 | 87.08 | 84.31 | 74.92 | 79.10 | 80.16 | 29.33 | 33.48 | 32.05 | 29.32 | 30.04 | 30.84 |
| | **SEm±** | | | **CD @ 5%** | | | **SEm±** | | | **CD @ 5%** | | |
| Genotypes(G) | 1.08 | | | 3.12 | | | 0.52 | | | 1.51 | | |
| Fertilizers( F) | 1.39 | | | 4.03 | | | 0.67 | | | 1.95 | | |
| GxF | 2.41 | | | 6.99 | | | 1.17 | | | 3.39 | | |

Table 2. Effect of genotypes and mother plant nutrition on days to 50 per cent flowering, days to maturity and number of berries per clusters in various genotypes of Makoi

| Genotypes (G) | Days to 50 per cent flowering | | | | | | Days to maturity | | | | | | Number of berries per cluster | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fertilizer dosages | | | | | | | | | | | | | | | | | |
| | $F_1$ | $F_2$ | $F_3$ | $F_4$ | $F_5$ | **Mean** | $F_1$ | $F_2$ | $F_3$ | $F_4$ | $F_5$ | **Mean** | $F_1$ | $F_2$ | $F_3$ | $F_4$ | $F_5$ | **Mean** |
| $G_1$ | 24.66 | 32.33 | 28.67 | 31.00 | 33.67 | 30.47 | 62.0 | 71.0 | 63.0 | 69.0 | 70.7 | 67.3 | 4.34 | 5.55 | 5.24 | 4.60 | 4.82 | 4.91 |
| $G_2$ | 23.00 | 24.67 | 32.33 | 29.33 | 31.33 | 28.13 | 59.3 | 63.4 | 67.0 | 64.0 | 66.7 | 64.0 | 4.30 | 4.87 | 4.79 | 4.61 | 4.62 | 4.64 |
| $G_3$ | 21.66 | 32.67 | 26.33 | 28.67 | 31.33 | 28.13 | 58.7 | 67.7 | 60.7 | 64.0 | 69.0 | 64.0 | 4.66 | 4.91 | 4.93 | 4.65 | 4.78 | 4.79 |
| Mean | 23.11 | 30.56 | 29.11 | 29.67 | 32.11 | 28.91 | 60.0 | 67.4 | 63.6 | 65.7 | 68.8 | 65.0 | 4.43 | 5.11 | 4.99 | 4.62 | 4.74 | 4.78 |

**Comparision of means between**

| | **SEm±** | **CD @ 5%** | **SEm±** | **CD @ 5%** | **SEm±** | **CD @ 5%** |
|---|---|---|---|---|---|---|
| Genotypes(G) | 0.26 | 0.77 | 0.6 | 1.3 | 0.03 | 0.10 |
| Fertilizers( F) | 0.34 | 1.00 | 0.8 | 1.7 | 0.04 | 0.13 |
| GxF | 0.60 | 1.74 | 1.4 | 2.9 | 0.08 | 0.23 |

Table 3. Effect of genotypes and mother plant nutrition on fresh weight of berries per plant (g), test weight of seeds (g) and seed yield per hectare (kg) in various genotypes of Makoi

| Genotypes (G) | Fresh weight of berries (g) | | | | | | Test weight (g) | | | | | | Seed Yield hectare$^{-1}$ (kg) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fertilizer dosages | | | | | | | | | | | | | | | | | |
| | **$F_1$** | **$F_2$** | **$F_3$** | **$F_4$** | **$F_5$** | **Mean** | **$F_1$** | **$F_2$** | **$F_3$** | **$F_4$** | **$F_5$** | **Mean** | **$F_1$** | **$F_2$** | **$F_3$** | **$F_4$** | **$F_5$** | **Mean** |
| $G_1$ | 116.53 | 122.56 | 122.23 | 117.25 | 118.54 | 119.40 | 0.817 | 0.837 | 0.821 | 0.848 | 0.882 | 0.841 | 660.2 | 861.6 | 800.2 | 792.8 | 759.0 | 774.7 |
| $G_2$ | 105.93 | 126.57 | 125.61 | 106.73 | 107.86 | 114.50 | 0.420 | 0.423 | 0.458 | 0.461 | 0.445 | 0.441 | 751.5 | 855.5 | 813.0 | 767.1 | 775.0 | 792.4 |
| $G_3$ | 106.28 | 128.82 | 128.82 | 108.18 | 109.26 | 116.00 | 0.414 | 0.418 | 0.482 | 0.433 | 0.460 | 0.461 | 769.8 | 809.1 | 892.3 | 773.0 | 775.5 | 803.9 |
| Mean | 109.55 | 125.49 | 125.60 | 110.70 | 111.90 | 116.60 | 0.551 | 0.559 | 0.587 | 0.581 | 0.596 | 0.575 | 727.1 | 842.0 | 835.1 | 777.6 | 769.8 | 770.3 |

**Comparision of means between**

| | **SEm±** | **CD @ 5%** | **SEm±** | **CD @ 5%** | **SEm±** | **CD @ 5%** |
|---|---|---|---|---|---|---|
| Genotypes(G) | 0.65 | NS | 0.002 | NS | 16.1 | NS |
| Fertilizers( F) | 0.83 | 2.41 | 0.003 | 0.008 | 19.4 | 56.2 |
| GxF | 1.44 | 4.18 | 0.005 | 0.015 | 11.7 | NS |

were collected separately and weighed in weighing balance and their mean values were computed. From each treatment one thousand seeds of three replicates were selected and weighed. The mean weight was estimated as per ISTA (Anonymons 1996). Seed yield per plant was converted to get seed yield per hectare.The data on various biometric observations collected during the study were subjected to statistical analysis as per the procedure outlined by Sundararaj *et al.* (1972).

There was significant difference between genotypes and mother plant nutrition on plant height and number of branches. The highest plant height and number of branches was recorded in MG-1 when supplied with $F_2$ (125:75:75 kg NPK $ha^{-1}$ + FYM 10t $ha^{-1}$) (92.91 cm and 35.12, respectively) when compared to lower levels of fertilizers $F_1$ (100:50:50 kg NPK $ha^{-1}$+ FYM 10t $ha^{-1}$) (Table1). Similar results were observed by Sreechandana (2004) in *Solanum viarum.*

The genotypes and mother plant nutrition differed significantly on days to 50 per cent flowering and days to maturity. There was delay in days to 50 per cent flowering and days to maturity in MG-1 when supplied with $F_5$ (75% of NPK of $F_1$ + 25 % NPK through poultry manure + FYM 10t $ha^{-1}$) (33.67days and 71 days, respectively) when compared to lower levels of fertilizer $F_1$(100:50:50 kg NPK $ha^{-1}$+ FYM 10t $ha^{-1}$) (Table 2). This may be probably due to negative influence of bio fertilizers on flowering. Similar results were recorded by Mohanchandra (2003) in *Solanum nigrum.* Contrary to this Gururaj and Mallikarjunaiah (1995) reported that inoculation of bio-fertilizers hastened the flowering in Sunflower.

The more number of berries per cluster per plant was observed in MG-1 with $F_2$(125:75:75 kg NPK $ha^{-1}$ + FYM 10t $ha^{-1}$) (5.55) (Table 3) when compared other genotypes and nutrition levels. The response of this variety may be probably due to the nutrients available was sufficient at this fertilizer level. Similar result was recorded by Ali *et al.* (1993) in coriander.Higher fresh weight of berries was observed in MG-14 with $F_2$ (125:75:75 kg NPK $ha^{-1}$ + FYM 10t $ha^{-1}$) and $F_3$ (150:100:100 kg NPK $ha^{-1}$+ FYM 10t $ha^{-1}$) (128.2g) when compared to lower levels of fertilizers F (100:50:50 kg NPK $ha^{-1}$+ FYM 10t $ha^{-1}$) (Table 3).[1] The higher test weight was recorded in MG-1 with $F_5$ (75% of NPK of $F_1$ +25 % NPK through poultry manure + FYM 10t $ha^{-1}$) (0.88 g) (Table 3). The response of this genotype for this fertilizer level may be due to the positive influence of bio fertilizers on test weight. Similar results were recorded by Gururaj and Mallikarjunaiah (1995) in Sunflower.The interaction effect between genotypes and mother plant nutrition differed non significant for seed yield per hectare.

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