International Journal of Plant & Soil Science

33(23): 189-199, 2021; Article no.IJPSS.76586
ISSN: 2320-7035

Assessment of Quality of Farm Saved Paddy Seeds Collected from Cauvery Delta Region

S. Selvamani [a], B. Sushmitha [a], R. Kowsalya [a], T. Eevera [a*] and S. Venkatesan [a]

[a] Anbil Dharmalingam Agricultural College and Research Institute, Tamil Nadu Agricultural University, Tiruchirappalli - 27, Tamil Nadu, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJPSS/2021/v33i2330734
Editor(s):
(1) Prof. RusuTeodor, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania.
Reviewers:
(1) Muhammad Mahran Aslam, Nuclear Institute of Agriculture, Pakistan.
(2) Md. Harunur Rashid, University of Newcastle, Australia.
(3) María Elena Sánchez Pardo, Instituto Politécnico Nacional, México.
Complete Peer review History: https://www.sdiarticle4.com/review-history/76586

Original Research Article

Received 06 September 2021
Accepted 12 November 2021
Published 18 November 2021

ABSTRACT

Paddy is cultivated on a large scale in Cauvery delta region of Tamil Nadu. Due to non-availability of adequate quantity of certified seeds at their village level most of the farmers of this region using their farm saved seeds to raise the next season crop. In order to know the quality of farm-saved paddy seeds of delta region, a total of 20 seed samples from 17 distinct varieties were collected from various villages in the Thanjavur district of Tamil Nadu during Rural Agricultural Work Experience programme. The samples were subjected to physical and physiological seed quality parameters evaluation at Seed Science and Technology laboratory of Anbil Dharmalingam Agricultural College and Research Institute, Thiruchirappalli. Only 15% of samples such as Seeraga samba, Karuppukavuni and RNR 1548 alone showed 80% seed germination. The average germination percent was 50.05. Based on our observations, farmers of this region store their seeds in gunny bags without proper drying and not following any pre-storage seed treatment to protect the seeds against storage pathogens and insects. Hence, awareness should be made among the farmers of this region regarding post harvest handling and management of farm produce harvested and stored for seed purpose. The government of Tamil Nadu should educate farmers about post-harvest handling of seeds through the Department of Agriculture to increase productivity and production of our country.

**Corresponding author: E-mail: teevera@gmail.com;*

Keywords: Paddy; germination; farm-saved seed; quality.

1. INTRODUCTION

Rice (*Oryza sativa L.*) is the most important staple food for about half of the world's human population. It is known as the grain of life for Asians as it supplies the majority of starch, protein and micronutrient requirements [1]. India is the second largest producer of rice in the world and is cultivated in an area of 437.8 lakh hectares with an average productivity of 2705 kg per hectare[2]. In Tamil Nadu, rice is the principal crop extensively cultivated in an area of 18.04 lakh hectares with a production of 63.08 Lakh Metric Tons during the year 2019-2020.

Seed is a mature ovule formed after fertilization from tissues of the mother plant.

A seed is a small embryonic plant enclosed by a protective covering called seed coat, and some stored food on the endosperm. It is the product of ripened ovules of gymnosperm and angiosperm plants, which occurs after fertilization and some modifications occurring inside the mother plant. The formation of seeds completes the process of reproduction in plants (which starts with the development of flowers and pollination), the embryo develops from the zygote and seed coat from integuments of the ovule[3].

Seed is the basic input for sustainable agriculture [4]. The response of other inputs depends on the quality of seeds to a larger extent. Seeds set the maximum yield and quality potential of a crop[5].

Seed testing is available to assure if the seeds delivered to the farmers are of certified quality. Seed testing determines the standards of a seed lot and thereby it enables the farming community to get quality seeds. Seed quality is considered as a value of different attributes of seeds viz., free from seed borne diseases, seed moisture content, germination and vigour, storability and insect infestation. In India, the mandates of seed testing are to estimate the moisture content, germination and physical purity of seeds[6].

The formal seed sector in India contributes only about 30-35 percent of total seed requirements, whereas the informal seed sector contributes enormously, primarily in the form of farmers' own seed, also known as Farm Saved Seed (FSS) which accounts for 65-70 percent of total seed requirements [7], indicating low seed replacement rates (SRRs). Although India's seed industry is the fifth largest in the world, with strong expansion, only 24% of sub-marginal and 29% of marginal farmers replace seeds every year, compared to 40% of large farmers. The informal seed sector, which accounts for 65-70 percent of total seed production, is dominated by farm-saved seeds (FSS). The percentage of small and marginal farmers who have access to high-quality seed is only 20% [8].

Indian farmers are still in use of farmer-saved seeds as input. Despite yield loss recurring from farm saved seeds, Indian farmers resist switching over to hybrid seeds and other high yielding varieties [9].

The major reason behind Indian farmers using their own seeds relies on the price [10]. Prices are considerably higher for private hybrids than for public hybrids or varieties. Many Seed companies have increased the costs for producing private hybrids. These are the main factors which force farmers to go for FSS. Food security is proportional to seed security. The essentiality to increase production and productivity demands the availability of quality seeds at appropriate price in desired quantity and at the righttime.

The Seed quality testing is carried out on seed samples which are drawn from a seed lot that are to be used for cultivation. Some practical difficulties in the production of quality seeds by government owned farms of the Agriculture and Horticulture departments are now responsible for non-availability of adequate quantities of seed materials to the farmers. There is a huge gap between seed production and requirement. Out of the total seed requirement in the country, only 37 per cent was being met by the public and private sector, while the rest were managed by FSS. In Tamil Nadu, out of 2.56 lakh tonnes of seed requirements, only 24 per cent was met by the supply agencies, resulting in the supply gap of 76 per cent[11].

The supply gap is more in agricultural crops compared to horticultural crops, and therefore the government is keen to maximize the quality seed ofproduction in the states. Despite huge institutional frameworks for timely production in public as well as private sectors, the continuous availability of good quality seeds is a problem for the farmers. As a result, farmers prefer to rely on FSS. Seed Replacement Rate has a strong

positive effect with the productivity and production of crops.Lower Seed Replacement Rate of paddy ultimately pulls down the seed multiplication ratio to the ratio of 1:80. Which ultimately affects the productivity and production of our country [12].There is a need to rejuvenate the seed sector through revamping the public sector seed companies, including the state seed corporations.

Considerable numbers of research were conducted to compare the quality difference between certified seeds and FSS. Farm saved seeds in some districts of Andhra Pradesh and Bihar proved to be of better quality [13]. But there is comparatively lesser yield in farm saved seeds when compared to certified seeds. This result in reduced production in India and this also deteriorates the quality of seeds.

In order to create awareness among the farmers about the role of quality seeds in improving the farm productivity and income, through various extension functionaries,the government of India conducts training programmes to the farmers. In line with the department of agriculture, state agricultural universities are also conducting field demonstration and kissan mela to make the farmers aware of improving the quality of farm saved seeds[14].

In order to assess the impact of awareness created by the various government functionaries with reference to use of quality seeds and up gradation of quality of farm saved seeds among the farmers of delta region this study was conducted during 2020-2021 in Thanjvur district of Tamil Nadu, India. Farm saved paddy seeds were collected, assessed the quality parameters and results were presented in this paper.

2. MATERIALS AND METHODS

Thanjavur, a foremost district of the Cauvery delta zone in Tamil Nadu, India. Where about 70%of the population is engaged in farming. The Cropped area of the district is around 2.69 lakh hectares, whereas the geographical area is 3.39 lakh hectare. An area of 1.856 lakh hectares was under cultivation during September – January, 2018-19 in the district. The district is called the“Rice Bowl of Tamil Nadu", as the major Cultivation here is Paddy.

2.1 Materials

As a part of our Rural Agricultural Work experience, we collected Paddy seed samples from farmers. Nearly 30 samples of FSS of 17 distinct varieties from various villages of the district were taken to assess their quality. Generally, farmers use seed that they saved from the last harvest. This seed is called Farm Saved Seeds (FSS). Because of this, the seed replacement rate is quite low. We did some quality tests to check the seeds samples collected from farmers. The details of the samples were given in Table 1.

2.2 Methods

2.2.1 Physical parameters: Purity test

From each sample, 100 seeds were analyzed, and the samples were divided into fractions (pure seed, other crop seed, and inert matter). The percentage of each fraction was calculated, and seeds of other crops and weeds identified and their numbers recorded.

2.2.2 Axial dimensions

The seeds were randomly selected and the axial dimensions *viz*., length, width of each twenty seeds were measured using graphical method and the mean value was recorded in centimetres. The axial dimensions were also recorded for grains after removing the husks in the same way.

2.2.3 Colour characteristics

The colour of the seeds wasexamined manually for golden / white/ straw/ yellow colour and recorded.

2.2.4 Profile value

Shape was defined as the ratio of length (the principal axial dimension) to width. The shape of a grain wasinfluenced by volume and weight. Rice varieties with slender type record more value for volume than rice varieties with round type.

$$\text{Shape} = \text{Length} \div \text{Width}$$

2.2.5 Beak intensity

The paddy seeds were manually examined for the beak characteristic and recorded for characteristics like Curved/ slightly curved/ straight.

2.2.6 Thousand seed weight

Thousands seeds of each variety were counted manually and weight is expressed in grams.

Table 1. List of variety names with their details

Variety	Farmer Name	Village	Month and Year of collection
Atthurkichadi samba(M)	Mr.Srinivasan	Mathur,Thanjavur (tk)	November,2020
Atthurkichadi samba (Mk)	Mr.Rajarajan	Mariammankovil	December, 2020
Athisayaponni	Mr.Anbuselvan	Kuruvadipatti, vallam	March,2020
BPT 5204	Mr.Vijayakumar	Surakkottai	September,2020
CR 1009	Mr.Jayasankar	Ammapettai	December,2020
IR 20	Mr.Mariappan	Orathanadu	January, 2020
Karungkavuni	Mr.Asaithambi	Kuruvadipatti,vallam	April,2020
Karuppukavuni Burma black	Mr.Pandiyan	Thirukanurpatti,Thanjavur	December, 2020
Kattuyanam	Mr.Anbuselvan	Kuruvadipatti,vallam	February, 2021
Mapillai samba(S)	Mr.Mathivanan	Surakkottai	April ,2020
Mapillai samba(T)	Mr.Srinivasan	Thiruvaiyaru	January,2021
Seeraga samba(MG)	Mr.Sambanthamooorthi	Marungulam	October, 2020
Seerga samba (V)	Mr.Ramakrishnan	Valamarkottai, Thanjavur (tk)	December,2020
Thanga samba	Mr.Balaji	Vannarapettai	January,2021
Karuthakkar	Mr.Ramalingam	Mariammankovil	January,2021
Basmathi	Mr.Gunasekar	Kuruvadipatti, Vallam	November,2020
Sonamasoori	Mr.Thiyagarajan	Kandiyur	January,2021
RNR 1548	Mr.Pasuapthi	Orathanadu	December, 2020
Thuyamalli	Mr.Ponnu Raman	Pavanamangalam, Thiruvaiyaru	January, 2020
Poongar	Mr.Sethuraman	Mananangkorai, Thanjavur	February,2021

Note: M-Mathur, MK – Mariammankovil, S – Surakkottai, T – Thiruvaiyaru, MG Marungulam, V – Valamarkottai.tk- taluk.

Fig. 1. Images of farm saved Paddy seeds of Delta farmers

2.3 Physiological Parameters

2.3.1 Germination

The germination test was conducted by following the procedure prescribed in [9] using sand medium by following tray method.100 seeds of each variety were placed in separate trays in moist sand and maintained in a room temperature of 25±2^{0}C and 90 ± 5% relative humidity.Atthe end of fourteenth day the number of normal seedlings in each variety was counted and the germination was calculated and expressed in percentage.

2.3.2 Root length

At the time of germination count, ten normal seedlings were selected at random from each variety and used for measuring the root length of seedlings. Root length was measured from the point of attachment of seed to the tip of primary root [15]. The mean values were calculated and expressed in centimetre.

2.3.3 Shoot length

The seedlings used for measuring root length were also used for measuring shoot length. The shoot length was measured from the point of attachment of seed to the tip of the terminal leaf and the mean values were expressed in centimeter [15].

2.3.4 Vigour index

Vigour index was computed using three following formulas and the mean values were expressed in the whole number [16].

Vigour index 1 (VI G1) = Germination (%) x Shoot length (cm)

Vigour index 2 (VI G2) = Germination (%) × Root length (cm)

Vigour index 3 (VI G3) = Germination (%) × Dry matter (g)

2.3.5 Speed of germination

Number of seedlings emerging daily are counted daily from the day if planting the seeds in the medium till the time of germination is complete. Thereafter the Germination Index (G.I.) was computed using the formula:

$$G.I. = n/d \quad (1)$$

where, n = number of seedlings emerging on the day ' d '
d = day after planting

The Variety having a greater germination index is considered to be more vigorous.

2.3.6 Dry matter production

The seedlings used for growth measurement were placed in a paper cover and dried in shade for 72 h. Dry weight was recorded and the mean values were expressed in gram per ten seedlings.[17].

3. RESULTS AND DISCUSSION

3.1 Physical Purity

Among the varieties examined, the physical purity fluctuated from 98-100%. This indicates that the FSS samples met the Indian Minimum Seed Certification Standards (IMSCS) for physical purity and inert matter. The kind of inert matter found were empty glumes and other extraneous matters such as mud / stones, chaff and broken pieces of stem. However, Farm saved paddy seed samples were free from other crop seeds and weed seeds (Table 2 & 3).

3.2 Thousand Seed Weight

The weight of thousand seeds of paddy recorded were shown in Table 4. The weight showed a significant difference among all the rice varieties. The maximum weight was obtained from Mappilai samba of Surakottai, 28.06 g and minimum value ,10.26 g belongs to the variety Seeraga samba of Marungulam. Mapillai samba seeds weighed 32g while seeraga samba seeds weighed 22g [18]. The Mapillai samba was good, but the Seeraga samba weighed less as compared to the regular weight. It's possible that this is due to undersized or shrunken seeds.

3.3 Physiological Parameters

3.3.1 Germination percentage

As per the Indian Minimum Seed Certification Standard (IMSCS), the paddy seed must possess a minimum of 80.0% germination. In this survey, highest germination of 82% was recorded for the Seeraga samba variety collected from Vallam. (Table 5). In the germination test, samples of Karuppukavuni, Seeraga samba of Vallam and RNR 1548 alone satisfied the minimum germination requirement of paddy seed as per the IMSCS. Whereas the other six samples viz., Athisayaponni, BPT 5204, CR 1009, Kattuyanam, Mapillai samba of Thiruvayaru and Poongar recorded lower germination value and considered to be not eligible to use a seed in the perspective of section number 6 of Indian Seed Act, 1966.In this study, samples germination value is recorded from 2% to 82%. The average germination was 50.05 % for farm saved paddy seeds of Thanjavur District. The reason lower germination may be due to poor handling of farm produce after harvest, especially without proper drying farmers are storing the seeds in gunny bags. Storage conditions also found to be not conducive to store the seeds for more than six months. Since the seeds are living entities and always try to interact with the surrounding environmental factors like temperature and relative humidity of the go-down and biotic factors. Particularly dried seeds stored in the gunny bag try to establish moisture equilibrium with the surrounding. This phenomenon resulting in uptake of moisture by the seeds during the rainy season leads to increased moisture content. The germination percentage and seed moisture content along with storage temperature are highly correlated with increasing predictably with decreasing temperature and moisture content [19]. High seed moisture content along with high temperature and ambient oxygen would trigger a series of metabolic changes and increase in respiration and the consumption of storage reserves, and thus lead to seed deterioration [20;21].

3.3.2 Speed of germination

The maximum and minimum value was recorded in Seeraga samba of Marungulam(18.39) and BPT (0.36) respectively. Other varieties like IR 20, RNR 1548, Karuthakkar, Karuppukavuni, and Basmathi have16.33, 15.69, 15.56, 15.33 and 15.27 values respectively (Table6). The values ranged from 0.36 to 18.39.

3.3.3 Vigour index

Vigour index significantly varied among the varieties. From the column Vigour Index G1, the maximum vigour value was recorded in Karuthakkar (1560), and the minimum in BPT 5204 (3.69) and the ranges were between 3.69 to 1560. The varieties like Athisayaponni, Kattuyanam, Mapillai samba of Thiruvayaru, and Poongar have no vigour value. From the column

VI G2, the maximum vigour value was recorded in IR 20 (663.75) and the minimum in BPT5204 (2.49) and values ranged from 2.49 to 663.75. From the column VI G3, the maximum (49.50) and minimum value (19.80) was recorded in IR 20 and Karuppukavuni respectively and the values were from 19.80- 49.50. The results were given in Table 6.

Table 2. Physical parameters of farm saved seeds collected from Thanjavur district

	Colour	Seed size		Width(cm)
		Length(cm)	Grain type	
Atthurkichadi samba(M)	Straw	0.8	Medium	0.22
Atthurkichadi samba (Mk)	Straw	0.7	Short	0.25
Athisayaponni	Straw	0.8	Medium	0.21
BPT 5204	Straw	0.8	Medium	0.25
CR 1009	Brown	0.8	Medium	0.25
IR 20	Straw	0.9	Long	0.25
Karungkavuni	Straw	0.9	Long	0.23
Karuppukavuni Burma black	Brown	0.9	Long	0.32
Kattuyanam	Brown	0.9	Long	0.27
Mapillai samba(S)	Brown	0.9	Long	0.28
Mapillai samba(T)	Brown	0.9	Long	0.28
Seeraga samba(MG)	Straw	0.6	Short	0.19
Seerga samba (V)	Yellow	0.6	Short	0.23
Thanga samba	Yellow	0.8	Medium	0.24
Karuthakkar	Brown	0.8	Medium	0.29
Basmathi	Golden	1.0	Long	0.20
Sonamasoori	Golden	0.7	Short	0.24
RNR 1548	Straw	0.7	Medium	0.21
Thuyamalli	Straw	0.8	Medium	0.22
Poongar	Brown	0.8	Medium	0.30

Table 3. Physical parameters of farm saved seeds collected from Thanjavur district

Variety	Grain characters			Length /width ratio	
	Colour	Length(cm)	Width(cm)	L/W ratio	Grain size
Atthur kichadi samba(M)	White	0.6	0.18	3.3	Slender
Atthur kichadi samba (Mk)	Brown	0.6	0.20	3.0	Medium
Athisayaponni	White	0.6	0.16	3.75	Slender
BPT 5204	White	0.5	0.17	2.9	Bold
CR 1009	White	0.6	0.23	2.6	Medium
IR 20	White	0.5	0.20	2.5	Medium
Karungkavuni	Black	0.7	0.19	3.68	Slender
Karuppukavuni Burma black	Red	0.7	0.25	2.8	Medium
Kattuyanam	Red	0.6	0.22	2.7	Medium
Mapillai samba(S)	Red	0.7	0.25	2.8	Medium
Mapillai samba(T)	Red	0.7	0.25	2.8	Medium
Seeraga samba(MG)	White	0.5	0.16	3.1	Slender
Seerga samba (V)	White	0.5	0.18	2.7	Medium
Thanga samba	White	0.6	0.20	3.0	Medium
Karuthakkar	Brown	0.6	0.25	2.4	Medium
Basmathi	White	0.7	0.16	4.3	Slender
Sonamasoori	White	0.5	0.19	2.6	Medium
RNR 1548	White	0.6	0.18	3.3	Slender
Thuyamalli	White	0.6	0.19	3.1	Slender
Poongar	White	0.6	0.22	2.7	Medium

Table 4. Physical parameters of farm saved seeds collected from Thanjavur district

Variety	1000 seed weight (g)	Variety	1000 seed weight (g)
Atthur kichadi samba(M)	16.86	Mapillai samba(T)	28.06
Atthur kichadi samba (Mk)	16.15	Seeragasamba(MG)	10.26
Athisayaponni	13.38	Seerga samba (V)	10.56
BPT 5204	20.52	Thanga samba	12.41
CR 1009	22.75	Karuthakkar	23.61
IR 20	17.23	Basmathi	19.60
Karungkavuni	25.79	Sonamasoori	13.52
Karuppukavuni Burma black	26.53	RNR 1548	13.39
Kattuyanam	24.84	Thuyamalli	16.57
Mapillai samba(S)	26.58	Poongar	16.85

Table 5. Physical parameters of farm saved seeds collected from Thanjavur district

Variety	Shape (profile value)		Beak	Awn
	Length /width ratio	Shape		
Atthur kichadi samba(M)	3.6	Elongated	Straight	Absent
Atthur kichadi samba (MK)	2.8	Semi – long	Straight	Absent
Athisayaponni	38	Elongated	Slightly curved	Absent
BPT 5204	3.2	Elongated	Straight	Absent
CR 1009	3.2	Elongated	Straight	Absent
IR 20	3.6	Elongated	Straight	Absent
Karungkavuni	3.9	Elongated	Straight	Absent
Karuppukavuni Burma black	2.8	Semi – long	Straight	Absent
Kattuyanam	3.3	Elongated	Straight	Absent
Mapillai samba (S)	3.2	Elongated	Straight	Absent
Mapillai samba (T)	3.2	Elongated	Straight	Absent
Seeraga samba (MG)	3.1	Elongated	Slightly curved	Absent
Seerga samba (V)	2.6	Semi – long	Slightly curved	Absent
Thanga samba	3.3	Elongated	Straight	Absent
Karuthakar	2.7	Semi – long	Straight	Absent
Basmathi	5.0	Elongated	Straight	Present
Sona masoori	2.9	Semi – long	Straight	Absent
RNR 1548	3.3	Elongated	Straight	Absent
Thuyamalli	3.5	Elongated	Straight	Absent
Poongar	2.6	Semi – long	Straight	Absent

Most of the samples recorded lower value for speed of germination and vigour index; this clearly indicates that improper storage conditions and increase of seed moisture content hasten the ageing related process in the seeds. The occurrence of an ageing related catabolic process within the seeds resulted in accumulation of unwanted metabolite within the seeds and ultimately makes the seed less vigorous. In the case of less vigorous seeds, the process of germination always slows down and that will be reflected in the speed of germination. In line with above discussion, in this experiment also more number of samples recorded lower value for speed of germination.

3.3.4 Shoot length (cm)

Significant differences in shoot length were obtained for different rice varieties. The shoot length values ranged from 1.23- 21.04 cm. Among different varieties, the lengthiest shoot was registered by Karuppukavuni 2(21.04 cm) followed by Karuthakkar (20.02cm) and shortest shoot was recorded by CR 1009 (8.5cm) (Table 7).

Table 6. Physiological parameters of farm saved seeds collected from Thanjavurdistrict

Variety	Germination (%)	Speed of germination	Vigour index		
			VI G1	VI G2	VI G3
Atthur kichadi samba (M)	64	13.79	828.8	572.8	39.0
Atthur kichadi samba (MK)	69	12.32	1068.8	209.7	37.2
Athisayaponni	24(D)	-	-	-	-
BPT 5204	3	0.39	3.6	2.4	-
CR 1009	2	0.36	17.0	15.0	-
IR 20	75	16.33	826.5	663.7	49.5
Karungkavuni	36	6.87	520.2	334.8	19.8
Karuppukavuni Burma black	81	15.33	1486.0	290.7	45.3
Kattuyanam	13(D)	-	-	-	-
Mapillai samba(S)	66	10.54	897.6	759.0	34.9
Mapillai samba(T)	36(D)	-	-	-	-
Seeragasamba(MG)	81	18.39	810.0	627.7	25.9
Seerga samba (V)	82	14.28	1020.9	319.8	27.8
Thanga samba	63	13.45	948.1	592.2	20.1
Karuthakkar	78	15.56	1560.0	353.3	41.6
Basmathi	76	15.27	1394.0	245.4	28.8
Sonamasoori	72	13.49	974.1	283.6	30.9
RNR 1548	80	15.69	1244.0	286.4	24.8
Thuyamalli	73	13.33	1270.0	237.9	37.2
Poongar	42(D)	-	-	-	-

Table 7. Physical parameters of farm saved seeds collected from Thanjavur district

Variety	Shoot length(cm)	Root length(cm)	Dry matter (g per 10 seedlings)
Atthur kichadi samba(M)	12.95	8.95	0.610
Atthur kichadi samba (MK)	15.49	3.03	0.540
Athisayaponni	-	-	-
CR 1009	8.50	7.50	-
BPT 5204	1.23	0.83	-
IR 20	11.02	8.85	0.660
Karungkavuni	14.45	9.30	0.550
KaruppukavuniBurrma black	21.04	3.59	0.560
Kattuyanam	-	-	-
Mapillai samba(S)	13.60	11.5	0.530
Mapillai samba (T)	-	-	-
Seeraga samba (MG)	10.00	7.75	0.320
Seerga samba (V)	12.45	3.90	0.340
Thanga samba	15.05	9.40	0.320
Karuthakkar	20.02	4.53	0.530
Basmathi	17.21	3.23	0.380
Sonamasoori	13.53	3.94	0.430
RNR 1548	15.55	3.58	0.310
Thuyamalli	17.40	3.26	0.410
Poongar	-	-	-

3.3.5 Root length (cm)

The root lengths significantly differed among the varieties. The values were between 0.83-11.50 cm. Lengthiest root was recorded by Mapillai samba of Surakottai (11.5 cm) followed by Thanga samba (9.4 cm), Karuppukavuni(9.3 cm). Shortest root was recorded by BPT 5204 (0.83), then Aathur kichadi samba of Mariammankovil (3.03), Basmathi (3.23 cm), Thuyamali (3.26 cm) (Table 7).

3.3.6 Dry matter (g per 10 seedlings)

Significant differences were observed for different varieties (Table 7). The values were between 0.310g to 0.660 g.The dry matter Production of seedling was superior in IR 20 (0.660 g) followed by Aathur kichadi samba of Mathur(0.610 g) and RNR 1548 recorded the least value (0.310g).

The assurances offered with certified seed are not valid on saved seed, the latter may contain diseased seeds that results in poor germination and mixed with weed seeds that may compete with the crop for moisture and nutrients and other essential inputs. These added challenges could easily lead to loss from our savings gained from planting farm saved seed.

This survey cum seed quality analysis results clearly indicates that during saving the seeds in the farm, most of the farmers are not following any precautionary measures to prevent the loss of seed quality during storage. But seed producers carry out a few measures including, cleaning the drill and combined harvester for harvesting, maintaining the seeds under good storage structures, offering seed treatment etc. In FSS, there is no guarantee in Purity, Germination and Seed vigour. When they opt for certified seeds, it not only reduces their risk against diseases and low germination rates, but farmers can also take advantage of new advancements in seed technology. Although saved seed performed well in some states [22]. The certified seed gives higher yields and offers genetic benefits of a specific variety.

4. CONCLUSION

The present study revealed that only 3 samples viz., Karuppukavuni, Seeraga samba of Vallam and RNR 1548 out of 20 samples fulfilled the minimum requirement prescribed by the IMSCS with reference to germination of 80% for paddy. Due to mechanization of paddy cultivation in delta region, the physical purity of all the twenty seed samples satisfied the minimum limit prescribed by the IMSCS as per the section number six of Indian Seed Act, 1966. Based on our interaction with the farmers, the reason for lower germination of the majority of the farm saved seeds of this study was due to lack of awareness among the farmers about liveliness of the seed. Farmers are treating both grain and seeds as one and the same. Some of the farmers are using fertilizer bags for bagging and storage of seeds. Use of fertilizer bags for storing seeds is highly detrimental to the seed quality. Farmers facing the problem of drying yards to dry the seeds and storage go-down facilities for long term storage of seeds. Even though various extension functionaries work at village level to create awareness about use of quality seeds, still many of the farmers are in the dark with reference to quality aspects of the seed.

For centuries, farmers have sown seeds, saved seed and replanted their own seed. This cycle continues in many areas. As the global population continues to expand, it gets critical to increase productivity on existing lands, and research shows certified seed consistently out yields saved seed. Government and extension functionaries should work more to make the farmers aware of the benefits and risks associated with both farm saved and certified seed, while preparing for planting season.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Babu VR, Shreya K, Dangi KS, Usharani G, Nagesh P. Evaluation of popular rice (*Oryza sativa* L.) hybrids for quantitative, qualitative and nutritional aspects. International Journal of Scientific and Research Publications. 2013;3(1):1-8.
2. Edukondal B, Reddy RV, Rani ST, Kumari CA,Soundharya B. Studies on variability, heritability, correlation and path analysis for yield, yield attributes in rice (*Oryza sativa* L.). International Journal of Current Microbiology and Applied Sciences. 2017;6(10): 2369-2376.
3. Bareke, T. Biology of seed development and germination physiology. Adv. Plants Agric. Res. 2018;8(4):336-46.
4. Varshney SK, Singh KMN, Singh RS. Quality status of rice seed saved by farmers in Bihar. Department of seed technology, Tirhut College of Agriculture, Dholi (Muzaffarpur)-843121, Bihar, India. 2007;44(3):268-269.
5. Alqudah AM, Samarah NH, Mullen RE. Drought stress effect on crop pollination, seed set, yield and quality. In Alternative farming systems, biotechnology, drought stress and ecological fertilization. Springer, Dordrecht. 2011;193-213.

6. Rao NK, Hanson J, Dulloo ME, Ghosh K, Nowell A. Manual of seed handling in genebanks. Bioversity International; 2006.
7. DAC & FW. State of Indian Agriculture 2015-16. Department of Agriculture, Cooperation & Farmers Welfare, Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, New Delhi, Govt. of India. 2016;280.
8. Roy TN. Review on access of small and marginal farmers to improved seeds in India. Economic Affair.2015;60(4):713–719.
9. Witcombe JR, Packwood AJ, Raj AGB, Virk DS. The extent and rate of adoption of modern cultivars in India. Seeds of choice: Making the most of new varieties for small farmers. 1998; 53-68.
10. Manjunatha BL, Rao DUM, Sharma JP, Roy Burman R, Dipika Hajong, Dastagiri MB, Sumanthkumar V. Factors Affecting Accessibility, Use and Performance of Quality Seeds in Andhra Pradesh and Bihar.Journal of Community Mobilization and Sustainable Development. 2015; 10(1):130-145.
11. Bonner FT. Seed testing. Seeds of woody plants in the United States. 1974;136-152.
12. Parimala K, Subramanian K,Mahalinga Kannan S, Vijayalakshmi K.A Manual on Seed Production and Certification.Centre for Indian Knowledge Systems(CIKS), Chennai. 2013.1.
13. Parimala K, Subramanian K, Mahalinga Kannan S, Vijayalakshmi K.A Manual on Seed Production and Certification. Centre for Indian Knowledge Systems (CIKS), Chennai; 2013.
14. Phillips, C. *Saving more than seeds: Practices and politics of seed saving*. Routledge; 2016.
15. International Rice Research Institute (IRRI); 2002. Available:http://www.irri.org
16. Abdul-Baki AA, Anderson JD. Vigour determination of soybean seeds by multiple criteria. Crop Sci. 1973;13:630-633.
17. International Seed Testing Association. International rules for seed testing, Seed Sci Tech 1985;13:229-355
18. Balasubramanian AV, Vijayalakshmi K, Subhashini Sridhar, Subramanian K, Parimala K, Manikandan R. Traditional Rice Varieties of Tamil Nadu: A Source Book. CIKS, Chennai; 2019.
19. Rajjou L, Debeaujon I. Seed longevity: survival and maintenance of high germination ability of dry seeds. Comptes Rendus Biologies. 2008;331(10):796–805.
20. Liu J, Gui J, Gao W, Ma J, Wang Q. Review of the physiological and biochemical reactions and molecular mechanisms of seed aging. Acta Ecologica Sinica. 2016;36(16):4997–5006.
21. McDonald MB. Seed deterioration: physiology, repair and assessment. Seed Science and Technology.1999;27(1):177–237.
22. Dhedhi KK, Patoliya BV, Asha C, Detroja JS, Sorathiya, Khanpara MD. Effect of pinching and foliar application of nutrients on seed yield and quality of sunhemp (*Crotalaria juncea* L.). The Bioscan. 2017; 12(2):1069-1073.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle4.com/review-history/76586