Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

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Study on physiological growth parameters, yield and yield contributing traits in aromatic and non-aromatic rice (*Oryza sativa* L.) genotypes

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Abstract
An experiment was conducted to study on physiological functions, yield and yield contributing traits in aromatic and non-aromatic rice genotypes during *kharif*, 2017 & 2018. Results showed that maximum LAI, AGR, LAD and LAR were recorded in aromatic rice, Belgaum Basmati, Paras Sona and Phule Maval and in non-aromatic rice Karjat-9. Highest dry matter production recorded for the variety Karjat-3 (non-aromatic), while lowest dry matter was recorded in genotype Girga (aromatic). Highest grain yield was recorded in Karjat-3 and lowest grain yield was recorded in Girga. The aromatic and non-aromatic rice genotypes differed significantly with respect to yield components like leaf area index, leaf area duration, leaf area ratio, total number of filled spikelets, grain yield and harvest index.

Keywords: Aromatic rice, growth parameters, yield and harvest index

Introduction
Rice (*Oryza sativa* L.) is the staple food of more than half of the world population. Domesticated rice belongs to Poaceae family with two species, *Oryza sativa* and *Oryza glaberrima* is the native to West Africa. Studies have suggested food grain crop of the world which constitute the principle food for about 60% of the world population. Rice contributes 43% of total food grain production and 46% of total cereal production in India. In India, rice is the most important food crop covering about one fourth of the total crop area and providing food to about half of 43.19 million hectares with production of 110.15 million tonnes and productivity of 2.55 tonnes ha^{-1}. Area coverage under rice is estimated to have decreased from 189.49 lakh hectares in 2016-17 to 187.16 lakh hectares in 2017-18. (Anonymous, 2017) [2].

The status of aromatic (scented) rice consumption is still persists only very marginal due to limited area of cultivation coupled with low productivity and production and high prices. Analysis of yield and yield components is required and moreover the physiological behaviour of this group of rice become necessary for further increasing the productivity both by conventional and genetic transfer by identifying the physiological constraints.

Information on physiological characters plays a vital role in rice breeding. It is essential to know the physiological behaviour and genetic expression of the selective aromatic and modern rice genotypes for definite breeding objectives to improve those genotypes. Identifying promising physiological traits associated with quality and yield plays an important role in varietal development programmes. Development of rice varieties with high yielding ability is one of the most fundamental approaches for dealing with the expected increase in the world demand.

Little information is available on the physiological characters of scented and non-scented rice varieties and hence the present work would give an account of growth and yield performance of some aromatic and non-aromatic rice genotypes and better orientation towards physio-chemical traits and grain yield.

Material and methods
The experiment was carried out at Regional Agricultural Research Station, Karjat, Dist. Raigad (MS) during *Kharif* 2017 and 2018. It is situated at 18°91'67" North latitude and 73°33' East longitude with an altitude of 194 meters (636 ft) above the mean sea level with warm and humid conditions throughout the year. The mean annual precipitation is 3500 mm, which is generally received during the month from June to November at the location. The present experiment was conducted during the *kharif* 2017 & 2018. Fifty eight aromatic and non-aromatic rice genotypes were used and cultivated in a Randomized Block Design (RBD) with two replications.

Following Physiological growth parameters were computed

A. AGR (g/day^{-1}) was calculated from total dry matter accumulation by using formula given by Radford (1967) [26].

B. The RGR (g/ g^{-1}/day^{-1}) was calculated according the formula given by Leopold (1964) [16].

C. Net assimilation rate (NAR) (g dm^{-2}day^{-1}) was calculated with the formula given by Watson (1947) [33].

D. Leaf area index (LAI) was calculated as per the formula given by Watson (1947) [33].

E. LAD is the integral time of LAI over the growth period and expressed in days (Power *et al.*, 1964) [25].

F. The term, Leaf Area Ratio (LAR) was suggested by Radford (1967) [26].

G. SLW is a measure of leaf weight per unit leaf area; the term was suggested by Radford (1967) [26].

H. **Dry matter production (g):** For dry matter studies, five plants were selected randomly at 20 DAS after sowing till harvest at 20 days interval. These were properly dried in a hot air oven at 80 ºC for first one hour and then at constant temperature at 60 ºC.

Yield and yield contributing traits

Harvesting was done when plants reached to physiological maturity. Five randomly selected plants from each plot were harvested separately and observations on these selected plants were recorded and subjected to statistical analysis as per Panse and Sukhatme (1985) [20].

Result and discussion

1. Physiological growth parameters

Absolute growth rate (AGR)

The maximum AGR was recorded in Karjat-3 (1.3756 g/day/plant). In aromatic rice genotypes maximum AGR was recorded in Paras Sona (1.1136 g/day/plant). The minimum AGR was recorded in Girga (0.6361 g/day/plant). Similar finding were also reported by Erfani and Nasiri (2000) [5] and Chandrasekhar *et al.* (2001) for rice hybrids. AGR was observed highly significant and positively correlated with grain yield. Horie (2003) [9] and Mondal *et al.* (2010) [18] also reported that higher AGR had significant correlation with yield.

Relative growth rate (RGR)

The significantly maximum RGR was recorded in aromatic rice genotypes, RDN-Scented (0.0169 g/g/day) which was at par with Super Basmati (0.0168 g/g^{-1}/day^{-1}), Lolak (0.0166 g/g^{-1}/day^{-1}), Lolak (0.0143 g/g^{-1}/day^{-1}), Dhanprasad (0.0165 g/g^{-1}/day^{-1}), Kala Krishna (0.0165 g/g^{-1}/day^{-1}), Bishnubhog (0.0163 g/g^{-1}/day^{-1}), Shrabanmasi (0.0160 g/g^{-1}/day^{-1}), Basmati-370 (0.0160 g/g^{-1}/day^{-1}), Pusasugandha (0.0159 g/g^{-1}/day^{-1}), Karjat-3 (0.0158 g/g^{-1}/day^{-1}), Kala Jeera (0.0158 g/g^{-1}/day^{-1}), Basmati-107 (0.0158 g/g^{-1}/day^{-1}), Basmati-386 (0.0157 g/g^{-1}/day^{-1}), Tulsi-75-14 (0.0156 g/g^{-1}/day^{-1}) and Kundalika (0.0156 g/g^{-1}/day^{-1}) over other rice genotypes. The minimum RGR was recorded in Karjat-9 (0.0121 g/g^{-1}/day^{-1}). Similar decrease of RGR with the age of crop was reported by Chandrasekhar *et al.* (2001) and Chandrika *et al.* (2015) [4] in rice.

Net assimilation rate (NAR)

The significantly maximum NAR was recorded in aromatic rice genotypes, Dhanprasad (0.0554 g dm^{-2} day^{-1}) which was at par with Pakistan Basmati (0.0448 g dm^{-2} day^{-1}), Pusasugandha (0.0547 g dm^{-2} day^{-1}), Basmati-386 (0.0527 g dm^{-2} day^{-1}), Ghansal Regional (0.0526 g dm^{-2} day^{-1}) and Bishnubhog (0.0519 g dm^{-2}day^{-1}) over other rice genotypes. The minimum NAR was recorded in Karjat-9 (0.0277 g dm^{-2} day^{-1}). Similar increasing trend of NAR with the age of crop was also reported by Chandrasekar *et al.* (2001) and Chandrika *et al.* (2015) [4] in rice. The varietal differences for NAR have also been reported by Mondal *et al.* (2010) [18].

Leaf area index (LAI)

It was observed that LAI increased from 20 DAT to 80 DAT beyond which declined sharply and similar result was also found by Chandrasekhar *et al.* (2001) and Chandrika *et al.* (2015) [4]. The significantly maximum LAI was recorded in karjat-9 (5.52) which was at par with Belgaum Basmati (5.46), Paras Sona (5.36), Phule Maval (4.97) and Parag (4.92) over other rice genotypes. The minimum LAI was recorded in Pakistan basmati (2.13). The decrease in the leaf area index towards maturity may be due to lesser number of leaves as a result of senescence of older leaves. In rice, yield increased with increase in LAI (Pinheiro and Guimaraes, 1990, Sahoo and Guru, 1998) [24, 28]. The varietal differences for LAI have also been reported by Shahidullah *et al.* (2009) [29], Mondal *et al.* (2010) [18] and Lavanya *et al.* (2018) [15].

Leaf area duration (LAD)

The leaf area duration (LAD) increased gradually up to 60-80 DAT thereafter decreased. The significantly maximum LAD was recorded in karjat-9 (61.20 days) which was at par with Belgaum Basmati (60.55 days), Paras Sona (59.66 days), Phule Maval (55.36 days) and Parag (54.23 days) over other rice genotypes. The minimum LAD was recorded in Basmati-63 (23.92 days). Similar results were reported by Nighwan and Chandra (1980) [19], Chandrasekhar *et al.* (2001), Katsura *et al.* (2007) [13] and Chandrika *et al.* (2015) [4].

Leaf area ratio (LAR)

significantly maximum LAR was recorded in aromatic rice genotypes, Paras Sona (0.53 dm^2 g^{-1} day^{-1}) which was at par with Belgaum Basmati (0.51 dm^2 g^{-1} day^{-1}), Kala Jeera (0.51 dm^2 g^{-1} day^{-1}), SKL-7 (0.50 dm^2 g^{-1} day^{-1}), Parag (0.50 dm^2 g^{-1} day^{-1}) and Phule Maval (0.50 dm^2 g^{-1} day^{-1}) over other rice genotypes. The minimum LAR was recorded in Basmati-388 (0.29 dm^2 g^{-1} day^{-1}). Similar results were also reported by Park *et al.* (2004) [21], Kumar *et al.* (2006) [14] and Chandrika *et al.* (2015) [4].

Specific leaf weight (SLW)

The significantly maximum SLW was recorded in aromatic rice genotypes, Pakistan Basmati (0.738 g dm^{-2}) which was at par with Basmati-386 (0.734 g dm^{-2}), Dhanprasad (0.725 g dm^{-2}), Basmati-388 (0.710), Pusasugandha-5 (0.695), Basmati-63 (0.689 g dm^{-2}), Kate chinoor (0.688 g dm^{-2}), Ambemohar (0.677 g dm^{-2}), Girga (0.666 g dm^{-2}), Pusa Basmati (0.659 g dm^{-2}), Pusasugandha (0.645 g dm^{-2}) and Ghansal regional (0.629 g dm^{-2}) over other rice genotypes. The minimum SLW was recorded in SKL-7 (0.339 g dm^{-2}). Similar significant varietal difference for Specific leaf weight (SLW) was also reported by Shivkumar and Haloi (2001) [30].

Total dry matter production

The present studies, clearly indicated that, dry matter production and accumulation of all the 58 aromatic and non-aromatic rice genotypes increased continuously upto harvest. Amongst 58 rice genotypes, non-aromatic rice genotypes

Karjat-3 had the significantly higher accumulation of total dry matter (53.15 g plant[-1]) which was at par with Karjat-9 (51.61 g/plant[-1]), Karjat-7 (51.58 g plant[-1]), Karjat-8 (49.96 g plant), Karjat-2 (49.05 g plant), Belgaum Basmati (47.42 g plant[-1]) and Paras Sona (46.50 g plant[-1]) over other rice genotypes. Seed yield per plant was observed highly significant and positively correlated with total dry matter. Similar results were also obtained by Sinha *et al.* (2009) [32] and Hussain *et al.* (2014) [10].

2. Yield and yield contributing traits
In the present investigation, significantly higher grain yield was recorded in Karjat-3 (20.66 g plant[-1]) which was at par with Karjat-7 (18.79 g plant[-1]), Karjat-9 (18.49 g plant[-1]), Karjat-8 (18.20 g plant[-1]), Karjat-2 (18.01 g plant[-1]), Belgaum

Basmati (17.51 g), Paras sona (16.83 g) and Phule Maval (16.67 g) over other rice genotypes. The lowest grain yield was recorded in Girga (7.03 g plant[-1]). Grain yield was observed positively associated with total dry matter, chlorophyll content, chlorophyll stability index, AGR, total and filled spikelets per panicle and 1000 grain weight while panicle length was observed negative association with grain yield. Similar results were reported by Sidhu *et al.* (1992) [31], Fageria and Baligar (2001) [6], Patel *et al.* (2010) [22], Islam *et al.* (2016) [11] and Mohhamd Shmim *et al.* (2018) [17]. Variation in grain yield in rice has been also reported by Hari *et al.* (1997) [8], Golam *et al.*, (2001) [7], Ramarao (2004), Chandrika *et al.* (2015) [4], Kardile *et al.* (2018) [12] and Mohammad Shamim *et al.* (2018) [17].

Table 1: Absolute growth rate (g/day/plant) and relative growth rate (g/g/day) at 20-40 DAT to 80 DAT- at harvest in aromatic and non-aromatic rice genotypes

Sr. No	Genotypes	AGR				RGR			
		20-40 DAT	40-60 DAT	60-80 DAT	80 DAT-At Harvest	20-40 DAT	40-60 DAT	60-80 DAT	80 DAT-At Harvest
1	Phule Maval (G1)	0.1171	0.5236	0.4762	1.1032	0.0202	0.0285	0.0116	0.0143
2	Phuleradha (G2)	0.1191	0.4851	0.3994	0.9474	0.0251	0.0309	0.0106	0.0141
3	SYE-7 (G3)	0.0943	0.4336	0.4532	1.0852	0.0167	0.0281	0.0121	0.0154
4	Terana (G4)	0.1170	0.4913	0.3800	1.0558	0.0286	0.0316	0.0100	0.0155
5	Parag (G5)	0.1030	0.4322	0.4619	1.0539	0.0182	0.0279	0.0122	0.0149
6	ACK-5 (G6)	0.1153	0.5019	0.3730	1.0607	0.0267	0.0309	0.0099	0.0155
7	HMT Sona (G7)	0.1236	0.4629	0.4356	0.7913	0.0266	0.0294	0.0112	0.0121
8	Kasturi (G8)	0.1040	0.4825	0.4111	0.9687	0.0290	0.0344	0.0108	0.0146
9	Paras Sona (G9)	0.1257	0.5322	0.4771	1.1136	0.0207	0.0284	0.0106	0.0143
10	Lolak (G10)	0.1194	0.4500	0.3777	1.0751	0.0371	0.0323	0.0103	0.0166
11	Tulsi-75-14 (G11)	0.1008	0.4573	0.4296	1.0466	0.0251	0.0326	0.0113	0.0156
12	Basmati-63 (G12)	0.0887	0.4003	0.3257	0.7340	0.0374	0.0374	0.0103	0.0142
13	Pusa Sugandha-5 (G13)	0.0940	0.4012	0.3517	0.8281	0.0375	0.0365	0.0111	0.0148
14	Basmati-107 (G14)	0.0852	0.4444	0.4308	1.0631	0.0238	0.0350	0.0121	0.0158
15	Basmati-386 (G15)	0.1338	0.4661	0.4043	1.0968	0.0385	0.0311	0.0108	0.0157
16	Super Basmati (G16)	0.0880	0.4676	0.3876	1.1471	0.0211	0.0340	0.0107	0.0168
17	Antarvel (G17)	0.0963	0.4499	0.4391	1.0264	0.0221	0.0321	0.0120	0.0150
18	Kala Jeera (G18)	0.1054	0.4495	0.3988	1.0741	0.0236	0.0308	0.0109	0.0158
19	Dhanaprasad (G19)	0.1373	0.4187	0.3851	1.1017	0.0407	0.0290	0.0110	0.0165
20	Bishnubhog (G20)	0.0913	0.4572	0.4147	1.1244	0.0211	0.0317	0.0112	0.0163
21	Shrabanmasi (G21)	0.1005	0.4685	0.3655	1.0682	0.0257	0.0333	0.0102	0.0160
22	Pusasugandha (G22)	0.1189	0.5148	0.3756	1.1495	0.0254	0.0314	0.0095	0.0159
23	Kala Krishna (G23)	0.1226	0.4186	0.3728	1.0817	0.0307	0.0317	0.0109	0.0165
24	Belgaum Basmati (G24)	0.1235	0.5421	0.5167	1.1073	0.0198	0.0284	0.0114	0.0136
25	RDN-Scented (G25)	0.1143	0.4209	0.3766	1.1117	0.0326	0.0303	0.0111	0.0169
26	Mamla (G26)	0.1077	0.4736	0.4039	1.0341	0.0272	0.0317	0.0109	0.0151
27	Ghansal regional (G27)	0.0954	0.4854	0.4666	1.0885	0.0242	0.0333	0.0121	0.0150
28	Pakistan basmati (G28)	0.0922	0.4075	0.3731	0.7919	0.0373	0.0345	0.0118	0.0138
29	Pusa basmati (G29)	0.1395	0.4945	0.4226	1.0355	0.0324	0.0297	0.0106	0.0144
30	Kale chinoor (G30)	0.1272	0.4134	0.3807	1.0558	0.0377	0.0290	0.0112	0.0155
31	RDN-local (G31)	0.1132	0.4557	0.4210	0.8894	0.0379	0.0329	0.0117	0.0139
32	Lala (G32)	0.1244	0.4483	0.3914	0.9649	0.0361	0.0304	0.0109	0.0145
33	Durgabhog (G33)	0.1222	0.4346	0.4351	0.8360	0.0369	0.0304	0.0121	0.0125
34	Velchi (G34)	0.1011	0.5035	0.4201	0.8596	0.0244	0.0333	0.0108	0.0135
35	PKV-khamang (G35)	0.0798	0.4622	0.4087	0.8486	0.0205	0.0328	0.0114	0.0133
36	PKV-HMT (G36)	0.1025	0.4327	0.4408	0.9163	0.0338	0.0318	0.0126	0.0134
37	PKV-ganesh (G37)	0.0946	0.5367	0.3852	1.0301	0.0205	0.0327	0.0096	0.0144
38	PKV-Makrand (G38)	0.1247	0.4915	0.4429	0.9323	0.0326	0.0304	0.0113	0.0142
39	Ambika (G39)	0.1227	0.4616	0.3896	0.9949	0.0325	0.0297	0.0106	0.0150
40	Avishkar (G40)	0.1068	0.4456	0.4024	1.0138	0.0255	0.0295	0.0111	0.0150
41	Bhogawati (G41)	0.1079	0.4523	0.4236	1.1048	0.0326	0.0314	0.0117	0.0156
42	Kundalika (G42)	0.0901	0.5174	0.3978	0.9850	0.0256	0.0350	0.0104	0.0140
43	Pawana (G43)	0.0975	0.5137	0.4182	1.0466	0.0210	0.0316	0.0105	0.0160
44	Basmati-370 (G44)	0.1006	0.4549	0.3695	0.7816	0.0298	0.0320	0.0106	0.0138
45	Basmati-388 (G45)	0.0996	0.3997	0.3638	1.0518	0.0406	0.0322	0.0116	0.0152
46	Pusa sugandha-2 (G46)	0.1054	0.4569	0.4288	0.9054	0.0264	0.0304	0.0116	0.0138
47	Sugandha (G47)	0.1117	0.4775	0.4002	0.8774	0.0372	0.0327	0.0109	0.0126

48	Patnijira (G$_{48}$)	0.1027	0.5172	0.4331	0.9185	0.0221	0.0312	0.0107	0.0137
49	Bela blue (G$_{49}$)	0.1189	0.4480	0.4458	0.6361	0.0344	0.0301	0.0121	0.0127
50	Girga (G$_{50}$)	0.0837	0.3859	0.3202	0.9667	0.0430	0.0349	0.0110	0.0141
51	Ambemohar (G$_{51}$)	0.1442	0.4556	0.4266	1.0560	0.0379	0.0279	0.0112	0.0153
52	Elaichi (G$_{52}$)	0.1103	0.4849	0.3810	1.0271	0.0247	0.0300	0.0100	0.0138
53	Badshahabhog (G$_{53}$)	0.1068	0.5235	0.4806	1.3756	0.0264	0.0326	0.0117	0.0158
54	Karjat-3 (G$_{54}$)	0.1750	0.5514	0.5208	1.1563	0.0390	0.0280	0.0113	0.0138
55	Karjat-2 (G$_{55}$)	0.1639	0.5618	0.5196	1.2385	0.0312	0.0280	0.0111	0.0142
56	Karjat-7 (G$_{56}$)	0.1801	0.5711	0.5465	1.1083	0.0359	0.0276	0.0114	0.0127
57	Karjat-8 (G$_{57}$)	0.1943	0.5934	0.5504	1.1022	0.0339	0.0267	0.0110	0.0121
58	Karjat-9 (G$_{58}$)	0.2649	0.5540	0.6246	0.9980	0.0465	0.0229	0.0119	0.0112
	Range	0.0798-0.2649	0.3859-0.5934	0.3202-0.6246	0.5929-0.9980	0.0167-0.0465	0.0229-0.0374	0.0095-0.0126	0.0111-0.0147
	S.E±	0.018	0.031	0.033	0.050	0.004	0.0014	0.0004	0.0010
	C.D at 5%	0.050	0.087	0.093	0.141	0.011	0.0040	0.0012	0.0028

Table 2: Net assimilation rate (g/dm^2/days) and leaf area index at 20-40 DAT to at harvest in aromatic and non-aromatic rice genotypes

Sr. No	Genotypes	NAR				LAI				
		20-40 DAT	40-60 DAT	60-80 DAT	80 DAT-At Harvest	20 DAT	40 DAT	60 DAT	80 DAT	At Harvest
1	Phule Maval (G$_1$)	0.0079	0.0177	0.0131	0.0304	1.05	3.54	5.02	5.61	4.97
2	Phuleradha (G$_2$)	0.0132	0.0273	0.0181	0.0412	0.64	2.31	2.87	3.67	3.26
3	SKL-7(G$_3$)	0.0068	0.0170	0.0140	0.0323	1.16	3.12	4.37	5.06	4.83
4	Terana (G$_4$)	0.0142	0.0302	0.0155	0.0437	0.76	1.67	3.21	3.90	3.22
5	Parag (G$_5$)	0.0076	0.0168	0.0139	0.0312	1.08	3.00	4.61	5.05	4.92
6	ACK-5 (G$_6$)	0.0118	0.0284	0.0161	0.0439	0.86	2.14	3.05	3.67	3.43
7	HMT Sona (G$_7$)	0.0130	0.0259	0.0181	0.0333	0.67	2.25	3.09	3.80	3.22
8	Kasturi (G$_8$)	0.0110	0.0264	0.0149	0.0347	0.84	1.95	3.60	4.31	3.82
9	Paras Sona (G$_9$)	0.0074	0.0165	0.0116	0.0283	1.38	4.00	5.52	6.09	5.36
10	Lolak (G$_{10}$)	0.0112	0.0204	0.0133	0.0389	0.77	2.78	3.75	4.32	3.73
11	Tulsi-75-14 (G$_{11}$)	0.0096	0.0265	0.0173	0.0432	1.07	1.93	3.30	3.67	3.40
12	Basmati-63 (G$_{12}$)	0.0192	0.0426	0.0210	0.0471	0.38	1.05	1.92	2.46	2.15
13	Pusa Sugandha-5 (G$_{13}$)	0.0181	0.0384	0.0210	0.0482	0.40	1.17	2.07	2.77	2.29
14	Basmati-107 (G$_{14}$)	0.0098	0.0295	0.0186	0.0428	0.85	1.49	3.21	3.67	3.53
15	Basmati-386 (G$_{15}$)	0.0175	0.0334	0.0187	0.0527	0.78	1.45	2.89	3.42	2.69
16	Super Basmati (G$_{16}$)	0.0082	0.0239	0.0161	0.0465	0.75	2.62	3.14	3.86	3.34
17	Antarvel (G$_{17}$)	0.0107	0.0276	0.0178	0.0427	0.96	1.60	3.43	3.75	3.22
18	Kala Jeera (G$_{18}$)	0.0121	0.0202	0.0119	0.0327	0.56	2.26	4.59	5.09	4.45
19	Dhanaprasad (G$_{19}$)	0.0187	0.0326	0.0198	0.0554	0.80	1.33	2.57	3.12	2.65
20	Bishnubhog (G$_{20}$)	0.0088	0.0220	0.0179	0.0519	0.62	2.91	3.18	3.49	2.90
21	Shrabanmasi (G$_{21}$)	0.0136	0.0286	0.0138	0.0399	0.69	1.51	3.55	4.13	3.65
22	Pusasugandha (G$_{22}$)	0.0182	0.0378	0.0183	0.0547	0.57	1.40	2.72	3.24	2.87
23	Kala Krishna (G$_{23}$)	0.0135	0.0255	0.0169	0.0478	0.69	1.96	2.92	3.53	3.05
24	Belgaum Basmati (G$_{24}$)	0.0066	0.0156	0.0133	0.0281	1.40	4.73	5.43	5.91	5.46
25	RDN-Scented (G$_{25}$)	0.0124	0.0239	0.0158	0.0460	0.76	1.98	3.24	3.76	3.25
26	Mamla (G$_{26}$)	0.0141	0.0283	0.0170	0.0438	0.56	1.86	3.11	3.79	3.07
27	Ghansal regional (G$_{27}$)	0.0132	0.0337	0.0220	0.0526	0.67	1.51	2.82	3.36	2.66
28	Pakistan basmati (G$_{28}$)	0.0151	0.0321	0.0226	0.0481	0.41	1.57	2.14	2.67	2.13
29	Pusa basmati (G$_{29}$)	0.0131	0.0298	0.0201	0.0474	0.93	2.24	2.62	3.51	2.85
30	Kate chinoor(G$_{30}$)	0.0203	0.0306	0.0186	0.0465	0.55	1.39	2.64	3.30	2.73
31	RDN-local (G$_{31}$)	0.0114	0.0214	0.0154	0.0384	0.67	2.55	3.72	4.24	3.72
32	Lala (G$_{32}$)	0.0128	0.0255	0.0177	0.0402	0.90	2.16	3.00	3.45	2.99
33	Durgabhog (G$_{33}$)	0.0109	0.0190	0.0144	0.0311	0.75	2.83	3.88	4.92	4.09
34	Velchi (G$_{34}$)	0.0099	0.0237	0.0151	0.0302	0.79	2.45	3.83	4.25	3.78
35	PKV-khamang (G$_{35}$)	0.0105	0.0287	0.0174	0.0360	0.69	1.68	3.20	3.63	3.29
36	PKV-HMT (G$_{36}$)	0.0118	0.0217	0.0153	0.0296	0.65	2.11	3.91	4.54	3.89
37	PKV-ganesh (G$_{37}$)	0.0108	0.0303	0.0159	0.0381	0.71	1.99	3.28	3.79	3.21
38	PKV-Makrand (G$_{38}$)	0.0124	0.0239	0.0165	0.0386	0.93	2.31	3.80	4.01	3.72
39	Ambika (G$_{39}$)	0.0150	0.0240	0.0146	0.0350	0.56	2.08	3.66	4.11	3.63
40	Avishkar (G$_{40}$)	0.0127	0.0276	0.0185	0.0447	0.68	1.90	2.87	3.46	3.00
41	Bhogawati (G$_{41}$)	0.0114	0.0229	0.0159	0.0378	0.75	2.25	3.58	4.16	3.63
42	Kundalika (G$_{42}$)	0.0100	0.0239	0.0135	0.0391	0.68	2.38	4.06	4.52	3.74
43	Pawana (G$_{43}$)	0.0106	0.0263	0.0158	0.0367	0.66	2.30	3.47	4.21	3.58
44	Basmati-370 (G$_{44}$)	0.0124	0.0240	0.0155	0.0440	0.47	2.32	3.26	3.70	3.21
45	Basmati-388 (G$_{45}$)	0.0185	0.0364	0.0227	0.0486	0.52	1.17	2.13	2.55	2.14
46	Pusa sugandha-2 (G$_{46}$)	0.0118	0.0266	0.0154	0.0374	0.96	1.60	3.70	4.36	3.80
47	Sugandha (G$_{47}$)	0.0134	0.0290	0.0183	0.0398	0.67	1.87	3.04	3.35	3.26
48	Patnijira (G$_{48}$)	0.0118	0.0296	0.0182	0.0367	0.78	1.89	3.32	3.59	3.33
49	Bela blue (G$_{49}$)	0.0102	0.0205	0.0173	0.0357	0.87	2.83	3.59	3.97	3.52

50	Girga (G₅₀)	0.0205	0.0399	0.0215	0.0397	0.30	1.01	1.90	2.46	2.20
51	Ambemohar (G₅₁)	0.0181	0.0268	0.0196	0.0444	0.58	1.96	3.06	3.30	3.00
52	Elaichi (G₅₂)	0.0098	0.0238	0.0143	0.0414	1.07	2.40	3.59	4.17	3.28
53	Badshahabhog (G₅₃)	0.0121	0.0268	0.0198	0.0405	0.55	2.43	3.34	3.74	3.65
54	Karjat-3 (G₅₄)	0.0219	0.0248	0.0154	0.0406	0.52	2.14	4.66	5.19	4.65
55	Karjat-2 (G₅₅)	0.0174	0.0242	0.0151	0.0327	0.62	2.38	4.67	5.44	4.83
56	Karjat-7 (G₅₆)	0.0177	0.0248	0.0180	0.0406	0.73	2.69	4.15	4.66	4.20
57	Karjat-8 (G₅₇)	0.0178	0.0276	0.0181	0.0357	1.02	2.35	4.02	4.83	4.20
58	Karjat-9 (G₅₈)	0.0272	0.0184	0.0155	0.0277	0.40	3.29	5.64	6.02	5.52
Range		0.0066-0.0272	0.0156-0.0426	0.0116-0.0227	0.0229-0.0474	0.30-1.40	1.01-4.73	1.90-5.64	2.46-6.09	2.13-5.52
S.E±		0.0029	0.0028	0.0029	0.0030	0.06	0.12	0.15	0.28	0.23
C.D at 5%		0.0083	0.0078	0.0083	0.0085	0.18	0.36	0.43	0.78	0.65

Table 3: Leaf area duration (days) and leaf area ratio (dm^2 g^{-1} day^{-1}) at 20-40 DAT to 80 DAT- at harvest in aromatic and non-aromatic rice genotypes

Sr. No	Genotypes	LAD				LAR			
		20-40 DAT	40-60 DAT	60-80 DAT	80 DAT-At Harvest	20-40 DAT	40-60 DAT	60-80 DAT	80 DAT-At Harvest
1	Phule Maval (G₁)	36.57	53.77	61.14	55.36	2.61	1.68	0.87	0.50
2	Phuleradha (G₂)	23.71	31.05	39.53	36.28	2.16	1.16	0.59	0.36
3	SKL-7(G₃)	32.38	46.86	54.96	53.36	2.61	1.66	0.87	0.50
4	Terana (G₄)	17.51	33.80	42.20	36.07	2.12	1.05	0.65	0.37
5	Parag (G₅)	31.18	49.13	55.07	54.23	2.61	1.68	0.88	0.50
6	ACK-5 (G₆)	22.25	32.60	39.80	38.00	2.40	1.15	0.62	0.37
7	HMT Sona (G₇)	23.25	33.14	41.04	35.99	2.14	1.13	0.62	0.37
8	Kasturi (G₈)	20.36	37.91	46.65	42.54	2.82	1.29	0.73	0.44
9	Paras Sona (G₉)	41.36	59.22	66.46	59.66	2.85	1.72	0.92	0.53
10	Lolak (G₁₀)	28.59	40.24	46.96	41.61	3.68	1.57	0.79	0.45
11	Tulsi-75-14 (G₁₁)	20.40	34.98	40.05	37.68	2.78	1.22	0.66	0.38
12	Basmati-63 (G₁₂)	10.89	20.22	26.54	23.92	2.30	0.88	0.50	0.31
13	Pusa Sugandha-5 (G₁₃)	12.08	21.87	29.72	25.71	2.47	0.95	0.54	0.32
14	Basmati-107 (G₁₄)	15.91	33.61	39.88	38.99	2.61	1.19	0.68	0.39
15	Basmati-386 (G₁₅)	15.25	30.30	37.07	30.28	2.33	0.93	0.58	0.32
16	Super Basmati (G₁₆)	27.00	34.01	41.73	37.27	2.80	1.41	0.67	0.39
17	Antarvel (G₁₇)	16.99	35.89	40.90	35.98	2.23	1.15	0.68	0.37
18	Kala Jeera (G₁₈)	23.17	48.13	55.50	49.62	2.09	1.52	0.92	0.51
19	Dhanaprasad (G₁₉)	14.12	27.03	33.77	29.67	2.32	0.88	0.56	0.31
20	Bishnubhog (G₂₀)	29.75	34.68	38.11	32.52	2.54	1.44	0.63	0.34
21	Shrabanmasi (G₂₁)	15.84	37.06	44.83	40.66	2.11	1.15	0.74	0.43
22	Pusasugandha (G₂₂)	14.57	28.60	35.15	31.94	1.50	0.82	0.52	0.31
23	Kala Krishna (G₂₃)	20.36	31.15	38.17	34.03	2.77	1.20	0.65	0.37
24	Belgaum Basmati (G₂₄)	48.74	58.99	64.55	60.55	3.14	1.82	0.86	0.51
25	RDN-Scented (G₂₅)	20.65	34.42	40.87	36.22	2.76	1.26	0.71	0.39
26	Mamla (G₂₆)	19.16	32.97	41.06	34.45	2.02	1.11	0.64	0.36
27	Ghansal regional (G₂₇)	15.81	29.73	36.41	29.99	1.93	0.98	0.55	0.31
28	Pakistan basmati (G₂₈)	16.19	23.02	28.84	23.97	2.69	1.06	0.52	0.29
29	Pusa basmati (G₂₉)	23.39	28.42	37.73	31.99	2.56	0.99	0.53	0.32
30	Kate chinoor(G₃₀)	14.45	27.83	35.61	30.55	1.95	0.94	0.60	0.34
31	RDN-local (G₃₁)	26.23	39.77	46.17	41.47	3.52	1.52	0.76	0.43
32	Lala (G₃₂)	22.43	32.17	37.48	33.35	2.98	1.20	0.62	0.35
33	Durgabhog (G₃₃)	29.09	41.58	53.08	45.80	3.48	1.59	0.84	0.47
34	Velchi (G₃₄)	25.24	40.79	46.29	42.06	2.64	1.39	0.72	0.43
35	PKV-khamang (G₃₅)	17.51	33.64	39.51	36.51	1.97	1.16	0.66	0.39
36	PKV-HMT (G₃₆)	21.75	41.18	49.27	43.47	2.86	1.48	0.82	0.47
37	PKV-ganesh (G₃₇)	20.61	34.83	41.14	35.93	1.92	1.08	0.61	0.36
38	PKV-Makrand (G₃₈)	23.92	40.30	43.87	41.23	2.65	1.28	0.68	0.39
39	Ambika (G₃₉)	21.40	38.65	44.76	40.45	2.17	1.24	0.73	0.42
40	Avishkar (G₄₀)	19.68	30.56	37.45	33.47	2.01	1.07	0.60	0.35
41	Bhogawati (G₄₁)	23.25	38.07	45.17	40.45	2.85	1.37	0.74	0.43
42	Kundalika (G₄₂)	24.41	42.97	49.23	41.93	2.62	1.46	0.77	0.42
43	Pawana (G₄₃)	23.72	36.99	45.59	39.97	1.98	1.21	0.67	0.40
44	Basmati-370 (G₄₄)	23.64	34.92	40.26	35.76	2.40	1.34	0.69	0.39
45	Basmati-388 (G₄₅)	12.18	22.49	27.60	23.99	2.20	0.89	0.51	0.29
46	Pusa sugandha-2 (G₄₆)	17.02	38.58	47.29	42.37	2.24	1.15	0.75	0.43
47	Sugandha (G₄₇)	19.48	32.26	36.58	35.99	2.81	1.13	0.60	0.36
48	Patnijira (G₄₈)	19.73	35.08	39.25	36.91	1.87	1.06	0.59	0.35
49	Bela blue (G₄₉)	29.24	38.75	43.33	39.21	3.38	1.48	0.71	0.40
50	Girga (G₅₀)	10.40	20.04	26.49	24.46	2.10	0.88	0.52	0.33
51	Ambemohar (G₅₁)	20.24	32.55	36.07	33.32	2.09	1.04	0.58	0.33

52	Elaichi (G$_{52}$)	25.07	38.33	45.34	36.94	2.53	1.26	0.71	0.39
53	Badshahabhog (G$_{53}$)	24.86	35.78	40.72	40.25	2.21	1.22	0.59	0.37
54	Karjat-3 (G$_{54}$)	21.94	48.75	56.58	51.69	1.79	1.13	0.74	0.43
55	Karjat-2 (G$_{55}$)	24.53	49.12	59.06	53.76	1.80	1.16	0.75	0.45
56	Karjat-7 (G$_{56}$)	27.62	44.15	50.74	46.67	2.05	1.12	0.63	0.38
57	Karjat-8 (G$_{57}$)	24.48	42.55	52.33	46.83	1.91	0.97	0.61	0.37
58	Karjat-9 (G$_{58}$)	33.33	59.69	65.81	61.20	1.74	1.24	0.77	0.45
	Range	10.40-48.74	20.04-59.69	26.49-66.46	23.92-61.20	1.50-3.68	0.82-1.82	0.50-0.92	0.29-0.53
	S.E±	1.23	1.55	2.74	2.47	0.25	0.09	0.03	0.02
	C.D at 5%	3.48	4.39	7.77	7.00	0.72	0.27	0.08	0.05

Table 4: Specific leaf weight (SLW) (g dm^{-2}) and total dry matter (g/plant) at 20 DAT to at harvest in aromatic and non-aromatic rice genotypes

Sr. No	Genotypes	SLW					TDM				
		20 DAT	40 DAT	60 DAT	80 DAT	At Harvest	20 DAT	40 DAT	60 DAT	80 DAT	At Harvest
1	Phule Maval (G$_1$)	0.227	0.130	0.260	0.400	0.408	1.514	3.855	14.33	23.85	45.91
2	Phuleradha (G$_2$)	0.197	0.190	0.430	0.581	0.585	0.973	3.355	13.06	21.04	39.99
3	SKL-7(G$_3$)	0.196	0.122	0.246	0.391	0.339	1.575	3.460	12.13	21.20	42.90
4	Terana (G$_4$)	0.115	0.205	0.380	0.526	0.610	0.817	3.158	12.98	20.58	41.70
5	Parag (G$_5$)	0.200	0.140	0.230	0.392	0.390	1.474	3.534	12.18	21.42	42.49
6	ACK-5 (G$_6$)	0.106	0.142	0.377	0.536	0.478	0.966	3.273	13.31	20.77	41.98
7	HMT Sona (G$_7$)	0.120	0.165	0.397	0.553	0.616	0.963	3.435	12.69	21.40	37.23
8	Kasturi (G$_8$)	0.107	0.125	0.307	0.435	0.434	0.671	2.751	12.40	20.62	40.00
9	Paras Sona (G$_9$)	0.196	0.123	0.255	0.380	0.402	1.535	4.048	14.69	24.23	46.50
10	Lolak (G$_{10}$)	0.079	0.084	0.287	0.426	0.444	0.488	2.876	11.88	19.43	40.93
11	Tulsi-75-14 (G$_{11}$)	0.135	0.141	0.336	0.519	0.487	0.858	2.874	12.02	20.61	41.54
12	Basmati-63 (G$_{12}$)	0.116	0.129	0.531	0.694	0.689	0.324	2.098	10.10	16.62	31.30
13	Pusa Sugandha-5 (G$_{13}$)	0.109	0.130	0.487	0.636	0.695	0.341	2.221	10.24	17.28	33.84
14	Basmati-107 (G$_{14}$)	0.128	0.122	0.332	0.511	0.459	0.762	2.465	11.35	19.97	41.23
15	Basmati-386 (G$_{15}$)	0.071	0.293	0.432	0.620	0.734	0.508	3.184	12.51	20.59	42.53
16	Super Basmati (G$_{16}$)	0.171	0.072	0.346	0.469	0.474	0.953	2.713	12.06	19.82	42.76
17	Antarvel (G$_{17}$)	0.150	0.110	0.307	0.471	0.500	0.984	2.910	11.91	20.69	41.22
18	Kala Jeera (G$_{18}$)	0.294	0.153	0.273	0.408	0.438	0.986	3.093	12.08	20.06	41.54
19	Dhanaprasad (G$_{19}$)	0.076	0.272	0.483	0.677	0.725	0.470	3.217	11.59	19.29	41.33
20	Bishnubhog (G$_{20}$)	0.299	0.085	0.348	0.543	0.578	1.059	2.886	12.03	20.32	42.81
21	Shrabanmasi (G$_{21}$)	0.143	0.133	0.300	0.439	0.423	0.809	2.820	12.19	19.50	40.86
22	Pusasugandha (G$_{22}$)	0.231	0.258	0.457	0.648	0.645	1.002	3.379	13.68	21.19	44.18
23	Kala Krishna (G$_{23}$)	0.163	0.211	0.401	0.567	0.529	0.656	3.109	11.48	18.94	40.57
24	Belgaum Basmati (G$_{24}$)	0.195	0.108	0.264	0.411	0.402	1.628	4.097	14.94	25.27	47.42
25	RDN-Scented (G$_{25}$)	0.166	0.185	0.357	0.518	0.574	0.627	2.913	11.33	18.86	41.10
26	Mamla (G$_{26}$)	0.146	0.136	0.357	0.507	0.506	0.830	2.984	12.46	20.53	41.22
27	Ghansal regional (G$_{27}$)	0.218	0.180	0.402	0.578	0.629	0.887	2.795	12.50	21.84	43.60
28	Pakistan basmati (G$_{28}$)	0.124	0.096	0.471	0.652	0.738	0.382	2.227	10.38	17.84	33.68
29	Pusa basmati (G$_{29}$)	0.058	0.178	0.488	0.618	0.659	0.772	3.562	13.45	21.90	42.61
30	Kate chinoor(G$_{30}$)	0.185	0.303	0.449	0.602	0.688	0.527	3.070	11.34	18.95	38.16
31	RDN-local (G$_{31}$)	0.111	0.126	0.322	0.482	0.484	0.454	2.719	11.83	20.25	41.37
32	Lala (G$_{32}$)	0.103	0.153	0.403	0.593	0.601	0.562	3.050	12.02	19.85	37.63
33	Durgabhog (G$_{33}$)	0.104	0.125	0.313	0.423	0.446	0.527	2.971	11.66	20.36	39.66
34	Velchi (G$_{34}$)	0.142	0.133	0.308	0.473	0.424	0.914	2.936	13.01	21.41	38.13
35	PKV-khamang (G$_{35}$)	0.228	0.095	0.326	0.480	0.457	1.018	2.614	11.86	20.03	37.22
36	PKV-HMT (G$_{36}$)	0.105	0.122	0.291	0.430	0.397	0.549	2.598	11.25	20.07	37.04
37	PKV-ganesh (G$_{37}$)	0.245	0.187	0.385	0.567	0.581	1.193	3.086	13.82	21.53	39.85
38	PKV-Makrand (G$_{38}$)	0.075	0.163	0.333	0.536	0.518	0.717	3.210	13.04	21.90	42.50
39	Ambika (G$_{39}$)	0.207	0.167	0.330	0.511	0.526	0.709	3.162	12.39	20.19	38.83
40	Avishkar (G$_{40}$)	0.207	0.157	0.408	0.573	0.556	0.955	3.091	12.00	20.05	39.95
41	Bhogawati (G$_{41}$)	0.130	0.121	0.317	0.466	0.461	0.628	2.787	11.83	20.31	40.58
42	Kundalika (G$_{42}$)	0.109	0.062	0.250	0.387	0.412	0.801	2.603	12.95	20.91	43.00
43	Pawana (G$_{43}$)	0.274	0.149	0.348	0.490	0.524	1.187	3.137	13.41	21.78	41.48
44	Basmati-370 (G$_{44}$)	0.193	0.076	0.329	0.479	0.472	0.686	2.697	11.80	19.19	40.12
45	Basmati-388 (G$_{45}$)	0.097	0.163	0.479	0.679	0.710	0.363	2.354	10.35	17.62	33.26
46	Pusa sugandha-2 (G$_{46}$)	0.121	0.133	0.289	0.419	0.393	0.889	2.997	12.13	20.71	41.75
47	Sugandha (G$_{47}$)	0.079	0.142	0.386	0.577	0.506	0.495	2.728	12.28	20.28	38.39
48	Patnijira (G$_{48}$)	0.272	0.197	0.373	0.595	0.551	1.167	3.221	13.57	22.23	39.78
49	Bela blue (G$_{49}$)	0.143	0.145	0.364	0.548	0.572	0.612	2.989	11.95	20.87	39.23
50	Girga (G$_{50}$)	0.138	0.115	0.517	0.680	0.666	0.269	1.942	9.66	16.07	28.79
51	Ambemohar (G$_{51}$)	0.095	0.211	0.429	0.619	0.677	0.610	3.493	12.60	21.14	40.47
52	Elaichi (G$_{52}$)	0.173	0.141	0.333	0.496	0.556	1.041	3.247	12.95	20.56	41.68
53	Badshahabhog (G$_{53}$)	0.148	0.158	0.384	0.579	0.529	0.890	3.026	13.50	23.11	43.65

54	Karjat-3 (G54)	0.225	0.242	0.311	0.475	0.486	0.693	4.194	15.22	25.64	53.15
55	Karjat-2 (G55)	0.195	0.224	0.316	0.460	0.482	1.017	4.295	15.53	25.92	49.05
56	Karjat-7 (G56)	0.178	0.214	0.357	0.545	0.558	0.853	4.455	15.88	26.81	51.58
57	Karjat-8 (G57)	0.135	0.246	0.373	0.542	0.568	1.033	4.919	16.79	27.80	49.96
58	Karjat-9 (G58)	0.313	0.208	0.275	0.472	0.468	0.703	6.000	17.08	29.57	51.61
Range		0.058-0.313	0.062-0.303	0.230-0.531	0.380-0.694	0.339-0.738	0.269-1.628	1.942-6.000	9.66-17.08	16.07-29.57	22.67-43.61
S.E±		0.027	0.011	0.025	0.033	0.040	0.08	0.49	0.78	1.35	1.60
C.D at 5%		0.077	0.031	0.071	0.094	0.114	0.23	1.38	2.20	3.82	4.53

Table 5: Evaluation of aromatic and non-aromatic rice genotypes for yield and yield attributes of rice

Sr. No	Genotypes	Panicle length (cm)	Total number spikelets/ panicle	Number filled spikelets/ panicle	1000 grain wt. (g)	Grain yield/ plant (g)	Straw wt./plant (g)	Harvest Index (%)
1	Phule Maval (G1)	25.65	176.04	146.58	18.46	16.67	25.16	39.90
2	Phuleradha (G2)	24.49	120.73	91.02	16.42	13.43	24.48	35.40
3	SKL-7(G3)	25.51	157.17	128.92	18.24	15.14	24.61	38.37
4	Terana (G4)	24.43	120.23	103.15	11.38	14.62	27.09	34.79
5	Parag (G5)	20.39	118.98	94.56	18.66	15.53	28.71	34.77
6	ACK-5 (G6)	19.99	106.38	101.50	12.64	14.85	24.28	37.95
7	HMT Sona (G7)	23.30	144.04	119.29	17.20	10.42	19.41	34.97
8	Kasturi (G8)	25.25	163.58	148.04	15.80	13.46	25.92	34.03
9	Paras Sona (G9)	21.12	176.60	151.10	18.91	16.83	23.87	41.30
10	Lolak (G10)	25.13	125.38	85.75	16.45	16.36	28.27	36.54
11	Tulsi-75-14 (G11)	27.85	132.98	108.69	13.28	14.47	25.35	36.06
12	Basmati-63 (G12)	28.26	97.91	78.62	16.78	8.91	16.43	34.86
13	Pusa Sugandha-5 (G13)	28.75	128.48	114.31	19.23	10.81	19.53	35.44
14	Basmati-107 (G14)	25.58	98.71	82.83	16.83	15.33	29.53	34.05
15	Basmati-386 (G15)	28.81	165.71	121.92	16.89	15.76	26.20	37.33
16	Super Basmati (G16)	27.16	149.81	124.10	16.33	15.63	27.98	35.80
17	Antarvel (G17)	25.23	167.92	139.83	14.20	15.45	26.99	36.26
18	Kala Jeera (G18)	24.59	119.08	94.21	13.36	15.39	28.73	34.79
19	Dhanaprasad (G19)	25.05	164.46	136.96	14.89	15.33	25.84	37.37
20	Bishnubhog (G20)	25.53	136.90	113.35	14.15	15.26	28.56	34.77
21	Shrabanmasi (G21)	26.12	126.83	103.79	14.35	15.81	28.72	35.39
22	Pusasugandha (G22)	27.77	100.25	81.92	17.75	15.78	29.79	34.56
23	Kala Krishna (G23)	27.38	152.00	128.33	14.95	15.66	29.92	34.36
24	Belgaum Basmati (G24)	24.60	176.69	149.60	19.50	17.51	24.28	42.13
25	RDN-Scented (G25)	25.10	160.02	130.27	13.27	15.95	26.72	37.35
26	Mamla (G26)	23.95	158.00	130.54	12.75	15.47	25.80	37.29
27	Ghansal regional (G27)	26.69	104.73	82.31	14.46	15.74	29.65	34.60
28	Pakistan basmati (G28)	25.35	121.85	105.52	13.98	10.02	16.89	36.98
29	Pusa basmati (G29)	25.55	165.58	142.25	13.45	15.61	28.49	35.23
30	Kate chinoor(G30)	25.12	136.69	108.06	17.22	13.24	24.48	34.87
31	RDN-local (G31)	25.79	108.19	89.27	14.28	15.45	26.75	36.37
32	Lala (G32)	25.42	148.40	122.52	9.98	12.53	20.87	37.30
33	Durgabhog (G33)	22.95	173.65	141.73	9.19	13.56	22.63	37.22
34	Velchi (G34)	25.79	116.00	110.25	13.60	12.31	21.56	36.14
35	PKV-khamang (G35)	24.26	150.65	137.31	13.98	11.48	20.53	35.77
36	PKV-HMT (G36)	25.65	131.08	124.17	11.81	12.20	22.95	34.50
37	PKV-ganesh (G37)	24.99	107.10	84.27	11.79	13.42	24.55	35.10
38	PKV-Makrand (G38)	26.52	137.81	101.90	17.34	14.63	26.89	35.21
39	Ambika (G39)	25.02	141.31	116.85	14.81	12.36	23.22	34.70
40	Avishkar (G40)	25.19	142.75	117.08	18.27	13.36	25.03	34.80
41	Bhogawati (G41)	24.43	146.21	120.46	13.34	14.15	25.83	35.39
42	Kundalika (G42)	24.61	138.35	112.56	16.96	14.27	26.68	34.83
43	Pawana (G43)	24.84	166.02	140.23	14.93	13.56	25.06	35.11
44	Basmati-370 (G44)	24.95	123.15	96.35	16.83	14.56	26.64	35.33
45	Basmati-388 (G45)	25.27	154.98	128.44	16.12	9.56	17.08	35.86
46	Pusa sugandha-2 (G46)	27.16	155.21	127.67	15.25	15.28	24.91	38.00
47	Sugandha (G47)	25.21	105.35	85.44	15.99	13.14	23.31	36.03
48	Patnijira (G48)	24.57	167.90	139.19	13.83	13.25	21.35	38.28
49	Bela blue (G49)	25.22	134.71	111.96	14.73	12.61	22.34	36.03
50	Girga (G50)	25.16	90.67	59.04	9.23	7.03	14.21	33.08
51	Ambemohar (G51)	24.52	166.96	139.71	13.20	13.74	23.39	36.75
52	Elaichi (G52)	26.06	103.15	86.06	16.56	14.51	24.71	36.97
53	Badshahabhog (G53)	24.57	132.02	111.02	10.94	15.41	25.14	38.00
54	Karjat-3 (G54)	20.25	179.46	152.46	19.48	20.66	28.23	42.25

55	Karjat-2 (G$_{55}$)	20.57	182.44	156.69	21.38	18.01	24.39	42.54
56	Karjat-7 (G$_{56}$)	20.50	182.85	148.52	19.89	18.79	23.78	44.32
57	Karjat-8 (G$_{57}$)	19.84	182.75	149.83	20.41	18.20	22.41	44.81
58	Karjat-9 (G$_{58}$)	20.73	190.46	163.21	21.59	18.49	21.77	45.93
	Range	19.84-28.81	90.67-190.46	59.04-163.21	9.19-21.59	7.03-20.66	14.21-29.92	33.08-45.93
	S.E±	1.12	3.50	2.31	0.89	1.37	1.34	2.03
	C.D at 5%	3.17	9.91	6.54	2.52	4.10	3.81	6.10

Table 6: Correlation co-efficient of morphological, physiological, growth parameters and yield attributing parameters in aromatic and non-aromatic rice genotypes

Traits	DFPF	DM	PH	NTPP	LPP	TDM	LA	CC	CSI	Pn	Tr	Sc	WUE	AGR	RGR	TSPP	TFSPP	PL	1000 GW	GY
DFPF	1.00																			
DM	0.947**	1.00																		
PH	0.259*	0.278*	1.00																	
NTPP	0.128	0.156	-0.219	1.00																
LPP	0.010	0.038	-0.274*	0.681**	1.00															
TDM	-0.030	0.031	-0.324*	0.703**	0.634**	1.00														
LA	-0.084	-0.051	-0.467**	0.603**	0.734**	0.708**	1.00													
CC	0.013	0.061	-0.277	0.721**	0.693**	0.763**	0.731**	1.00												
CSI	0.040	0.049	-0.309*	0.674**	0.571**	0.672**	0.630**	0.913**	1.00											
Pn	-0.014	0.017	-0.313*	0.555**	0.496**	0.640**	0.613**	0.615**	0.573**	1.00										
Tr	-0.044	-0.016	0.271*	-0.505**	-0.479**	-0.570**	-0.525**	-0.588**	-0.567**	-0.668**	1.00									
Sc	0.018	0.031	-0.289*	0.567**	0.514**	0.656**	0.518**	0.589**	0.556**	0.685**	-0.679**	1.00								
WUE	0.034	0.038	-0.281*	0.511**	0.490**	0.610**	0.526**	0.607**	0.572**	0.714**	-0.815**	0.648**	1.00							
AGR	-0.048	-0.065	-0.410**	0.601**	0.500**	0.745**	0.590**	0.621**	0.626**	0.541**	-0.468**	0.551**	0.502**	1.00						
RGR	-0.038	-0.086	0.070	-0.191	-0.238	-0.187	-0.243*	-0.217	-0.118	-0.271*	0.276*	-0.220	-0.286*	0.314*	1.00					
TSPP	0.134	0.167	-0.271*	0.427**	0.441**	0.519**	0.454**	0.536**	0.512**	0.548**	-0.559**	0.528**	0.537**	0.431**	-0.225*	1.00				
TFSPP	0.148	0.174	-0.266*	0.433**	0.447**	0.500**	0.468**	0.504**	0.473**	0.545**	-0.580**	0.563**	0.544**	0.391**	-0.257*	0.959**	1.00			
PL	0.051	0.118	0.314*	-0.265	-0.224	-0.332*	-0.400**	-0.334**	-0.386**	-0.462**	0.389**	-0.391**	-0.455**	-0.347**	0.292*	-0.321*	-0.331*	1.00		
1000 GW	0.013	0.056	-0.179	0.386**	0.397**	0.512**	0.428**	0.542**	0.506**	0.460**	-0.520**	0.475**	0.518**	0.375**	-0.185	0.336**	0.298*	-0.187	1.00	
GY	-0.006	0.030	-0.257*	0.616**	0.551**	0.844**	0.611**	0.703**	0.641**	0.507**	-0.543**	0.594**	0.491**	0.729**	-0.007	0.439**	0.402**	-0.248*	0.418**	1.00

(*indicates significance at 5 per cent levels; **indicates significance at 1 per cent levels)

Conclusion
Based on above results, it is concluded that, Among aromatic rice genotypes viz., Belgaum Basmati, Phule Maval and Paras Sona and all non-aromatic rice genotypes, i.e., Karjat-2, Karjat-3, Karjat-7, Karjat-8 and Karjat-9 found to be physiologically most efficient in respect of source translocation and sink capacity development, compared to other rice genotypes. Among aromatic rice genotypes Belgaum Basmati, Paras Sona and Phule Maval and non-aromatic rice genotypes Karjat-9, Karjat-8, Karjat-7, Karjat-2 and Karjat-3 showed higher value of leaf area index, leaf area duration, leaf area ratio, total number of filled spikelets, grain yield and harvest index.

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