

Morphometric characterization of some aromatic rice cultivars of Kerala

Mini.C.B. and Mohanan K.V.*

Genetics and Plant Breeding Division, Department of Botany, University of Calicut, Kerala-673635, India.

*Corresponding author; email:drkvmohanan@rediffmail.com

Abstract: *Rices that possess a scent in their plant parts and grains are known as scented rices. Scented rices were known since the ancient times and were considered best among specialty rices. Aromatic rices are very much popular among consumers owing to their aroma, cooking quality and palatability. Throughout the world they have been the choicest food of kings, royalty and the elites of society as well as common man. Indian scented rice varieties constitute a diverse group. They differ in the nature of aroma, morphological characters and yield characters. Most of these rices are highly area specific and best quality obtained in their native areas. Each Indian state has its own special scented rices. The demand for special purpose aromatic rice has dramatically increased over the past two decades. Indian sub continent is the home of aromatic rice diversity. Major advances in the productivity of aromatic rices, achieved in both developed and developing countries have largely depended on access to a wide range of diverse types available. Diversity is the fundamental basis of agricultural production and food security, promoting economic growth as well as valuable ingredient of ecological stability and in rice it is being rapidly eroded and disappearing throughout the world and aromatic rices are no exception. Scented rices of short and medium grain size are grown in most of the states, but the long grained Basmati rice of North Western India has gained popularity all over the country. Mostly aromatic varieties grow tall and show lodging. They have long growth duration and are weakly photosensitive but are very much susceptible to pests and diseases. They are characterized by long thin culm, long panicles with small well filled grains with good elongation on cooking. The present effort is to make a morphological study of nine native scented rice cultivars collected from different parts of Kerala, India namely Mullanchanna, Kayama, Tulasicheera, Chomala, Poothadikayama, Gandhakasala, Kunjinellu and Neycheera under the ecoclimatic conditions at 11°35'N latitude and 75°48'E longitude, in the first crop season of the area starting from the month of June.*

Keywords: aromatic rice, diversity, Kerala

INTRODUCTION

Aromatic rices are very much popular among consumers owing to their aroma, cooking quality and palatability. The demand for special purpose aromatic rice has dramatically increased over the past two decades. Indian subcontinent is the home of aromatic rice diversity (Sarawgi and Rita Bisne, 2007). Their grain characters are very peculiar (Sarma *et al.* (1990). There are large intra and inter varietal differences among scented rices which offer vast genetic diversity to breeders. Low yielding aromatic rices have been the major casualty of green revolution where main emphasis was on yield rather than quality. A large number of scented rices have been lost and many are at the verge of extinction. Some of the small and medium grained scented rices possess excellent aroma and other quality traits like kernel elongation after cooking, good taste, etc. These could be excellent source for improving quality in high yielding varieties. Indian scented rice varieties constitute a diverse group. They differ in the nature of aroma, morphological characters and yield characters. Most of these rices are highly area specific and best quality obtained only in their native areas. The present study of some aromatic rices of Kerala has been carried out to characterize nine scented rice cultivars of Kerala State of India so that effective steps could be taken for their conservation.

MATERIALS AND METHODS

Nine scented rice varieties collected from different places in the state of Kerala were grown in the experimental net house of the Genetics and Plant Breeding Division of the Department of Botany of University of Calicut, Kerala, India located at 11°35'N latitude and 75°48'E longitude, in the first crop season of the area. The experiments were started in the month of June 2010 by putting the first experimental crop of the above scented rice varieties. First the seeds were germinated in Petri dishes and seven day old seedlings were transplanted to experimental pots of 20cm diameter, on one plant per pot basis in RBD with three replications and 12 plants per replication. The plants were planted in the pots filled with paddy soil, sand and enriched compost mixed in 4:1:1 ratio. Standard manurial conditions were followed. The plants were flooded once every day on non rainy days. The cultivars consisted of nine scented cultivars namely *Mullanchanna, Kayama, Tulasicheera, Jeerakasala, Chomala, Poothadikayama,*

Gandhakasala Kunjinellu and Neycheera (Table 1). Observations were made on six plant characters and nine yield characters and data consolidated to characterize the cultivars (Figs. 1-9).

Table 1. The rice cultivars studied and places of collection

Sl. No	Cultivar	Place of collection
1	Mullannchanna	Wayanad
2	Kayama	Wayanad
3	Tulasicheera	Malappuram
4	Jeerakasala	Wayanad
5	Chomala	Wayanad
6	Poothadikayama	Wayanad
7	Gandhakasala	Wayanad
8	Kunjinellu	Kannur
9	Neycheera	Palakkad

RESULTS AND DISCUSSION

The nine rice cultivars mentioned above are presented below under appropriate heads based on the experimental observations.

1. MULLANCHANNA

No.	Characters	Mean
1	Age at tiller initiation (Days)	21.17±2.70
2	Age at flowering (Days)	145.67±0.63
3	Duration (Days)	175.67±0.63
4	No. of tillers at harvest	6.50±0.76
5	Ear bearing tiller no.	5.42±0.67
6	Plant height (cm)	249.53±9.96
7	No. of primary branches per panicle	12.97±0.12
8	Panicle length (cm)	39.04±1.17
9	Spikelets per panicle	117.97±6.79
10	Seeds per panicle	89.36±6.06
11	Hundred grain wt. (g)	2.14±0.01
12	Grain length (mm)	7.87±0.03
13	Grain thickness (mm)	2.20±0.02
14	Panicle density	2.96±0.03
15	Fertility percentage	75.43±1.73
16	Yield per plant (g)	9.95±1.26



Fig. 1. Mullannchanna

2. KAYAMA



Fig. 2. Kayama

No.	Characters	Mean
1	Age at tiller initiation (Days)	23.44±0.14
2	Age at flowering (Days)	129.14±0.28
3	Duration (Days)	159.14±0.28
4	No. of tillers at harvest	4.61±0.16
5	Ear bearing tiller no.	3.86±0.20
6	Plant height (cm)	211.67±7.76
7	No. of primary branches per panicle	13.30±0.55
8	Panicle length (cm)	34.85±1.46
9	Spikelets per panicle	303.89±26.64
10	Seeds per panicle	260.00±29.21
11	Hundred grain wt. (g)	1.12±0.03
12	Grain length (mm)	5.90±0.07
13	Grain thickness (mm)	1.84±0.03
14	Panicle density	8.46±0.32
15	Fertility percentage	85.37±2.56
16	Yield per plant (g)	11.35±0.88

3. TULASICHEERA



Fig. 3. Tulasicheera

No.	Characters	Mean
1	Age at tiller initiation (Days)	25.64±1.60
2	Age at flowering (Days)	125.72±0.95
3	Duration (Days)	155.72±0.95
4	No. of tillers at harvest	6.33±0.46
5	Ear bearing tiller no.	5.75±0.50
6	Plant height (cm)	166.08±6.58
7	No. of primary branches per panicle	10.67±0.21
8	Panicle length (cm)	29.90±0.46
9	Spikelets per panicle	225.03±8.02
10	Seeds per panicle	180.42±10.69
11	Hundred grain wt. (g)	0.91±0.03
12	Grain length (mm)	6.02±0.05
13	Grain thickness (mm)	1.71±0.01
14	Panicle density	7.32±0.13
15	Fertility percentage	79.71±2.07
16	Yield per plant (g)	9.82±0.46

4. JEERAKASALA



Fig.4. Jeerakasala

No.	Characters	Mean
1	Age at tiller initiation (Days)	23.92±0.41
2	Age at flowering (Days)	148.83±0.54
3	Duration (Days)	178.83±0.54
4	No. of tillers at harvest	7.47±0.67
5	Ear bearing tiller no.	6.78±0.65
6	Plant height (cm)	194.30±3.07
7	No. of primary branches per panicle	8.39±0.25
8	Panicle length (cm)	26.30±0.75
9	Spikelets per panicle	98.03±8.72
10	Seeds per panicle	77.50±7.40
11	Hundred grain wt. (g)	1.49±0.02
12	Grain length (mm)	5.88±0.01
13	Grain thickness (mm)	2.03±0.01
14	Panicle density	3.68±0.49
15	Fertility percentage	74.24±0.72
16	Yield per plant (g)	8.50±1.21

5. CHOMALA



Fig.5. Chomala

No.	Characters	Mean
1	Age at tiller initiation (Days)	15.89±0.45
2	Age at flowering (Days)	146.03±1.16
3	Duration (Days)	176.03±1.16
4	No. of tillers at harvest	6.78±0.70
5	Ear bearing tiller no.	4.36±0.43
6	Plant height (cm)	207.72±8.32
7	No. of primary branches per panicle	9.64±0.51
8	Panicle length (cm)	21.63±0.98
9	Spikelets per panicle	100.69±9.78
10	Seeds per panicle	81.92±9.92
11	Hundred grain wt. (g)	1.80±0.06
12	Grain length (mm)	7.80±0.06
13	Grain thickness (mm)	2.04±0.04
14	Panicle density	4.45±0.15
15	Fertility percentage	81.21±1.93
16	Yield per plant (g)	6.70±0.71

6. POOTHADIKAYAMA



Fig. 6. Poothadikayama

No.	Characters	Mean
1	Age at tiller initiation (Days)	17.14±0.70
2	Age at flowering (Days)	148.89±0.78
3	Duration(Days)	178.89±0.78
4	No. of tillers at harvest	7.81±0.57
5	Ear bearing tiller no.	5.81±0.39
6	Plant height (cm)	209.05±2.89
7	No. of primary branches per panicle	8.67±0.49
8	Panicle length (cm)	19.98±1.22
9	Spikelets per panicle	91.86±8.26
10	Seeds per panicle	68.67±5.91
11	Hundred grain wt. (g)	2.03±0.11
12	Grain length (mm)	7.57±0.03
13	Grain thickness (mm)	2.19±0.01
14	Panicle density	4.31±0.30
15	Fertility percentage	74.24±1.02
16	Yield per plant (g)	9.20±0.45

7. GANDHAKASALA



Fig. 7. Gandhakasala

No.	Characters	Mean
1	Age at tiller initiation (Days)	28.92±0.22
2	Age at flowering (Days)	131.97±0.67
3	Duration (Days)	161.97±0.67
4	No. of tillers at harvest	7.81±0.43
5	Ear bearing tiller no.	5.81±0.45
6	Plant height (cm)	198.92±5.98
7	No. of primary branches per panicle	12.03±0.60
8	Panicle length (cm)	33.29±0.74
9	Spikelets per panicle	233.25±12.41
10	Seeds per panicle	179.25±8.99
11	Hundred grain wt. (g)	1.19±0.11
12	Grain length (mm)	5.85±0.12
13	Grain thickness (mm)	1.78±0.03
14	Panicle density	6.71±0.39
15	Fertility percentage	76.65±0.09
16	Yield per plant(gm)	6.66±1.22

8. KUNJINELLU

No.	Characters	Mean
1	Age at tiller initiation (Days)	25.55±1.38
2	Age at flowering (Days)	108.81±1.65
3	Duration (Days)	138.81±1.65
4	No. of tillers at harvest	4.34±0.60
5	Ear bearing tiller no.	3.83±0.38
6	Plant height (cm)	164.94±7.42
7	No. of primary branches per panicle	11.17±0.17
8	Panicle length (cm)	33.10±0.08
9	Spikelets per panicle	148.22±6.94
10	Seeds per panicle	122.44±8.34
11	Hundred grain wt. (g)	1.66±0.03
12	Grain length (mm)	6.53±0.04
13	Grain thickness (mm)	2.12±0.01
14	Panicle density	4.28±0.21
15	Fertility percentage	81.54±1.98
16	Yield per plant (g)	8.81±1.44



Fig. 8. Kunjinellu

9. NEYCHEERA

No.	Characters	Mean
1	Age at tiller initiation (Days)	32.22±1.56
2	Age at flowering (Days)	120.94±0.10
3	Duration (Days)	150.94±0.10
4	No. of tillers at harvest	4.83±1.09
5	Ear bearing tiller no.	2.89±0.27
6	Plant height (cm)	142.05±5.43
7	No. of primary branches per panicle	7.75±0.57
8	Panicle length (cm)	24.42±0.53
9	Spikelets per panicle	121.92±5.90
10	Seeds per panicle	96.89±3.18
11	Hundred grain wt. (g)	0.71±0.03
12	Grain length (mm)	5.73±0.09
13	Grain thickness (mm)	1.70±0.04
14	Panicle density	4.63±0.32
15	Fertility percentage	79.78±2.86
16	Yield per plant (g)	2.12±0.37



Fig.9. Neycheera

Among the nine scented rice cultivars, tiller initiation started the earliest in Chomala and the latest in Neycheera. The earliest flowering variety was Kunjinellu (100.81 days) and the latest was Poothadikayama (148.89 days). Total duration was minimum in Kunjinellu and maximum in Poothadikayama. The highest tiller number at harvest was shown by Poothadikayama (7.81) and lowest by Ghandakasala (3.58). The number of ear bearing tillers varied from 2.89 in Neycheera to 6.78 in Jeerakasala. The highest plant height of 249.53cm was shown by Mullanchanna and the lowest by Neycheera (142.05cm) and it shows that most of them are tall varieties. The number of primary branches per panicle was the maximum in Kayama (13.30) and minimum in Neycheera (7.75). Panicle length among these varieties varied from 19.98 cm to 39.04 cm and Poothadikayama showed the minimum and Mullanchanna showed the maximum. The highest spikelet number per panicle was shown by Kayama (303.89) and lowest by Poothadikayama (91.86). In the case of seeds per panicle the minimum value of 68.87 was shown by Poothadikayama and the maximum of 260.0 by Kayama. Hundred grain weight was the lowest (0.71 mm) in Neycheera and highest in Mullanchanna (2.14 mm). Grain length was maximum (7.87 mm) in Mullanchanna and minimum in Neycheera (5.73 mm) and grain thickness was maximum in Mullanchanna (2.20 mm) and minimum by Neycheera (1.70 mm). Kayama showed the highest panicle density (8.46) and Jeerakasala showed the lowest (3.68). Fertility percentage was the lowest in Jeerakasala (74.24) and the highest (85.37) in Kayama and yield per plant was the lowest in Neycheera (2.12 g) and the highest (11.35 g) in Kayama. Earlier workers like Sarma *et al.*, (1990) have studied the grain characteristics of aromatic rice varieties and have observed wide variation in grain length, breadth, L/B ratio and 1000 grain weight and have concluded that some of these varieties could be used as donors in breeding programmes. The present study has given information on nine aromatic native rice cultivars of Kerala. Diversity is the fundamental basis of agricultural production, food security, promoting economic growth as well as a valuable ingredient of ecological stability.

REFERENCES

- Sarawgi A.K. and Rita Bisne., 2007. Studies on genetic divergence of aromatic rice germplasm for agromorphological and quality characters. *Oryza* 44: 74-76.
- Sarma K.K., Ahmed T. and Baruah D. K., 1990. Grain characteristics of some aromatic rice varieties of Assam. *Intl. Rice Res. Newsl.* 15(1):13.