

Original Research Article

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## Identification of Elite Wood apple Genotypes for Physical Characters in Selected Districts of Karnataka, India

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### ABSTRACT

In Wood apple the existing variability is low due to the problem of unexploitation and lack of awareness. However, to some extent variation is seen in the genotypes with respect to morphological, physico-chemical parameters and also in productivity. In any crop, the improvement by selection method involves identification of superior types from a genetic population. Thus variability in the population is a pre-requisite for crop improvement and is considered as a boon to a plant breeder. As variability makes pre-requisite for selection criteria, it is the most quickest and effective method of breeding, particularly in perennial crops. Hence, the present research was carried through survey of eighty six genotypes from selected districts of Karnataka like Bijapur, Belgaum, Haveri, Shivamogga, Davangere, Chitradurga and Tumukur district during the fruiting season of 2018-19. The trees were used for studying the physical characters and the observations on various parameters of tree were recorded. Among 86 genotypes surveyed, 49 genotypes were found small type, 27 genotypes were medium and 10 were large type of genotypes. The tree girth ranged from 18.00 cm to 230 cm with an average plant girth of 103.47 cm, 28 genotypes have light brown colored bark where as 58 genotypes have dark brown colored bark while, 40 genotypes and 35 genotypes are semi spreading and 11 genotypes were erect type of branching habit and 52 genotypes shown oval type of canopy and 34 genotypes exhibit round shape of canopy.

#### Keywords

*Feronia limonia*,  
Rutaceae,  
community lands,  
Roman Goddess

#### Article Info

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### Introduction

Wood apple (*Feronia limonia*), is also called as elephant apple, monkey fruit, curd fruit, *Kath bel* and other dialectal names in India. It is the only species of its genus, in the

family Rutaceae. The name *Feronia* is assigned to the tree in the honor of Roman Goddess of forest. The wood apple is native to India and Srilanka. The tree is very hardy, tolerance to drought and salinity and thrives better in deep, well drained soils of dry

forests. It prefers slightly acidic soil but can be grown on a variety of soils. Its cultivation as a fruit tree is rare, but fruits of naturally occurring trees in community lands, forests and on road sides are used for chutney and pickle making. The wood apple is mainly found in forest and dry plain area of Indian subcontinents. The age of the plant varies from 13 to 70 years with yield potentiality in mother plants varying from 650 to 1085 kg of fruit per plant having the fruit weight between 130 and 225 gm. Fruit length varies between 7.3 to 8.9 cm while breadth between 7.2 and 8.4 cm. Fruit size (length  $\times$  breadth) varies in relation to fruit weight. Wood apple has high nutritional value. The pulp is pleasant and sweet, contains 2.66 per cent pectin, 64.2 per cent moisture, 7.1 per cent protein, 3.7 per cent fat, 1.9 per cent minerals, 50 per cent fiber, 18.1 per cent carbohydrates, 0.13 per cent calcium, 0.11 per cent phosphorus and 0.048 per cent iron (Raghvendra *et al.*, 2011). In order to address the above points, the survey was carried out in selected districts of Karnataka likelike Bijapur, Belgaum, Haveri, Shivamogga, Davangere, Chitradurga and Tumukur district during the fruiting season of 2018-19.

## **Materials and Methods**

During the survey work 86 genotypes were selected from different locations of Karnataka Selected genotype each from Mallavali, Taradhalli and Balekoppa, Selected two genotypes each from Kanakapur and Mallapur, Three genotypes were selected each from Dupdhal, Tatur Jc pura and Maradur, Four genotypes were selected each from Chitrahalli and Allur, Five wood apple genotypes were selected each from Devarhipargi, Honalli cross, Ecchalgata and Ramanhalli. Six genotypes from Dwarahalli, Seven genotypes from Godachi, Eleven genotypes from Hanumanhalli and Thirteen genotypes were selected from Bellar farm,

Total 86 genotypes which were bearing stage during survey was selected during 2018 december to 2019 january.

### **Tree height (m)**

The tree height was recorded based on visual observations and they are categorized in to three different groups like, large height (>12 m), medium height (8-12 m) and low height types (<8 m).

### **Shape of canopy**

The shape of canopy was recorded based on visual observations and they are categorized in to round type and oval type.

### **Branching / spreading**

Tree growth habit is recorded by visual appearance of the tree and they are grouped in spreading type, semi-spreading type and erect type.

### **Bark colour**

The bark colour of the tree are grouped in two types *viz.*, light brown and dark brown and recorded by visual observations.

### **Tree girth (cm)**

The tree girth was calculated by measuring circumference ( $2\pi r$ ) of the tree at a height of 60 cm from the ground level with the help of a measuring tape and was expressed in centimeters.

### **Statistical Analysis**

The analysis of variance for each character was carried out by taking the mean value of each treatment under each replication at department of Fruit Science, KRCCH-Arabhavi.

## Results and Discussion

Various growth characters viz., plant height, trunk diameter and plant canopy spread were studied.

Among 86 genotypes surveyed, 49 genotypes were found small type, 27 genotypes were medium and 10 were large type of genotypes. which may be due to some amount of genetic and environmental conditions. This was in concurrence with the earlier findings of Sappandi *et al.*, (2005) in wood apple Abhilash *et al.*, (2018) in kagzi lime. Similarly, trunk diameter is an important character which contributes significantly on yield of plant as it supports primary branches as well as secondary branches essential for

fruit bearing. In the present study, the trunk girth ranged from 18.00 cm to 230 cm with an average plant girth of 103.47 cm. Highest plant girth of 230 cm was recorded in genotype Ls-72 followed by Ls-70 (210 cm), Ls-59 and Ls-69 (200 cm each) and the lowest girth was recorded in Ls-5 (18 cm) which is followed by both Ls-6 and Ls-1 (25 cm each) genotypes which may be due to some amount of genetic influence similar findings were noticed in Sappandi *et al.*, (2005) in wood apple Abhilash *et al.*, (2018) in kagzi lime. Among 86 genotypes surveyed, 52 genotypes shown oval type of canopy and 34 genotypes exhibit round shape of canopy. While may be due to influence of environmental conditions and genetic influence. Similar findings were noticed in

**Table.1** Variability for morphological traits of wood apple trees

Sl. No.	Genotypes	Tree height (m)	Tree girth (cm)	Bark colour	Branching habit	Shape of canopy
<b>Low height type</b>						
1	Ls-60	4	60	Light Brown	Semi-Spreading	Oval
2	Ls-32	4	110	Dark Brown	Spreading	Oval
3	Ls-14	5	132	Dark Brown	Semi-Spreading	Round
4	Ls-33	5	80	Light Brown	Semi-Spreading	Oval
5	Ls-15	6	60	Dark Brown	Semi-Spreading	Round
6	Ls-20	6	80	Light Brown	Erect	Oval
7	Ls-22	6	130	Light Brown	Erect	Oval
8	Ls-34	6	75	Dark Brown	Semi-Spreading	Oval
9	Ls-35	6	95	Dark Brown	Semi-Spreading	Oval
10	Ls-38	6	105	Dark Brown	Semi-Spreading	Oval
11	Ls-39	6	110	Dark Brown	Spreading	Round
12	Ls-40	6	125	Dark Brown	Spreading	Oval
13	Ls-48	6	60	Dark Brown	Spreading	Round
14	Ls-53	6	100	Dark Brown	Spreading	Round
15	Ls-54	6	140	Dark Brown	Semi-Spreading	Oval
16	Ls-57	6	130	Light Brown	Spreading	Oval
17	Ls-62	6	120	Light Brown	Spreading	Round
18	Ls-63	6	85	Light Brown	Erect	Oval
19	Ls-80	6	75	Dark Brown	Spreading	Round
20	Ls-82	6	80	Dark Brown	Semi Spreading	Oval
21	Ls-85	6	90	Dark Brown	Semi Spreading	Oval
22	Ls-86	6	110	Dark Brown	Semi Spreading	Round

23	Ls-16	7	80	Dark Brown	Semi-Spreading	Oval
24	Ls-17	7	80	Dark Brown	Semi-Spreading	Oval
25	Ls-23	7	80	Light Brown	Spreading	Oval
26	Ls-24	7	70	Light Brown	Spreading	Oval
27	Ls-26	7	110	Dark Brown	Spreading	Oval
28	Ls-29	7	180	Dark Brown	Semi-Spreading	Oval
29	Ls-31	7	165	Dark Brown	Spreading	Oval
30	Ls-36	7	90	Dark Brown	Semi-Spreading	Oval
31	Ls-37	7	95	Dark Brown	Semi-Spreading	Oval
32	Ls-41	7	120	Dark Brown	Semi-Spreading	Oval
33	Ls-42	7	80	Dark Brown	Spreading	Oval
34	Ls-43	7	110	Dark Brown	Erect	Oval
35	Ls-45	7	145	Dark Brown	Spreading	Round
36	Ls-46	7	85	Dark Brown	Spreading	Round
37	Ls-47	7	60	Dark Brown	Erect	Round
38	Ls-49	7	65	Dark Brown	Erect	Round
39	Ls-52	7	90	Dark Brown	Spreading	Oval
40	Ls-56	7	157	Dark Brown	Spreading	Round
41	Ls-58	7	75	Light Brown	Semi-Spreading	Round
42	Ls-64	7	50	Light Brown	Semi Spreading	Oval
43	Ls-66	7	165	Light Brown	Spreading	Round
44	Ls-74	7	85	Dark Brown	Spreading	Round
45	Ls-77	7	183	Dark Brown	Spreading	Oval
46	Ls-78	7	95	Dark Brown	Semi Spreading	Round
47	Ls-79	7	65	Dark Brown	Semi Spreading	Round
48	Ls-81	7	75	Dark Brown	Semi Spreading	Round
49	Ls-83	7	78	Dark Brown	Semi Spreading	Round
<b>Medium height type</b>						
50	Ls-18	8	70	Dark Brown	Semi-Spreading	Round
51	Ls-25	8	80	Light Brown	Spreading	Oval
52	Ls-44	8	130	Dark Brown	Spreading	Round
53	Ls-10	9	120	Light Brown	Spreading	Oval
54	Ls-13	9	135	Light Brown	Spreading	Oval
55	Ls-21	9	60	Light Brown	Erect	Oval
56	Ls-27	9	140	Dark Brown	Spreading	Oval
57	Ls-28	9	150	Dark Brown	Spreading	Oval
58	Ls-30	9	110	Dark Brown	Semi-Spreading	Oval
59	Ls-50	9	145	Dark Brown	Erect	Round
60	Ls-59	9	200	Light Brown	Spreading	Round
61	Ls-65	9	140	Light Brown	Semi Spreading	Round
62	Ls-67	9	110	Dark Brown	Spreading	Round
63	Ls-72	9	230	Dark Brown	Spreading	Round
64	Ls-75	9	110	Dark Brown	Semi Spreading	Oval
65	Ls-84	9	100	Dark Brown	Spreading	Oval
66	Ls-6	10	25	Light Brown	Spreading	Round
67	Ls-9	10	125	Light Brown	Semi-Spreading	Round
68	Ls-11	10	125	Light Brown	Spreading	Oval

69	Ls-12	10	160	Dark Brown	Spreading	Oval
70	Ls-19	10	132	Light Brown	Erect	Oval
71	Ls-51	10	85	Dark Brown	Spreading	Oval
72	Ls-55	10	158	Dark Brown	Spreading	Round
73	Ls-61	10	140	Light Brown	Spreading	Oval
74	Ls-71	10	85	Dark Brown	Semi Spreading	Oval
75	Ls-73	10	150	Dark Brown	Spreading	Round
76	Ls-76	10	110	Dark Brown	Semi Spreading	Oval
<b>Large height type</b>						
77	Ls-1	12	25	Dark Brown	Spreading	Oval
78	Ls-7	12	100	Light Brown	Semi-Spreading	Oval
79	Ls-68	12	130	Light Brown	Semi Spreading	Oval
80	Ls-69	12	200	Light Brown	Spreading	Round
81	Ls-8	14	80	Dark Brown	Semi-Spreading	Oval
82	Ls-70	14	210	Light Brown	Semi Spreading	Oval
83	Ls-5	15	18	Light Brown	Semi-Spreading	Oval
84	Ls-2	18	75	Dark Brown	Erect	Oval
85	Ls-3	30	200	Dark Brown	Erect	Round
86	Ls-4	30	200	Dark Brown	Spreading	Round
<b>Mean</b>		8.51	103.47			
<b>Range</b>		4-30	20-230			

The trees were observed for branching habit during the course of survey and found to produce spreading type in 40 genotypes and 35 genotypes are semi spreading and 11 genotypes were erect type of branching habit out of 86 genotypes surveyed. While may be due to influence of environmental conditions and genetic influence similar findings were noticed in charoli by Kareedy (2003) Pavani *et al.*, in bael (2017) Among 86 genotypes surveyed 28 genotypes have light brown colored bark where as 58 genotypes have dark brown colored bark. It may be due to influence of environmental conditions and genetic influence similar findings were noticed by Kareedy in charoli (2003) Sappandi *et al.*, in wood apple (2005).

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