

Evaluation of Growth and Yield Characters of Nutmeg (*Myristica fragrans* Houtt.) Ecotypes under Coconut Ecosystem

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Abstract An experiment was conducted to evaluate the performance of fourteen nutmeg ecotypes under coconut ecosystem during the period from 2014 to 2015. Observation on quantitative traits viz. maximum tree height (4.39 m) in Mf1, canopy spread NS (3.78m) in Mf6, canopy spread EW (3.45m) in Mf7, trunk girth (52.36 cm) in Mf7, pericarp yield/tree (16.07 kg) in Mf1, mace yield/tree (0.320 kg) in Mf1 and nut yield/tree (2.46 kg) in Mf1 were recorded. Among the 14 ecotypes Mf1 performed well under coconut ecosystem.

Keywords Evaluation, Ecotypes, Ecosystem, Yield.

Introduction

Nutmeg (*Myristica fragrans* Houtt) an important tree spice belongs to the family Myristicaceae. It is a native of Indonesia and distributed in areas of West Indies, Sri Lanka, India, Phillipines, Tropical America

and Pacific Islands [1]. In India, nutmeg is grown in some parts of Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra, North East India and in Andaman Island. Nutmeg requires a hot and moist climate with a rainfall of 150-300 cm per annum. It is grown best at low elevations in alluvium formed deep friable loam soil with good drainage. The crop does not thrive above an altitude of 750 meters as inter crop. In Kerala, nutmeg is mainly cultivated as a homestead crop in coconut and arecanut gardens.

World average production of nutmeg is estimated between 10,000 and 12,000 tonnes per year. Indonesia and Grenada dominate in nutmeg production and export of nutmeg products viz., nutmeg seed and mace with world market share of 75 and 20% respectively. Other nutmeg producers include India, Malaysia, Papua New Guinea, Srilanka and Caribbean Islands. The tree yield two distinct spices viz., nutmeg which is the dried seed and mace which is the dried aril. Both are used as spices and in medicine. Nutmeg is said to have stimulative, carminative, astringent and aphrodisiac properties. The pericarp is made into sweet meats, jellies, beverages, candy, jam and pickle [2].

Materials and Methods

The trees were 14 year old planted as intercrop in a coconut plantation. A total of 14 nutmeg ecotypes namely check, Mf1, Mf2, Mf3, Mf4, Mf5, Mf6, Mf7, Mf8, Mf9, Mf10, Mf11, Mf12 and Mf13 maintained at Pollachi in farmer's field was used for the study during 2014 and 2015. The experiment was conducted in

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Table 1. Morphological characters of nutmeg ecotypes.

Ecotypes	Plant height (m)	Morphological characters		
		Canopy spread (m)		Trunk girth (cm)
		NS	EW	
Check	3.35	2.98	2.5	32.47
Mf 1	4.39	3.57	2.7	47.34
Mf 2	3.77	3.38	2.82	42.9
Mf 3	3.79	3.39	2.88	43.49
Mf 4	3.76	3.43	2.9	43.53
Mf 5	4.21	3.58	3.11	45.95
Mf 6	3.65	3.78	3.16	50.51
Mf 7	3.87	3.26	3.45	52.36
Mf 8	3.95	3.17	3.14	40.56
Mf 9	3.97	3.54	3.43	45.45
Mf 10	2.86	2.64	3.13	17.72
Mf 11	3.13	2.35	2.62	13.15
Mf 12	2.33	1.79	2.37	17.55
Mf 13	2.91	2.45	2.83	17.1
Mean	3.57	3.09	2.93	36.44
SEd	0.07	0.08	0.06	0.61
CV at 5%	0.14	0.16	0.13	1.25

Table 2. Yield characters of nutmeg ecotypes.

Ecotypes	Pericarp Wt (kg)/	Mace Wt (kg)/	Nut Wt (kg)/
	tree	tree	tree
Check	11.68	0.2345	1.832
Mf 1	16.07	0.3201	2.455
Mf 2	12.48	0.2693	1.070
Mf 3	12.10	0.1104	1.764
Mf 4	11.98	0.1035	0.837
Mf 5	13.36	0.3072	1.773
Mf 6	12.86	0.0608	0.988
Mf 7	12.09	0.3110	1.453
Mf 8	11.47	0.3104	1.507
Mf 9	8.14	0.0570	0.630
Mf 10	0.29	0.0025	0.021
Mf 11	0.15	0.0035	0.020
Mf 12	0.08	0.0007	0.015
Mf 13	7.65	0.0915	0.722
Mean	9.32	0.16	1.08
SEd	0.24	0.01	0.03
CV at 5%	0.48	0.01	0.07

a randomized block design with three replications. Observation on growth and yield parameters viz., tree height, canopy spread (NS and EW), trunk girth, pericarp yield/tree, mace yield/tree and nut yield/tree were recorded. The data were subjected to statistical analysis to obtain information on the mean performance of growth and yield attributes existing among the ecotypes and also to assess the association among the different yield attributing traits correlation and path analysis were done using GENRES package.

Results and Discussion

The tree height was significantly higher (4.39 m) in Mf1 followed by Mf 5 (4.21). The findings revealed that canopy spread (NS) was maximum in Mf6 (3.78m) and minimum in Mf 12 (1.79m). The canopy spread (EW) was highest in Mf7 (3.45m) followed by Mf 9 (3.43). Mf7 (52.36) recorded the highest trunk girth and Mf 12 (13.15 m) recorded the lowest trunk girth (Table 1). The presence of shade compelled the plant to become taller in receiving natural light. The expression of enhanced plant height among the genotypes may be attributed to the differential ability of genotypes for the synthesis of phytohormones such as auxins and gibberellins and nutritional factors. This might be due to the fact that plants under shade grow

taller primarily due to more sunlight. In this context, etiolated seedlings under shading caused the plants to grow taller due to increase in concentration of certain growth promoting substances like auxins and gibberellins. When auxins are more, the plants are able to absorb and translocate the nutrients to the apical bud. This leads to the conclusion that auxins act on some protoplasmic system leading to altered arrangement of cell wall components and hence greater extensibility leading to increased height [3]. Similar variability was reported in cocoa [4] and in cashew [5].

Significant differences were noticed for pericarp yield per tree, mace yield per tree and nut yield per tree (Table 2). Among the ecotypes tested, the ecotype, Mf 1 had recorded higher pericarp yield (16.07 kg) followed by Mf 5 (13.36 kg). Maximum mace yield per tree was recorded by Mf1 (0.320 kg) which was followed by Mf 8 (0.310 kg) and Mf 9 (0.057 kg) which are on par with each other. Highest nut yield per tree was recorded in Mf1 (2.46 kg) followed by check variety (1.43 kg). Mf 3 (1.46 kg) and Mf 5 (1.77 kg) which were on par with each other. From the data it is obtained that nutmeg could efficiently utilize lower light intensities for higher growth and yield characters. The results are in consonance with the earlier findings [6–10]. From the results of the present investiga-

tion, Mf 1 may be considered as the most suitable ecotype for cultivation under the coconut ecosystem.

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