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Influence of organics, plant growth regulators and micronutrients on dry matter production and root yield in carrot (*Daucus carota* L.) genotypes

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SUMMARY

Field experiments were conducted to evaluate the influence of organics, plant growth regulators and micronutrients in two cultivars of carrot (Dharwad Local and Pusa Kesar) at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during 2003-04 and 2004-05. The results revealed that application of RDF + GA_3 (40 ppm), RDF + cytozyme (2000 ppm) and RDF + miraculan (2000 ppm) recorded significantly higher dry weight of leaf, dry weight of root, TDM and root yield compared to other treatments. Among varieties, Pusa Kesar recorded higher root dry weight and root yield over Dharwad local.

Key words : Carrot, Dry matter, Yield, GA_3, $MgSO_4$, $MnSO_4$, $FeSO_4$, FYM, RDF.

Carrot (*Daucas carota* L.) is an excellent source of carotene, a precursor of vitamin-A and fibre in the diet. Vitamin-A is an important nutrient, especially deficiency of which causes xerophthalmia, an eye ailment. In India at present, there is an alarming situation because of the vitamin-A deficiency, particularly in children causing great concern. There is an urgent need to direct various programmes for developing carotene rich crops wherever possible. Several medicinal qualities are also attributes to this vegetable crops such as cooling effect on the body, a strengthening effect on the heart and brain, prevention of constipation and possession of diuretic properties. Purple and black carrots are used for the preparations of a sort of beverages called 'kanjal', which is a very good appetizer.

MATERIALS AND METHODS

Field experiments were carried out on Dharwad Local and Pusa Kesar varieties of carrot for two years during 2003-04 and 2004-05 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad in factorial randomized block design with three replications in a medium black clay loam soil. Sixteen treatments comprised of organics, plant growth regulators and micronutrients including control. The seeds were sown in first week of November during both the years with a spacing of 22.5x10 cm and the data were analysed statistically separately for two years.

RESULTS AND DISCUSSION

The dry matter accumulation or production is of greater significance in the determination of yield. With the application of organics, plant growth regulators and micronutrients, the canopy structure and partitioning of assimilates in desirable plant parts can be improved. Significantly higher leaf dry weight was recorded with the application of RDF + GA_3 (40 ppm), RDF + cytozyme (2000 ppm) and RDF + miraculan (2000 ppm) (Table 1). This may be due to the beneficial effects of these growth regulators on leaf development. Similarly, foliar application of NAA at flowering leads to higher leaf dry matter production in soybean (Merlo *et al.*, 1987), in potato (Padmavathi, 1998) and in turmeric (Jirali, 2001).

The data on dry weight indicated significant differences due to organics, plant growth regulators and micronutrients in both varieties. The application of RDF + GA_3 (40 ppm) and RDF + cytozyme (2000 ppm) showed significantly higher root dry weight over other treatments suggesting positive influence of these growth regulators on root growth and development, finally the dry weight of root. Similar results of increased bulb dry weight with application of NAA and GA has also been reported by Singh *et al.* (1982). The enhanced dry weight of root by the growth regulators may be due to increased translocation of assimilates found source to sink. Similar effects were also found in soybean due to the application of NAA (Shukla *et al.*, 1997).

The amount of total dry matter (TDM) (Table 2) produced is an indication of overall efficiency of the utilization of resources and better light interception. The increase in total dry matter toward maturity may be due to higher rate of CO_2 fixation and RuBp corboxylase activity during crop growth. The TDM was significantly higher in Dharwad Local over Pusa Kesar variety. The data indicated that, total dry matter was significantly higher with RDF + GA_3 (40 ppm) and RDF + cytozyme (2000 ppm) as compared to other treatments. This could be attributed to higher leaf area, leaf length and plant

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