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**PS Urade**

Department of Horticulture,  
College of Agriculture, Latur  
Vasantrao Naik Marathwada  
Krishi Vidyapeeth, Parbhani,  
Maharashtra, India

**AR Jadhav**

Department of Horticulture,  
College of Agriculture, Latur  
Vasantrao Naik Marathwada  
Krishi Vidyapeeth, Parbhani,  
Maharashtra, India

**RM Dheware**

Department of Horticulture,  
College of Agriculture, Latur  
Vasantrao Naik Marathwada  
Krishi Vidyapeeth, Parbhani,  
Maharashtra, India

## Studies on Physico-chemical properties of tamarind orchard soils of Latur district

PS Urade, AR Jadhav and RM Dheware

**Abstract**

The present investigation was carried out to study the soils physico-chemical properties of tamarind orchards soil of Latur during the year 2017-2018. The framed experiment was concentrated, to assess and find out the soil physico-chemical properties of tamarind orchards in Latur district, relation between physico-chemical properties and yield of sole and bunded crops and unfruitfulness of sole crops in tamarind orchards in Marathwada region. Twenty tamarind orchards of eight to thirty five years age planted at different spacing ranging from 8 x 8 m to 10 x 10 m with plant density of 100 to 150 plant ha<sup>-1</sup> under varied management practices located in different tehsil's of Latur district were selected for the experimentation. In Marathwada region, in sole planting soil, pH ranged from 7.65 to 8.95, Soils EC ranged in electrical conductivity from 0.34 to 0.95 dsm<sup>-1</sup> and organic carbon of soils recorded ranged between 0.22 to 0.97 and in bund planting, soil pH ranges from 7.65 to 8.90, EC from 0.34 to 0.95 dsm<sup>-1</sup> and OC from 0.25 to 0.97. The results showed that, out of 20 tamarind orchards studied 100 per cent orchards soils had alkaline pH with safe to normal EC. The OC of sole orchard, 30, 45 and 25 per cent orchards were low, medium and high, respectively and bund orchard, 40, 35 and 25 per cent low medium and high, respectively. The result showed that, these soil physico-chemical properties ranges are also beneficial to the fruitfulness of tamarinds. Hence, it can be concluded that, there is no effect of physico-chemical properties in unfruitfulness of sole orchard and fruitfulness of bund orchard in tamarind. It might be effect of shading in sole crops for unfruitfulness and in case of bund crop orchards it could get proper aeration and sunlight properly.

**Keywords:** Tamarind (*Tamarindus indica* L.), Soil physico-chemical properties (pH, EC, OC)

**Introduction**

Tamarind (*Tamarindus indica* L.) belongs to family Leguminosae (Fabaceae) is grown in semi-arid tropical and sub-tropical regions of the world. The fruit is native of Tropical Africa. The total area under cultivation of tamarind in India in the year 2016-17 is 186000 hectares and production is 943000 MT according to National Horticulture Board (Anonymous, 2017) [1]. Tamarind thrives best in loamy, deep, well drained alluvial soil, which favours the development of a long tap root (Galang, 1955) [4]. The optimum pH of tamarind is 5.5-6.8, which is slightly acidic (FAO, 1988) [3], through it also grows well in alkaline soils. The agriculture by-product like tamarind seed kernel can be used as a cheap source for functional food to increase the added value of tamarind seeds (Mohamed *et al.*, 2015) [7]. In advance agriculture, soil health has received due attention because of the fact that availability of plant nutrients depends upon various physical and chemical characteristics of the soil. Multi-nutritional deficiencies in horticultural crops are very common everywhere in the world and their application has been noted to influence plant growth and productivity in variety of ways. Deficient nutrient not only reduces the productivity of the crops but also reduce the use efficiency of applied nutrients. However, information on the optimum range of soils physico-chemical properties and plant for maintaining yield potential and quality of fruit in vertisols and associated black soil of Maharashtra is lacking.

**Materials and Methods**

The survey of randomly selected twenty tamarind orchards of eight to thirty five years age planted at different spacing ranging from 8 x 8 m to 10 x 10 m with plant density of 100 to 150 plant ha<sup>-1</sup> at Latur during the year 2017-2018. Soil samples collected during May 2017, at depth of up to 90 cm. The framed experiment was concentrated, to assess and find out the soil physico-chemical properties of tamarind orchards in Latur district, relation between physico-chemical properties and yield of sole and bunded crops and unfruitfulness of sole crops in tamarind orchards in Marathwada region. The pH determined by glass electrode pH meter (Jackson, 1973) [5], OC determined by Walkley and Black (Jackson, 1973) [5] and EC determined by EC meter. The statistical analysis of the data in respect of soil physico-chemical

**Correspondence****PS Urade**

Department of Horticulture,  
College of Agriculture, Latur  
Vasantrao Naik Marathwada  
Krishi Vidyapeeth, Parbhani,  
Maharashtra, India

properties was done according to the standard procedure given by Panse and Sukhatme (1985) [8].

## Result and Discussion

**1. Soil pH:** It is revealed from the data (Table 1 and Figure 1); soil pH ranged varies from 7.65 to 8.95 in sole planting whereas in bund planting it is 7.65 to 8.90. In Marathwada region, majority of soils are medium to deep black and categorized under vertisols and inceptisols. Thus, the soils were alkaline in nature similar result was found by Balpande *et al.* (2007) [2] reported in the soils of grape orchards in Nashik district of Maharashtra and Vineetha and Malewar (2009) [10] studied soils of sweet orange orchards in Marathwada region of Maharashtra.

**2. Electrical conductivity ( $\text{dsm}^{-1}$ ):** It is revealed from the data (Table 1 and Figure 1), soils EC ranged in electrical

conductivity from 0.34 to 0.95  $\text{dsm}^{-1}$  in sole planting whereas in bund planting it is 0.34 to 0.95  $\text{dsm}^{-1}$ . In Marathwada region the EC ranges safe to normal ( $< 0.8$  to  $2.5 \text{ dsm}^{-1}$ ). Similar result was found by Balpande *et al.* (2007) [2] reported in the soils of grape orchards in Nashik district of Maharashtra and Meena and Mathur (2017) [6] in relation to soil properties of Ghatol Tahsil, Banswara District of Rajasthan, India.

**3. Organic carbon (%):** It is revealed from the data (Table 1 and Figure 2), the organic carbon of soils recorded in present study ranged between 0.22 to 0.97 % in sole planting and in bund planting it is 0.25 to 0.97 %. Thus, soils were low to high in organic carbon content. The similar result was reported by Patil (2010) [9] in the soils of mango orchards in different tahsils of Latur district.

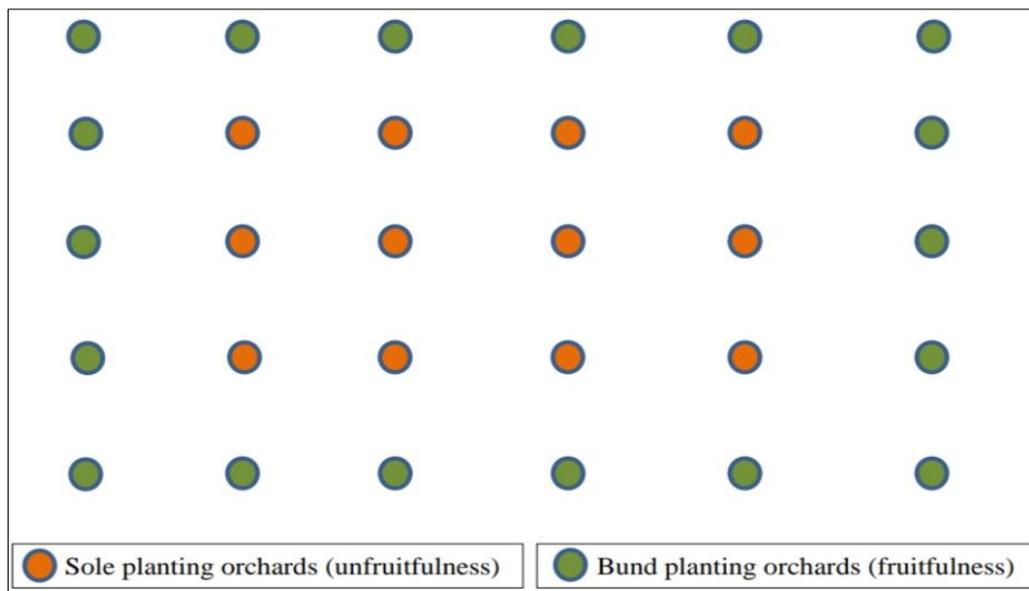


Fig 1: Planting of sole and bund orchards

Table 1: Physico-chemical characteristics of tamarind orchard soils of Latur district

Sr. No.	Orchard No.	pH		EC ( $\text{dsm}^{-1}$ )		OC (%)	
		Sole	Bund	Sole	Bund	Sole	Bund
1	LTO-1	7.96	7.90	0.54	0.54	0.85	0.72
2	LTO-2	8.04	8.00	0.43	0.43	0.78	0.85
3	LTO-3	7.83	7.80	0.60	0.60	0.79	0.82
4	LTO-4	8.23	8.23	0.95	0.95	0.97	0.97
5	LTO-5	7.83	7.86	0.36	0.36	0.58	0.57
6	LTO-6	7.83	7.85	0.64	0.64	0.81	0.75
7	LTO-7	8.15	8.10	0.49	0.49	0.72	0.78
8	LTO-8	8.17	8.16	0.81	0.81	0.22	0.25
9	LTO-9	8.00	7.98	0.52	0.52	0.43	0.42
10	LTO-10	8.15	8.14	0.38	0.38	0.79	0.72
11	LTO-11	7.89	7.80	0.45	0.45	0.85	0.89
12	LTO-12	7.78	7.78	0.68	0.68	0.71	0.71
13	LTO-13	8.21	8.23	0.92	0.92	0.55	0.45
14	LTO-14	8.05	8.00	0.38	0.38	0.67	0.68
15	LTO-15	8.56	8.54	0.65	0.65	0.50	0.49
16	LTO-16	7.67	7.65	0.49	0.49	0.46	0.43
17	LTO-17	7.78	7.79	0.83	0.83	0.30	0.31
18	LTO-18	7.65	7.65	0.50	0.50	0.36	0.32
19	LTO-19	8.95	8.90	0.34	0.34	0.83	0.80
20	LTO-20	7.89	7.91	0.42	0.41	0.45	0.48
Mean		8.03	8.01	0.57	0.57	0.63	0.59
Range		7.65-8.95	7.65-8.90	0.34-0.95	0.34-0.95	0.22-0.97	0.25-0.97
SE $\pm$		7.63	7.61	0.54	0.54	0.60	0.59

LTO: Latur Tamarind Orchards

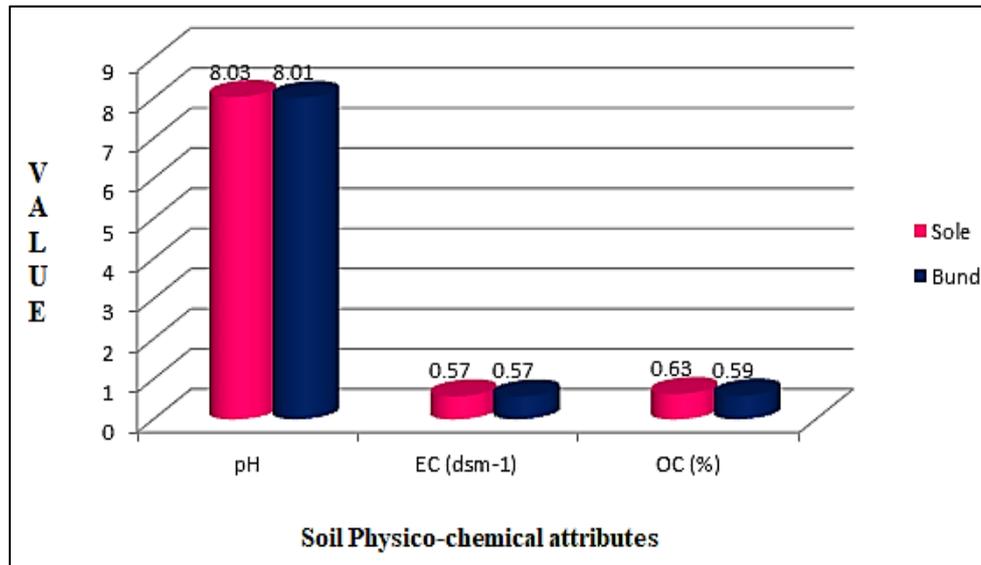


Fig 2: Comparison between Means of Sole and Bund Planting

### Conclusion

It is concluded that, in Marathwada region, the soils pH, EC and OC available in sufficient range and also beneficial to increase of growth, yield and quality of tamarind, but in this region yield and quality was not found in sufficient range, it may be due to shedding effect, irregular rainfall, soil moisture availability, lack of harvesting knowledge, etc.

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