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High Density Plantation in Saffron (*Crocus sativus* L.) for Achieving Higher Yields

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A B S T R A C T

The high density plantation approach is in vogue these days to mitigate the effects of decreasing area under the saffron cultivation. The approach has found wide adoption due to increase in the production and productivity of flowers as well as corms. A study was conducted wherein the graded and disease free corms were planted at different densities viz. 5corms/hill (25 X15cm), 10 corms/ hill (30 X 20 cm), 12 corms/hill (30 X 20cm) and 15 corms/hill at the density of 20X10 cm after following the recommended package of practices. It was found that the 5 corms/hill resulted in maximum daughter corm production, more number of leaves, higher flower production and hence more yields.

Introduction

Saffron (*Crocus sativus* L) is a slow growing perennial plant regenerating from regenerating from vegetative multiplication of its underground corms. Saffron is regarded as the most costly spice in the world being recognised as an anticancer medicinal herb (Gresta *et al.*, 2008). It is widely known for its aroma, colour and medicinal properties.

Saffron is cultivated worldwide from Spain to Kashmir (0^o- 90^oE longitude) and 30^o-42^oN latitude (Persia- England) (Anwar *et al.*, 2011). Though it has gained popularity worldwide, yet its production is all the countries (except Iran) have declined. In spite of the fact that more area has been brought under its cultivation, the declining trend of production envisages use of alternate methods for increasing production. Being a vegetatively propagated crop, the timely availability of the bigger sized disease free corms is an indispensable input which forms the single most costly input in saffron cultivation. Saffron is made up of a complex mixture of volatile and non-volatile compounds that contribute to its overall aroma and flavour (Moraga *et al.*, 2009).

Materials and Methods

Saffron corms 2.5-3 cm diameter having >8 g weight were sorted out and subjected to the

fungicide treatment of Carbendazime + Mancozeb (2.5 g/lt). The saffron corms were planted at a distance of 15 X25 cm spacing in a bed of 2X 15 cm dimension. The corms were planted at the rate of 2 corm/hill, 3 corm/hill, 4 corm/hill and 5 corm/hill and fertilisers were applied at the scheduled time and quantity. The sprinkler irrigation was applied in the month of August and September. The integrated nutrient management module of 120: 90: 80 kgs /ha was followed. The corms were hand sown at a depth of 15 cm. Weeding and Hoeing were carried out for better corm development.

Results and Discussion

Under high density production system, saffron yield has considerably increased. A benefit: cost ratio of 4.28: 1 has been achieved which amounts to an average productivity of 11.88 kg /hectare compared to 6.37 kg / hectare under normal density over 4 years planting cycle (Table 2).

Table.1 Plant characteristics in terms of corm density

Corm density (Corm/hill)	Number of flowers		Number of daughter corm/mother corm	
	1st year	2nd year	1st year	2nd year
5	400	423	2.04	2.14
10	405	402	2.16	2.03
12	412	406	2.20	1.87
15	417	407	2.02	1.85

Table.2 Yield characteristics with reference to corm density

Corm density (corm /hill)	Corm yield/m^2		Yield(kg/ha)	
	1st year	2nd year	1st year	2nd year
5	282.14	293	5.0	12.5
10	315.27	310.14	7.5	11.0
12	322.60	311.36	8.3	10.3
15	335.42	312.42	8.9	9.50

Study confirmed that under temperate conditions of Kashmir, corms planted at high densities *viz.*, 10corm / hill, 12corm/hill and 15 corm/hill remain viable only up to two years.

The corms are destroyed due to overcrowding whereas corms planted 5corm / hill exhibited superiority by 86.49% over normal density of 1 corm/hill (Table 1).

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