Evaluationoftraditionalricegenotypes(*Oryzasativa*L.)for seed quality traits underaerobiccondition

ABSTRACT

Freshly harvested seeds of 58 traditional rice genotypes and two checks (KRH-4 and Doddabyranellu grown under aerobic condition were subjected to seed quality evaluation. Among traditional rice genotypes lowest electrical conductivity (3.48 (dScm^{-1} g^{-1}), highest germination percentage (99.67 %), α-amylase activity (2.03 cm) and total dehydrogenase activity (1.123) was observed in Neralisale, whereas highest thousand seed weight (30.00 gm), mean seedling length (37.83 cm), mean seedling dry weight (22.53 mg), seedling vigor index-I (3693) and II (2216) was noticed in Chinnaponni compared to other genotypes. Among checks, Doddabyranellu showed better seed qualitytraits. From this studyit could be concluded that genotypes Chinnaponni and Neralisale are well-suited for aerobic condition, benefiting farmers facing irrigation constraints by ensuring improved seed quality.

Keywords:Aerobicrice, seedquality, checks,traditionalricegenotypes

1. INTRODUCTION

Rice (*Oryza sativa* l.) is one of the staple food crop and primary source of energy for over half of the world's population and is considered as "global grain". Rice is the primary food crop consumed by more than 3.5 billion people and is one of the world's leading cereals and grown under variety of climatic and soil conditions. Rice varieties are composed of carbohydrates (77.53 %), protein (12.35 %), fat (3.23%), ash (1.64 %) and supply 60 to 80per cent calories of energy. In addition to this, it is a source of magnesium, thiamine, niacin, phosphorous, vitamin B_6, zinc and copper. In rice production, India is the world's second largest producer after China.

Riceis thelargest irrigated water consumer and is responsibleformassive greenhouse gas (GHG) emissions which contribute to global warming. Traditional lowland rice production with constant floods requires a greater amount of water.However, rising water scarcity affects the viability of the irrigated rice production system, as well as food security and the livelihoods of rice producers and consumers. Given the rising scarcityof water, there is a need to develop alternative rice cultivation technologies that use less water.The name "Aerobic rice" was recently coined by IRRI to describe a new method of growing rice. Aerobic rice, also known as "upland rice" or "aerobic paddy" is a cultivation method which involvesgrowingofriceplantsinnon-puddled,welldrainedfieldsoruplandareastypically using less water rather than in traditional flooded paddy fields. It refers to the process of establishingthecropfromdryseedssowninthefieldratherthantransplantingseedlingsfrom nursery.

Traditional rice genotypes refer to the older, locally adapted rice varieties that have been cultivated by farmers for generations. These varieties are often well suited to specific agroclimatic conditions, local soil types and cultural preferences. They have played a crucial role in ensuring food security and livelihoods for many communities around the world. Traditional cultivars, which are rich in nutritional and locally superior traits, hold the key to ricecultivationsustainability.Thesevarietiesareimportantintermsofsustainableproduction and land usage [6, 13, 14].

Numerous hybrids have been evaluated for their performance and seed quality in aerobic condition. The effect of water regime such as upland cultivation of traditional rice genotypes on the seed quality of rice has not been studied exhaustively. Therefore, thepresent experiment was conducted to evaluate the performance of traditional rice genotypes under aerobic condition for seed quality traits.

2. MATERIALANDMETHODS

The study was conducted in Department of Seed Science and Technology laboratory, University of Agricultural Sciences, GKVK, Bangalore during the year 2022-23. Freshly harvested seeds of 58 traditional rice genotypes and two checks (KRH-4 and Doddabyranellu grown under aerobic condition were subjected to seed quality evaluation. Seed quality parameters *viz.*, thousand seed weight (gm), moisture content (%), seed germination (%), shoot length (cm), root length (cm), mean seedling length (cm), mean seedling dry weight (mg), seedling vigour index-I, seedling vigour index-II, electrical conductivity (dScm^{-1}g^{-1}), total dehydrogenase activity (A_{480}nm) and α-amylase activity (cm) were recorded.

2.1 Thousandseedweight(gm):

1000 seeds are counted from the harvested plants of each replication and are weighed and expressed in grams.

2.2 Seedmoisturecontent(%)

Three replicates of five grams of seed material are taken for determining the seed moisture content using hot air oven. The powdered seed material is placed in a weighed moisture cup. After removing the lid, moisture cups are placed in hot air oven maintained at 130°Cfor2±1for2hoursandthecontentsareallowedtodry. Thenitiscooledinadesiccator for 30 min and weighed in an electronic balance along with metal cup and lid. The moisture content is worked out using the following formula and expressed as percentage [2].

$$\text{Moisturecontent(\%)} = \frac{M_2 - M_3}{M_2 - M_1} \times 100$$

Where,

M_1:Weight ofthe emptymoisturecup

M_2:Weightofthemoisturecup+samplebeforedrying M_3: Weight of the moisture cup + sample after drying

2.3 Seedgermination(%)

The germination test is conducted in the laboratorybyusingbetween paper method as per ISTA rules, for this the one hundred seeds from each genotype are drawn at random in three replicates and is carried out. Further rolled towels are incubated in a germination chamber maintained at 25 ± 1°C and 90 per cent relative humidity. Germinated seedlings are evaluated on 14th day as final count and percentage germination is expressed based onnumber of normal seedlings present. [2].

2.4 Shootlength(cm):

From the germination test, ten normal seedlings are selected randomly from replication of each genotype on the day of final count. The shoot length is measured and expressed in centimeters.

2.5 Rootlength (cm):

From the germination test, ten normal seedlings are selected randomly from replication of each genotype on the day of final count. The root length is measured and expressed in centimeters.

2.6 Meanseedlinglength(cm):

From the germination test, ten normal seedlings are selected randomly from replication of each genotype on the day of final count. The seedling length is measured from tip of shoot to root tip and the mean length is calculated and expressed as seedling length in centimeters.

2.7 Meanseedlingdryweight(mg):

The normal seedlings are taken in butter paper after removing the cotyledons anddried in a hot-air oven maintained at 85 ± 1°C for 24 hours. Then, seedlings were removed and allowed to cool in a dessicator for 30 minutes before weighing in an electronic balance. The average weight is calculated and expressed as seedling dry weight in mg per 10seedlings.

2.8 Seedlingvigourindex–I:

The seedling vigor index - I is computed by multiplying percentage germination and seedling length (cm) and expressed as a whole number [1].

Seedlingvigourindex- I=Germination (%) x Mean seedlinglength (cm)

2.9 Seedlingvigourindex -II :

The seedling vigor index - II is computed by multiplying percentage germination and seedling dry weight (mg) and expressed as a whole number [1].

Seedlingvigour index-II=Germination(%)x Seedlingdryweight (mg)

2.10 Electricalconductivity(dScm^{-1}g^{-1}):

Electrical conductivity will be measured [2].Three replications of 25 seeds were weighed on an analytical balance and soaked in 25 ml of distilled water for 24 hours at 25 ± 10°C. The electrical conductivity was measured using digital conductivity meter.

2.11 Totaldehydrogenase activity(A_{480}nm):

The total dehydrogenase activity was measured by the method suggested by [5]. The seeds imbibed in Tz viability testing were washed thoroughly with distilled water and the red-coloured formazan from the stained regions was extracted by soaking with 5 ml of 2-methoxy ethanol for 8 h in an airtight container. The extract was decanted and the colour intensity was measured in Spectrophotometer (Model Mini Spec 17) at 480 nm with a suitable blank (Methoxy ethanol). The total dehydrogenase activity (TDH) was expressed as absorbance.

2.12 α-amylaseactivity(cm):

The α-amylase activity was estimated in semi quantitatively by adopting „Beld-Rock Model‟. The overnight soaked seeds of three replications were dehusked and cut into two equal halves. The embryo was placed equidistantly on a sterilized petri plates containing 2per cent agar and one per cent potato starch medium in such a way that embryo portion of seed should come on to top and incubated for 24 hours at 25 ± 1˚C [4]. After incubation, the seeds were removed and iodine solution was poured on to the agar medium. After30 minutes, the observation on clear „halo zone‟ formed around the embryos indicating the α-amylase activity. The diameter of α-amylase activity was measured and expressed in centimeters.

3. RESULTSAND DISCUSSION

3.1 1000seed weight (g)

The data pertaining to thousand seed weight of traditional rice genotypes cultivated under aerobic condition are depicted in Table 1.

Different rice genotypes and checks resulted in significant differences in thousand seed weight. Genotype Chinnaponni recorded highest thousand seed weight (30.00 g), while lowest was recorded ingenotype Jeeerigesanna (10.16 g). Among checks Doddabyranellu recorded higher test weight (27.00 g).

Higher test weight might be due to better translocation of photosynthates and bolder seeds [12]. Similar variation in thousand seed weight of different rice genotypes grown under aerobic condition was reported by [8].

3.2 Seedmoisturecontent(%)

Thedataonseedmoisturecontentoftraditionalricegenotypescultivatedunder aerobic condition are depicted in Table 1.

Seed moisture content of different genotypes and checks resulted in non significantdifferenceforseedmoisturecontent.Minimummoisturecontentwasrecordedingenotype

Bidigekannappa (11.03 %), while maximum moisture content was recorded in genotype Jupodli (12.46 %). Among checks Doddabyranellu recorded minimum moisture content (11.25 %).

3.3 Seedgermination(%)

The data pertaining to seed germination of traditional rice genotypes cultivated under aerobic condition are depicted in Table 1.

Seed germination varied significantly among different genotypes and checksproduced under aerobic condition. Genotype Neralisale recorded highest seed germination (99.67 %) followed by Jawahar (98.67 %), Chinnaponni (97.67 %), while genotype Ambemohar recorded lowest seed germination (82.33 %). Among checks Doddabyranellu recorded highest seed germination (97.67 %).

The primary goal of every seed production activity is to achieve a high level of germination. Rice seeds should possess at least 80 per cent germination as per minimum seed certification standards. In this study all the rice genotypes registered germination level of above 80 %. Highest germination percentage might be due to genotype character, water use efficiency and nutrient uptake, this will leads to increase in storage food and it may beutilized during germination and plant developmental stages [11,7]. Similar higher germination percentage of rice genotypes cultivated under aerobic condition were reported by [9].

Table1.Seedmoisturecontent,seedgerminationoftraditionalrice(*Oryzasativa*L.) genotypes cultivated under aerobic condition

Genotype number	Genotypes	Thousand seedweight (g)	Seedmoisture content (%)	Seed germination(%)
1	KRH-4	18.49	11.39	88.00
2	Doddabyranellu	27.00	11.25	97.67
1	Tvrsmukkanasanna	13.81	11.09	97.33
2	Salemsanna-2	14.96	11.50	96.00
3	Belegamibasmati	18.22	12.21	97.67
4	Kadupeple	20.50	11.13	87.67
5	Jeenugodu	21.53	11.62	97.33
6	Neralisale	28.01	11.65	99.67
7	Shashtikashale	20.79	11.14	94.00
8	Tulasiya	14.57	11.52	96.00
9	Rajamudikempu	12.05	11.74	91.00
10	Mysoorumalligae	19.89	11.43	97.33
11	Doddayasandha	24.03	11.56	95.00
12	HMT-1	25.59	11.66	95.67
13	Nirgulabattha	15.29	11.79	96.33
14	RNR	11.01	11.89	95.00

15	Saraswati-1	17.46	12.32	93.67
16	Salemsanna-1	12.58	11.85	94.67
17	Nirgasamba	18.25	12.17	97.33
18	Pattubattha	14.54	12.25	92.33
19	Mutthinasanna	22.24	12.33	95.67
20	Jupodli	22.66	12.46	97.00
21	Gudabattha-2	21.83	11.38	97.67
22	Ratnasagara	20.87	11.20	93.67
23	Bangaragandu	22.62	12.17	96.00
24	Navali	20.70	11.75	85.00
25	Bidigekannappa	19.52	11.03	92.00
26	Kalainamik-1	11.82	12.18	92.33
27	Doddabattha	21.25	11.41	91.00
28	Ambemohar	19.80	11.76	82.33
29	MSN 99	12.85	11.93	94.67
30	Imbangidda	16.63	11.63	92.00
31	Mobikar	14.91	11.75	93.33
32	Kagesele	18.02	12.19	95.67
33	Belejadu	13.21	11.42	93.33
34	Kuhadisamba	18.34	11.28	97.67
35	Kundipullan	18.69	11.55	96.00
36	Sannakki	10.90	12.26	93.67
37	Vannekattu	20.69	11.35	97.00
38	AP 21	16.39	11.16	91.33
39	Thogarsi	27.13	11.97	97.33
40	Ranangali	23.35	11.88	88.33
41	Santhethal	10.49	12.29	96.67
42	SLR3449	19.88	11.31	82.67
43	Basmati	19.27	11.24	86.33
44	Kyasalai	24.00	11.09	95.00
45	Valakkasanna	19.26	11.29	95.67
46	KMP 225	20.67	11.03	96.00
47	Beppigedoddabyra	22.05	11.87	86.00
48	Karibasmati	18.61	11.07	94.00
49	Sannallibattha	17.05	11.42	89.00
50	Chinnaponni	30.00	12.15	98.33

51	Bebbanna	16.24	11.74	90.67
52	GK-1	20.43	11.82	95.67
53	Sannakempakki	13.43	12.05	97.33
54	AP-6	19.31	11.43	97.67
55	Jeerigesanna	10.16	12.04	96.67
56	Jawahar	19.33	11.42	98.67
57	Ratbad	20.94	11.57	96.33
58	Bellineralu	20.89	11.83	91.67
	Mean	**18.75**	**11.66**	**93.95**
	SEm±	**0.49**	**0.37**	**1.84**
	CD(p=0.05)	**1.39**	**NS**	**5.16**
	CV(%)	**4.60**	**5.55**	**3.40**

*NS: Non Significant

3.4 Shootlength(cm)

The data pertaining to shoot length of traditional rice genotypes cultivated under aerobic condition are depicted in Table 2.

Shoot length varied significantly among different genotypes and checks produced under aerobic condition. Genotype Bangaragandu recorded highest shoot length (15.15 cm) followed by Chinnaponni (15.06 cm), while lowest was recorded by genotype Belegamibasmati (5.35 cm). Among checks KRH-4 recorded highest shoot length (9.76 cm).

3.5 Rootlength (cm)

The data pertaining to root length of traditional rice genotypes cultivated under aerobic condition are depicted in Table 2.

Root length varied significantly among different genotypes and checks produced under aerobic condition. Genotype Chinnaponni recorded highest root length (22.49 cm) followed by Beppigedoddabyra (22.02 cm), while lowest was recorded by genotype Tulasiya (9.32 cm). Among checks KRH-4 recorded highest root length (18.18 cm).

3.6 Meanseedlinglength(cm)

The data on mean seedling length of traditional rice genotypes cultivated under aerobic condition are depicted in Table 2.

Mean seedling length varied significantly among different genotypes and checks produced under aerobic condition. Genotype Chinnaponni recorded highest mean seedling length (37.83 cm) followed byBeppigedoddabyra (35.63 cm), whilelowest was recorded by genotype Belegamibasmati (16.01 cm). Among checks KRH-4 recorded highest mean seedling length (27.94 cm).

ThehighermeanseedlinglengthinChinnaponniisduetohighershootandroot length.

Table2.Shootlength,rootlength,meanseedlinglengthof traditionalrice(*Oryzasativa* L.)genotypescultivatedunderaerobiccondition

Genotype number	Genotypes	Shootlength (cm)	Rootlength (cm)	Meanseedling length(cm)
1	KRH-4	9.76	18.18	27.94
2	Doddabyranellu	8.41	15.42	23.83
1	Tvrsmukkanasanna	8.16	15.27	23.43
2	Salemsanna-2	10.38	19.55	29.94
3	Belegamibasmati	5.37	10.64	16.01
4	Kadupeple	9.60	17.04	26.64
5	Jeenugodu	12.70	17.83	30.53
6	Neralisale	10.70	21.70	32.40
7	Shashtikashale	8.08	15.42	23.51
8	Tulasiya	8.00	9.32	17.32
9	Rajamudikempu	7.86	16.22	24.08
10	Mysoorumalligae	10.06	16.31	26.37
11	Doddayasandha	9.63	17.53	27.16
12	HMT-1	12.28	14.74	27.02
13	Nirgulabattha	9.29	14.14	23.44
14	RNR	8.12	13.06	21.19
15	Saraswati-1	7.13	16.47	23.61
16	Salemsanna-1	10.76	13.25	24.02
17	Nirgasamba	10.87	16.43	27.30
18	Pattubattha	11.75	19.38	31.13
19	Mutthinasanna	7.48	10.79	18.27
20	Jupodli	13.24	19.79	33.03
21	Gudabattha-2	11.97	17.55	29.52
22	Ratnasagara	9.82	18.36	28.19
23	Bangaragandu	15.15	19.74	34.89
24	Navali	9.54	15.21	24.75
25	Bidigekannappa	9.57	16.74	26.31
26	Kalainamik-1	8.44	11.49	19.93
27	Doddabattha	12.24	19.50	31.74
28	Ambemohar	13.12	18.05	31.17
29	MSN 99	7.73	15.62	23.36
30	Imbangidda	9.20	13.81	23.01

31	Mobikar	6.40	10.54	16.94
32	Kagesele	9.81	16.35	26.17
33	Belejadu	9.17	18.24	27.42
34	Kuhadisamba	7.58	15.58	23.20
35	Kundipullan	11.83	20.53	32.36
36	Sannakki	7.27	15.33	22.60
37	Vannekattu	12.03	17.68	29.71
38	AP 21	10.24	15.37	25.61
39	Thogarsi	10.61	13.28	23.89
40	Ranangali	12.36	16.93	29.29
41	Santhethal	6.91	12.17	19.08
42	SLR3449	10.25	14.57	24.82
43	Basmati	10.14	13.53	23.67
44	Kyasalai	10.59	17.45	28.04
45	Valakkasanna	8.68	17.86	26.54
46	KMP 225	9.04	14.54	23.58
47	Beppigedoddabyra	13.61	22.02	35.63
48	Karibasmati	9.34	16.46	25.80
49	Sannallibattha	7.57	14.45	22.02
50	Chinnaponni	15.06	22.49	37.83
51	Bebbanna	9.13	12.73	21.87
52	GK-1	9.73	18.22	27.95
53	Sannakempakki	7.15	11.06	18.22
54	AP-6	12.17	17.44	29.62
55	Jeerigesanna	7.34	12.25	19.59
56	Jawahar	12.45	15.87	28.33
57	Ratbad	8.61	17.39	26.01
58	Bellineralu	9.05	11.36	20.42
	Mean	**9.84**	**15.94**	**25.78**
	SEm±	**0.31**	**0.40**	**0.55**
	CD(p=0.05)	**0.89**	**1.12**	**1.56**
	CV(%)	**5.62**	**4.35**	**3.75**

3.7 Meanseedlingdryweight(mg)

The data pertaining to mean seedling dry weight of traditional rice genotypes cultivated under aerobic condition are depicted in Table 3.

Mean seedling dry weight varied significantly among different genotypes and checks produced under aerobic condition. Genotype Chinnaponni recorded maximum seedling dry weight (22.53 mg) followed by Bangaragandu (22.32 mg), while genotype Belegamibasmati recorded lowest mean seedling dry weight (5.22 mg). Among checks KRH-4 recorded maximum seedling dry weight (10.63 mg).

3.8 Seedlingvigourindex-I

The data pertaining to seedling vigour index-I of traditional rice genotypes cultivated under aerobic condition are depicted in Table 3.

Seedling vigour index-I varied significantly among different genotypes and checks produced under aerobic condition. Genotype Chinnaponni recorded seedling vigour index-I (3693) followed by Bangaragandu (3348), while genotype Belegamibasmati (1564) recorded lowest seedling vigour index-I. Among checks KRH-4 recorded maximum seedling vigour index-I (2445).

The highest seedling vigour index-I is due to highest germination percentage and mean seedling length.

3.9 Seedlingvigourindex-II

The data pertaining to seedling vigour index-IIof traditional rice genotypes cultivated under aerobic condition are depicted in Table 3.

Seedling vigour index-II varied significantly among different genotypes and checks produced under aerobic condition. Genotype Chinnaponni recorded seedling vigour index-II (2216) followed by Bangaragandu (2143), while genotype Belegamibasmati recorded lowest seedling vigour index-II (510). Among checks Doddabyranellu recorded maximum seedling vigour index-II (1003).

The highest seedling vigour index-II is due to highest germination percentage and mean seedling dry weight.

Table 3. Mean seedling dry weight, seedling vigour index-I,meanseedling vigourindex-II of traditional rice (*Oryza sativa* L.) genotypes cultivated underaerobic condition

Genotype number	Genotypes	Mean seedling dryweight (mg)	Seedlingvigour index-I	Seedlingvigour index-II
1	KRH-4	10.63	2445	935
2	Doddabyranellu	10.27	2327	1003
1	Tvrsmukkanasanna	10.78	2281	1049
2	Salemsanna-2	13.03	2875	1251

3	Belegamibasmati	5.22	1564	510
4	Kadupeple	7.81	2331	686
5	Jeenugodu	13.53	2972	1317
6	Neralisale	19.81	3229	1974
7	Shashtikashale	8.50	2210	799
8	Tulasiya	6.70	1663	643
9	Rajamudikempu	13.74	2191	1250
10	Mysoorumalligae	14.17	2566	1379
11	Doddayasandha	15.97	2582	1516
12	HMT-1	16.26	2585	1558
13	Nirgulabattha	13.53	2257	1303
14	RNR	12.61	2313	1200
15	Saraswati-1	10.05	2211	941
16	Salemsanna-1	9.44	2274	893
17	Nirgasamba	8.93	2657	869
18	Pattubattha	19.48	2873	1799
19	Mutthinasanna	8.20	1748	784
20	Jupodli	19.73	3205	1914
21	Gudabattha-2	19.04	2883	1859
22	Ratnasagara	17.78	2639	1663
23	Bangaragandu	22.32	3348	2143
24	Navali	16.75	2106	1421
25	Bidigekannappa	15.06	2418	1387
26	Kalainamik-1	8.10	1840	748
27	Doddabattha	17.95	2891	1633
28	Ambemohar	17.20	2560	1415
29	MSN 99	15.93	2212	1506
30	Imbangidda	9.84	2119	904
31	Mobikar	5.83	1579	544
32	Kagesele	14.42	2505	1379
33	Belejadu	10.13	2557	946
34	Kuhadisamba	10.22	2262	998
35	Kundipullan	18.88	3107	1812
36	Sannakki	12.68	2116	1186

37	Vannekattu	16.80	2884	1630
38	AP 21	13.78	2334	1259
39	Thogarsi	11.93	2325	1161
40	Ranangali	12.34	2589	1090
41	Santhethal	10.51	1844	1016
42	SLR3449	13.79	2051	1138
43	Basmati	13.38	2044	1154
44	Kyasalai	12.83	2664	1219
45	Valakkasanna	14.86	2541	1421
46	KMP 225	15.74	2264	1511
47	Beppigedoddabyra	21.63	3063	1857
48	Karibasmati	11.39	2426	1071
49	Sannallibattha	9.91	1962	886
50	Chinnaponni	22.53	3693	2216
51	Bebbanna	8.41	1980	762
52	GK-1	16.62	2674	1590
53	Sannakempakki	6.84	1773	667
54	AP-6	17.14	2893	1674
55	Jeerigesanna	8.10	1894	782
56	Jawahar	10.15	2795	1001
57	Ratbad	9.34	2505	900
58	Bellineralu	6.95	1872	636
	Mean	**13.09**	**2426**	**1229**
	SEm±	**0.35**	**80.50**	**37.54**
	CD(p=0.05)	**0.99**	**225**	**105.13**
	CV(%)	**4.68**	**5.74**	**5.28**

3.10 Electricalconductivity(dScm^{-1}g^{-1})

Thedatapertainingtoelectricalconductivity(dScm^{-1}g^{-1})oftraditionalricegenotypes cultivated under aerobic condition are depicted in Table 4.

Electrical conductivity varied significantly among different genotypes and checks producedunderaerobiccondition.GenotypeNeralisalerecordedlowerelectricalconductivity (3.48 dScm^{-1} g^{-1}) followed byJawahar (3.56 dScm^{-1}g^{-1}), Chinnaponni (3.63 dScm^{-1}g^{-1}), while genotype Ambemohar recorded higher electrical conductivity (10.48 dScm^{-1}g^{-1}). Among checks Doddabyranellu recorded lower electrical conductivity (3.83 dScm^{-1}g^{-1}).

The EC of seed leachate is sensitive index of seed quality, which shows negative association with other seed quality [3, 15, 16, 17]. Electrical conductivity of the seed leachate was greatly influenced by the method of cultivation. This might be due to less number of leachetes , increased amount reactive oxygen species and more number of living cells and ion exchange is in dual acceptable condition between plant and soil in case of aerobically developed genotype [11, 19]. Similar results were reported by[9, 10, 18].

3.11 Totaldehydrogenaseactivity (A_{480}nm)

The data pertaining to total dehydrogenase activity of traditional rice genotypes cultivated under aerobic condition are depicted in Table 4.

Total dehydrogenase activity varied significantly among different genotypes and checks produced under aerobic condition. Genotype Neralisale recorded highest total dehydrogenase activity (1.123) followed by Jawahar (1.103), while genotype Ambemohar recorded lowest total dehydrogenase activity (0.283). Among checks Doddabyranellu recorded highest total dehydrogenase activity (0.727).

The highest total dehydrogenase activity may be due to high vigour seeds havingmore number of active and living cells which is present in the seeds of aerobically grown genotypes and these will contribute to good germination and growth. Similar results of highest total dehydrogenase activity in rice genotypes grown under aerobic condition were reported by[11, 20].

3.12α-amylaseactivity(cm)

The data pertaining to α-amylase activity of traditional rice genotypes cultivatedunder aerobic condition are depicted in Table 4.

α-amylase activity varied significantly among different genotypes and checks produced under aerobic condition. Genotype Neralisale recorded highest α-amylase activity (2.03 cm) followed by Chinnaponni (1.87 cm), while genotype Ambemohar (0.57 cm) recorded lowest α-amylase activity. Among checks Doddabyranellu recorded highest α-amylase activity (1.49 cm).

Higher amylase activity indicated that mobilization of reserve food materials and make available for the root and shoot growth hence the cultivars showing higher amylase activity resulted in higher germination [10, 21].

Table 4. Electrical conductivity ($dScm^{-1}$ g^{-1}), total dehydrogenase activity (A_{480}nm), α-amylase activity (cm) of traditional rice (*Oryza sativa* L.) genotypescultivated under aerobic condition

Genotype number	Genotypes	Electrical conductivity ($dScm^{-1}g^{-1}$)	Total dehydrogenase activity(A_{480}nm)	α-amylase activity(cm)
1	KRH-4	5.01	0.389	0.72
2	Doddabyranellu	3.83	0.727	1.49

1	Tvrsmukkanasanna	3.93	0.682	1.50
2	Salemsanna-2	4.04	0.523	1.24
3	Belegamibasmati	3.80	0.711	1.36
4	Kadupeple	6.95	0.366	0.62
5	Jeenugodu	3.74	0.603	1.30
6	Neralisale	3.41	1.123	2.03
7	Shashtikashale	4.31	0.418	1.16
8	Tulasiya	4.01	0.511	1.20
9	Rajamudikempu	4.78	0.376	0.84
10	Mysoorumalligae	3.48	0.634	1.51
11	Doddayasandha	4.08	0.421	1.14
12	HMT-1	4.04	0.475	1.17
13	Nnirgulabattha	4.11	0.504	1.27
14	RNR	4.05	0.467	1.08
15	Saraswati-1	4.25	0.342	1.11
16	Salemsanna-1	4.18	0.431	1.07
17	Nirgasamba	3.91	0.694	1.46
18	Pattubattha	4.45	0.395	1.02
19	Mutthinasanna	3.84	0.456	1.14
20	Jupodli	3.97	0.623	1.35
21	Gudabattha-2	3.83	0.701	1.66
22	Ratnasagara	4.76	0.322	1.04
23	Bangaragandu	3.79	0.687	1.18
24	Navali	9.24	0.341	0.61
25	Bidigekannappa	4.73	0.384	0.89
26	Kalainamik-1	4.66	0.370	0.86
27	Doddabattha	4.85	0.357	0.82
28	Ambemohar	10.48	0.283	0.57
29	MSN 99	4.12	0.408	1.09
30	Imbangidda	4.60	0.355	0.84
31	Mobikar	4.27	0.388	0.96
32	Kagesele	3.93	0.526	1.17
33	Belejadu	4.38	0.467	0.94

34	Kuhadisamba	3.71	0.908	1.61
35	Kundipullan	3.80	0.444	1.53
36	Sannakki	4.41	0.407	0.81
37	Vannekattu	4.01	0.697	1.32
38	AP 21	5.17	0.601	0.87
39	Thogarsi	3.95	0.801	1.58
40	Ranangali	4.97	0.397	0.74
41	Santhethal	3.93	0.511	1.28
42	SLR3449	9.88	0.296	0.61
43	Basmati	8.80	0.326	0.77
44	Kyasalai	4.07	0.478	1.11
45	Valakkasanna	4.09	0.501	1.17
46	KMP 225	3.80	0.483	1.19
47	Beppigedoddabyra	7.91	0.367	0.74
48	Karibasmati	3.95	0.445	1.09
49	Sannallibattha	4.84	0.401	0.77
50	Chinnaponni	3.63	1.014	1.87
51	Bebbanna	4.96	0.415	0.79
52	GK-1	3.83	0.482	1.16
53	Sannakempakki	3.75	0.748	1.43
54	AP-6	3.92	0.881	1.62
55	Jeerigesanna	4.05	0.526	1.57
56	Jawahar	3.56	1.103	1.83
57	Ratbad	4.16	0.503	1.30
58	Bellineralu	4.81	0.377	0.96
	Mean	**9.12**	**0.526**	**1.15**
	SEm±	**4.64**	**0.017**	**0.037**
	CD(p=0.05)	**0.42**	**0.049**	**0.10**
	CV(%)	**5.68**	**5.80**	**5.58**

4. CONCLUSION

From this study it could be concluded that genotypes Chinnaponni and Neralisale are well-suited for aerobic condition, benefiting farmers facing irrigation constraints by ensuring improved seed quality.

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