

SURVEY ON YIELD OF ARECANUT (*Areca catechu* L.) INFLUENCE WITH WEATHER PARAMETERS UNDER SOUTH KONKAN REGION OF MAHARASHTRA

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Abstract

A survey was conducted under south konkan region of Maharashtra on the relationship between the yield of Arecanut and weather parameters viz. temperature, relative humidity and rainfall. Results revealed that annual rainfall above 4300 mm with maximum humidity directly proportional to arecanut yield. Also higher amount of received rainfall determines the annual yield of arecanut. Arecanut prefers high relative humidity particularly during the morning period throughout its growth period. Multiple regression equations were developed for predicting the arecanut yield based on weather parameters.

Key words: *Arecanut, multiple regression, relationship, weather parameters, yield.*

Introduction

Arecanut, (*Areca catechu* L.), also popular by the names betel nut and "Supari" is used worldwide for consumption and chewing purpose. It is one of the important commercial plantation crops in the South East Asia. In the context of both area and production, India contributes to around 51% of World's total production. Major states cultivating this crop in India are Karnataka (40%), Kerala (25%), Assam (20%), Tamil Nadu, Meghalaya, West Bengal and

Maharashtra to some extent. Weather plays an important role in determining the yield of Arecanut.

The variations in weather parameters significant effect on nut yield. So far very few studies were conducted in this direction and none of them have indicated the critical periods of nut development during which weather factors play a critical role (Sunil *et al.* 2011). In this study, an attempt was made to identify the important weather parameters influenced with yield of arecanut.

The survey was conducted under south konkan region, Maharashtra from 2007-08 to 2014-15 with an objective to find out the relationship between the yields of arecanut as influenced by weather parameters. The details of weather parameters like maximum temperature, minimum temperature, morning and afternoon humidity, total received rainfall were obtained from agro-metrological observatory department, Agricultural Research Station, Mulde Tal, Kudal, Dist. Sindhudurg (Maharashtra). This weather data were utilized to workout simple correlation coefficient between annual nut yield and various weather parameters as per correlation coefficient procedure given by Pearson.

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Table 1. Year wise yield and related weather parameters of arecanut

Year	Weather Parameters				Rainfall (mm)	Yield (MT)
	Temperature (°C)		Humidity (%)			
	Max.	Min.	Forenoon	Afternoon		
2007-08	33.01	23.51	89.04	63.13	3554.9	723.60
2008-09	33.43	20.94	88.75	63.81	3433.8	720.90
2009-10	33.47	22.37	89.79	65.04	3363.0	591.60
2010-11	33.26	22.86	90.30	67.37	4239.9	739.60
2011-12	33.41	21.29	90.63	64.44	4314.2	777.08
2012-13	33.32	21.23	89.12	60.46	3404.1	599.30
2013-14	32.96	21.14	90.08	61.23	3917.5	730.90
2014-15	33.19	21.98	89.96	63.83	2889.6	511.90

Table 2. Relationship of weather parameters with annual yield of arecanut

Correlation coefficient values (r)				Rainfall (mm) (X ₅)	rss	Regression equation
Temperature (°C)		Humidity (%)				
Max. (X ₁)	Min. (X ₂)	Fore noon (X ₃)	After noon (X ₄)			
-0.131	-0.016	0.167	0.186	0.860**	4704.5810	Y = 148.690 X ₁ - 25.326 X ₂ - 78.653 X ₃ + 13.757 X ₄ + 2.060.10-1 X ₅ + 11604.634

N= 8

** -Significant at 1%

The results of the experiment revealed that the annual nut yield was significantly influenced by weather parameters (Table 1). After establishing their relationship, those weather parameters which have shown significant effect on yield of arecanut were selected and multiple regression analysis (stepwise) was done to quantify the influence of weather parameters on yield (Table 2).

Data on correlation coefficient between annual nut yield and weather parameters (Table

2) showed that, total annual received rainfall significantly positively correlated with annual nut yield. Whereas, maximum and minimum temperature negatively correlated with nut yield. The highest yield recorded was during the year 2011-12 (777.08 MT). This may be due to more rainfall (weekly rainfall >15 mm), high relative humidity (>80%) and high temperature (>15°C) experienced by the crop during the flowering stage. Low rainfall (less than 250 mm) during the nut development stage (May-June) may have also contributed to higher yield.

Weather parameters like minimum temperature, relative humidity (both morning and evening) and rainfall during flowering i.e., January-February (Murthy, 1977) had a significant positive influence on nut yield and nut weight. Even though increase in maximum temperature during peak summer (April-May) had negative influence on yield and yield attributes, during rainy and winter season (June-December) it had significant positive effect. This is because increase in temperature during the rainy and winter seasons brings the temperature to the optimum limit for crop growth of arecanut. For most of the tropical palms, the ideal mean annual temperature is usually found to be around 27°C, and the average diurnal variation between 5°C and 7°C, Lower temperature seemed to be more limiting than high temperature (Child, 1964). High morning relative humidity (above 90%) throughout the growing period enhanced the crop yield of arecanut. Marar and Pandalia (1957) reported similar results for coconut.

Conclusion:

Based on the result of the present investigation, it was observed that annual rainfall above 4300 mm with maximum humidity directly proportional to arecanut yield. High amount of received rainfall determines the annual yield of arecanut.

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