

Studies on Seed dormancy of certain short duration Rice varieties of Kerala *

by

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Synopsis: A preliminary study was conducted with 14 short duration Ptb strains to ascertain whether any of them possesses seed dormancy. The results indicated that all these strains lack seed dormancy.

Introduction: In rice it is generally understood that short duration varieties lack seed dormancy. In this State, short duration varieties are grown mostly during the first crop season and the harvest synchronises with the heavy showers of the S. W. Monsoon. So a short period of dormancy is desirable in such varieties to avoid considerable loss of grains in the field due to sprouting. The work reported in this paper is undertaken with the object of classifying 14 short duration Ptb strains into dormant and non-dormant and also to find out the period of dormancy in dormant strains.

Review of Literature: Arber (1934) reported that grains of various cereals possess the power of germination long before their maturity. Walker (1933) and Culpepper and Moon (1941) in sweet corn, Sprague (1936) in field corn, Bartel (1941) in wheat and barley, Harlan and Pope (1922) and Harlen (1926) in barley. Gregory and Purvis (1938), Nutman (1941) and Hatcher and Purvis (1945) in rye. Ponnaiya (1944) in sorghum and Gopinathan Nair (1961) and Purushothaman and Balasubramaniam (1963) in rice have recorded the germinability of immature grains.

Ramiah (1937) recorded that short duration varieties of rice with few exceptions are capable of germinating immediately after harvest and that long duration varieties have a period of dormancy. Mudaliar and Sundararaj (1954) also obtained similar results. Chalam (1954) found that the longer the duration of a variety the longer was its period of dormancy. Quick growing varieties require no resting period. But Dore (1955) could not find any correlation between duration and dormancy in his study on 21 Malayan varieties of rice. Narasinga Rao and Shanmugasundaram (1951) reported that only 22 out of 149 short duration types and varieties gave less than 5% germination immediately after harvest. These authors, therefore, suggested that most of the short duration varieties of rice do not have a period of dormancy.

Materials and Methods: The work reported in this paper was conducted at the Agricultural Botany Division, Agricultural College and Research Institute, Vellayani, Kerala.

14 short duration Ptb. strains viz., Ptb. 7, 8, 9, 10, 22, 23, 24, 25, 26, 28, 29, 30, 31 and 32 were utilised for this study. Seeds were obtained from the Agricultural Research Station, Pattambi.

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Seeds were sown in strips on 16—2—1963. Flowering dates of 50 plants in each strain were recorded by marking 50 panicles in each strain. The flowering date of a panicle was taken as the date on which 50% of the spikelets completed opening. The germinability of grains was tested at periodic intervals of 5 days. Germination test commenced in each strain at 15 days after flowering. Grains from 3 earheads were utilised for every test. The test was continued with 20, 25, and 30 day mature grains. At 30 days after flowering (the normal maturity for short duration varieties) all the ear-heads were harvested, dried and stored in paper covers. Germinability of grains on these stored earheads was tested at 5 day intervals up to 45 days after flowering.

Grains of each lot were kept in separate petridishes and soaked for 24 hours. The grains germinating within a period of 7 days from the commencement of the test were counted. Germination percentage of each lot was calculated and data tabulated.

Experimental Results: Germination percentages of grains of the 14 strains at different stages of testing are tabulated and presented in Table. The data reveal that grains of each strain start germination at a particular stage and the germination percentage gets progressively increased in subsequent tests. At the 30 day stage all strains except Ptb. 29 and 30 recorded more than 5% germination. Ptb. 29 and 30 give 5% or more germination only at the 40 day stage. It is also observed that Ptb. 10 gives 13.2% germination at 15 days after flowering and at the 30 day stage, this strain records as high a germination percentage as 77.1.

TABLE

Germination percentage of grains of 14 strains at different stages of testing.

Strain	Duration (Sowing to flowering)	Germination % of grains						
		Period from flowering to germination test						
		15 days	20 days	25 days	30 days	35 days	40 days	45 days
Ptb. 7	89 days	0.0	2.9	8.0	23.7	38.9	60.7	77.2
Ptb. 8	66 "	0.8	2.3	6.6	12.1	24.2	51.4	56.4
Ptb. 9	66 "	1.8	3.9	6.4	7.4	21.4	47.9	70.9
Ptb. 10	66 "	13.2	41.5	57.3	77.1	96.7	98.2	95.8
Ptb. 22	63 "	1.1	6.2	14.8	30.8	80.8	88.1	93.9
Ptb. 23	69 "	1.8	9.8	26.7	52.8	66.1	81.4	85.4
Ptb. 24	66 "	0.8	4.5	6.9	15.6	23.7	33.6	41.4
Ptb. 25	63 "	0.0	6.2	20.7	28.3	33.3	46.5	71.4
Ptd. 26	69 "	1.1	5.1	4.2	14.1	19.7	28.6	51.4
Ptd. 28	66 "	0.9	4.4	20.0	39.3	45.8	97.0	98.2
Ptd. 29	58 "	0.0	1.2	0.0	1.0	2.9	8.8	15.9
Ptd. 30	58 "	0.0	1.9	0.9	0.0	3.6	8.0	10.4
Ptd. 31	58 "	1.2	8.5	15.2	24.6	33.2	50.1	76.1
Ptd. 32	75 "	2.0	6.7	14.6	29.0	38.8	43.5	51.7

Discussion: (i) *Dormancy in short duration strains:* In short duration varieties of rice, the normal maturity period, i. e. period from flowering to harvest, is 30 days. The germinability of grains of a variety at this stage of maturity may therefore be taken as a criterion to decide whether the variety is dormant or non-dormant. Germination up to 5% can be considered to be due to environmental effects and so can be neglected. Thus any variety which gives 5% or more germination at 30 days maturity stage can be considered as non-dormant and the rest as dormant.

The results obtained in the present work reveal that strains Ptb. 7, 8, 9, 10, 22, 23, 24, 25, 26, 28, 31 and 32 give more than 5% germination at 30 days after flowering and so are non-dormant. Strains Ptb. 29 and 30 give similar germination only at 40 days after flowering. The very short period viz., 10 days after normal maturity, required by these two strains to germinate cannot be taken to mean that the strains possess seed dormancy, since Gopinathan Nair (1961) reported that the period of dormancy of a variety is a slightly variable factor depending on the seasonal conditions. Thus, these strains can also be said to be non-dormant. The results, therefore, suggest that all the 14 short duration strains do not possess seed dormancy. This observation is in agreement with the view held by previous investigators such as Ramiah (1937) and Narasinga Rao and Shanmugasundaram (1951) that short duration varieties generally lack seed dormancy.

(ii) *Germination of immature grains:* Grains of Ptb. 10 germinated 15 days after flowering. This indicates that immature grains of certain varieties of rice are capable of germinating. The result is in agreement with that obtained by Gopinathan Nair (1961) and Purushothaman and Balasubramaniam (1963) in rice and by many workers in other grain crops like corn, wheat, barley, rye and sorghum.

Of all the strains studied, Ptb. 10 is found to give the highest germination percentage at the different stages. The strain gives full germination at 35 days after flowering. This confirms the notorious non-dormant status of the strain evidenced in the rice tracts of the State.

Summary: 14 short duration Ptb. strains were grown and the flowering dates of panicles were recorded. The earheads at different stages were collected and germination of grains tested. It was found that none of the 14 strains possessed seed dormancy. The germination data indicated that immature grains of Ptb. 10 are capable of germinating.

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