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Effects of planting dates and spacing on disease incidence of *Alternaria* blight in African marigold (*Tagetes erecta* L.)

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Abstract

The investigation was carried out to study the effect of different planting dates and spacing on alternaria blight of African marigold cv. 'Pusa Narangi Gaiinda'. The treatments comprised of four planting dates, viz., 1st September (D1), 1st October (D2), 1st November (D3) and 1st December (D4) and three plant spacings, viz., 40×20 cm (S1), 40×40 cm (S2) and 40×60 cm (S3). The experiment was laid out in Factorial Randomized Block Design with twelve treatment combinations replicated thrice. Among different planting dates, maximum disease incidence (52.17%) was observed in 1st December planting, while minimum disease incidence (9.48%) was obtained in 1st September planting. As regards the effect of spacing, more disease incidence (29.75%) occurred at closer spacing of 40×20 cm as compared to the lesser disease incidence (23.06%) recorded with wider spacing of 40×60 cm. With regards to interaction effects, maximum disease incidence (60.50%) was observed in 1st December planting with closer spacing of 40×20 cm.

Keywords: Marigold, spacing, planting dates, disease incidence

Introduction

Marigold (*Tagetes spp.*) is one of the most important commercial flower crop in the global floriculture industry. It belongs to the family Asteraceae. Marigold has been named after Virgin Mary. The king Cortez after conquering Mexico got fascinated by the beauty of the flower and carried it to the Spain. It was then offered to the attar of Virgin "Mary" and thus got its name Mary's gold which is now popularly known as marigold (Marshall, 1969) [3]. The popularity of the marigold can be attributed to its ease in cultivation, wider adaptability to varying soil and climatic conditions, profuse flowering, short cropping duration and attractively colored flowers. The natural carotenoid pigments extracted from marigold petals are used in poultry feed and as a natural dye in various industries (Naik *et al.*, 2005) [5]. In India, the total area under floricultural crops is about 191,000 ha with a production of 1031 thousand metric tonnes of loose flowers. Tamil Nadu is the leading producer with an acreage of 32,000 ha contributing about 24% of total production of loose flowers in the country. Jammu and Kashmir has an area of 0.1 thousand hectare under flower cultivation with a production of 0.2 thousand metric tonnes of loose flowers (Anonymous, 2011) [1]. Though, quality of flower and yield is primarily a genotypic trait, it is greatly influenced by the prevailing environment during its growing period. Among other cultural requirements for proper growth and flowering of marigold, planting date is the most important factor which ensures the flower yield and its quality. Besides the planting date, growth and flower production is also affected by spacing. Kumar and Singh (2011) [2] are of the opinion that closer spacing provides more number of plants but deteriorates the quality of flower.

Materials and Methods

The present investigation was carried out at the experimental farm of the Division of Vegetable Science and Floriculture, FOA, Chatha, SKUAST-Jammu during the year 2011-12 in Factorial Randomized Block Design with two factors (dates of transplanting and spacing). There were twelve treatment combinations involving 4 planting dates, viz., D₁-1st September transplanting, D₂-1st October transplanting, D₃-1st November transplanting and D₄-1st December transplanting and 3 spacing, viz., S₁- 40 × 20 cm, S₂-40 × 40 cm and S₃- 40 × 60 cm. The total numbers of plots were 36 and the size of each plot was 2.40 m × 2.40 m. After field preparation, layout was done as per the treatments and the healthy seedlings with 3-4 leaves were transplanted on 1st September, 1st October, 1st November and 1st December,

2011. Recommended package of practices were followed from time to time. The incidence of *Alternaria* leaf blight of marigold was calculated by using the formula as:

$$\text{Disease incidence (\%)} = \frac{\text{Number of plants infected}}{\text{Total number of plants observed}} \times 100$$

Results and Discussion

The results pertaining to the effect of planting dates and spacing on percent disease incidence (*Alternaria* blight) have been depicted in Table 1. It is evident from the table that planting dates have a significant effect on the disease incidence of African marigold cv. 'Pusa Narangi Gaiinda'. In general, among different planting dates, maximum disease incidence (52.17%) was observed in 1st December planting,

while minimum disease incidence (9.48%) was obtained in 1st September planting.

As regards the effect of spacing, more disease incidence (29.75%) occurred at closer spacing of 40×20 cm as compared to the lesser disease incidence (23.06%) recorded with wider spacing of 40×60 cm.

Interaction between planting dates and spacing also exhibit significant effect on percent disease incidence. In general, maximum disease incidence (60.50%) was observed in 1st December planting with closer spacing of 40×20 cm. In contrast, minimum disease incidence (8.60%) was recorded in 1st September planting at a wider spacing of 40×60 cm and was found statistically at par with 1st September planting at a spacing of 40×40 cm (9.50%).

Table 1: Effect of planting dates, spacing and their interaction on disease incidence (%) of African marigold cv. 'Pusa Narangi Gaiinda'

Planting Dates \ Spacing	Spacing			Mean
	S ₁ (40×20 cm)	S ₂ (40×40 cm)	S ₃ (40×60 cm)	
D ₁ (1 st September)	10.33 (18.73)	9.50 (17.93)	8.60 (17.04)	9.48 (17.90)
D ₂ (1 st October)	17.66 (24.81)	15.00 (22.75)	14.00 (21.95)	15.55 (23.17)
D ₃ (1 st November)	30.52 (33.52)	28.22 (32.07)	24.33 (29.53)	27.69 (31.71)
D ₄ (1 st December)	60.50 (51.04)	50.67 (45.36)	45.33 (42.30)	52.17 (46.24)
Mean	29.75 (32.02)	25.85 (29.53)	23.06 (27.71)	

CD_(0.05) for:

Spacing = 0.36

Planting dates = 0.41

Planting dates × spacing = 0.72

Note: The values given in parenthesis are angular transformed values.

It has been known that cultural methods have highest value in management and suppression of disease. In the present investigation, the effect of planting dates and spacing on *Alternaria* blight incidence of marigold was also observed. The highest disease incidence (60.50%) was reported in late sown planting (1st December) with closer spacing of 40×20 cm. Whereas, minimum disease incidence (8.60%) was observed in early planting date (1st September) at a wider spacing of 40×60 cm. The severity of *Alternaria* leaf blight was significantly different among the different planting dates and planting densities showing that the incidence of the disease increase significantly with a delay in planting. The results are in agreement with the findings of Mengistu and Yamoah (2010) [4].

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