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Comparative study on effect of irrigation during fruit development on yield in mango cv. Alphonso

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Abstract

The comparative study was conducted in hard lateritic rocky area during the fruiting season 2017-18 to assess the effect of irrigation during fruit development on yield of mango cv. Alphonso. The maximum fruit retention at harvest stage (5.95 per cent) and delayed maturity (103.93 days) were observed in the trees where irrigation was given (T₁). The highest fruit weight (236.37g) and yield (37.93 kg/tree) were also obtained in irrigation treatment indicating 36.98 per cent increased yield over control.

Keywords: Mango, alphonso, irrigation, yield

Introduction

Mango (*Mangifera indica* L.) is national fruit of India and known as “King of fruits” and occupies a distinctive position in global fruit trade. It is extensively cultivated in India occupying more than 45 per cent of total world production. India has wealth of cultivars of mango and thousands of cultivars exist in country. Among them, ‘Alphonso’ is the choicest cultivar due to its peculiar characteristic like attractive colour and shape, sugar-acid blend, pleasant aroma, superior fragrance, highly appreciable flavour, delicious taste and long keeping quality. It has major share in total mango export and is commercially cultivated in Maharashtra, Goa, Gujarat and Karnataka. The Alphonso mango from Konkan region of Maharashtra has unique worth in the market and preferably mango fruits from Deogad tahsil of Sindhudurg districts have prime value as it grown in the unique geographic territory having hard lateritic rocky area (Malshe *et al.*, 2017) [5].

Conversely, there are certain limitations in Alphonso cultivar as it is irregular bearer, sensitive to climate aberration and occurrence of certain physiological disorder; spongy tissue. The flowering and fruiting in mango is complex and depend on several internal and external (Biotic and abiotic) factors. The proper management during fruit development stage is also essential in mango. The reduction in fruit drop and to yield improvement, several management practices during fruit development stage such as irrigation, spray of nutrients and growth promoters, etc. were recommended. The mango crop especially grown on hard lateritic rocky area of Konkan region is a site specific plantation and management of crop during fruit development stage is essential and it gives better response to irrigation. The protected irrigation of 150 to 200 litre of water at fortnight interval starting from pea grain stage to one month before harvesting time is recommended for reducing fruit drop (Anon. 2009) [1]. However, the geographical situation, availability of irrigation water, etc. are the major constraints in the region. Though the growers are aware about the benefits of irrigation practice, they are not adopting since they suppose as tedious practice. The dissemination of such technology to grower community, demonstration is an ideal tool. The present comparative study was undertaken to assess the effect of irrigation on mango yield cv. Alphonso under hard lateritic rocky area of Deogad region.

Materials and Methods

The comparative study was conducted in hard lateritic rocky area in different 4 villages of Deogad tahsil of Sindhudurg district of Maharashtra during the fruiting season 2017-18. For demonstration, uniform, 35 years old mango trees of cv. Alphonso were selected at 15 mango orchards and recommended management practices *viz.*, nutrient management, application of paclobutrazol, plant protection, etc. were followed unvaryingly. The treatments were T₁: Irrigation @ 150 lit water at 15 days interval starting from pea grain stage to one month before harvesting time and T₂: Control. The observations on fruit retention, fruit weight and yield were recorded. The data were analyzed statistically (Panse and Sukhatme, 1967) [6].

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Results and Discussion

The data on Influence of irrigation during fruit development stage on fruit retention percentage and days required for maturity from fruit set in mango cv. Alphonso are presented in Table 1. The revealed that there was noteworthy influence on fruit retention percentage in mango cv. Alphonso. The maximum fruit retention at harvest stage (5.95 per cent) was observed in the trees were irrigation was given (T₁). However, in untreated trees (Control) the fruit retention was 3.18 per cent. The improvement in fruit retention percentage might be due to supplementary moisture supply during fruit development stage which ultimately control the fruit drop. Fruit growth is slow at early stage, grows faster at rapidly expansion stage, slowing down at mature stage during the whole fruit growth cycle with one growth peak. Soil water content is essential to the early development of mango fruit. Water supply is the most critical during the first 42 days of fruit development (Wei *et al.*, 2017) [9]. The results are in agreement with Uddin and Amin (1994) [8] and Malshe *et al.* (2019). The days required for fruit maturity from fruit set was also differed significantly and the delayed maturity (103.93 days) was observed in irrigation treatment (T₁) as against 94.53 days in control. Normally, under lateritic rocky conditions the mango fruits mature early than the other territory as required heat units are being completed in shorter period. Burondkar *et al.* (2000) [2] reported that Alphonso cultivar recorded 93 days duration and 701 degree days heat units on typical lateritic rocky slopes of Deogad.

Table 1: Influence of irrigation during fruit development stage on fruit retention percentage, and days to maturity of fruits in mango cv. Alphonso

Treatment	Fruit retention at harvest stage (%)	Days to attain maturity from fruit set
T1: Irrigation	5.95 (± 1.52)	103.93 (± 4.11)
T2: Control	3.18(± 0.73)	94.53 (± 3.94)
S. E. ±	0.16	1.61
C. D. at 5%	0.51	4.87

Table 2: Influence of irrigation during fruit development fruit weight and yield of mango cv. Alphonso

Treatment	Average fruit weight (g)	Yield (Kg/tree)	Yield improvement over control
T1: Irrigation	236.37 (± 12.67)	37.93 (± 5.85)	36.98%
T2: Control	223.43 (± 7.70)	27.69 (± 5.47)	-
S. E. ±	1.61	0.74	-
C. D. at 5%	4.87	2.24	-

The data on the influence of irrigation during fruit development stage on fruit weight and yield in mango cv. Alphonso are presented in Table 2 revealed that the average fruit weight was also improved due to irrigation during fruit development stage. The highest fruit weight (236.37g) was recorded in irrigation treatment (T₁) and lowest was in control (223.43g). This indicates that the irrigation during fruit development stage of mango could improve the fruit weight by 5.79 per cent over control. Cell enlargement and division need adequate water during fruit growth and development period, while lack of water inhibited fruit growth and development (Liu *et al.*, 2007) [3]. The fruit weight improvement due to irrigation was also reported by Wei *et al.* (2017) [9].

Similarly, the yield of mango fruits was significantly increase by 36.98 per cent over control due to irrigation (Table 2). The

average yield in control (T₂ – No irrigation) was 27.69 kg/tree while it was 37.93 kg/tree in the irrigation treatment. The irrigation may be helpful for maintaining favourable water balance which is essential for the growth and development of the fruit as there is high water requirement particularly towards maturity. The similar findings were earlier reported by Sarkar and Rahim (2013) [7], Wei *et al.* (2017) [9] and Malshe *et al.* (2019) in mango.

From the present study it is concluded that in mango cultivation under hard lateritic rocky area, the irrigation during the fruit development period (@ 150 lit water at 15 days interval starting from pea grain stage to one month before harvesting time) is helpful for control of fruit drop and yield improvement.

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