

SEED GERMINATION IN LEMONGRASS AND PALMAROSA

Seeds of lemongrass (*Cymbopogon flexuosus* Stapf.) and palmarosa (*Cymbopogon martinii* Wats var. *Motia*) are usually collected during February—March and sown during May. Large areas of the crop are to be kept apart every year for collection of good quality seeds, thus reducing the area available for the harvest of the grass for extraction of oil. The general practice at present is to collect several times the quantity of seeds than what is actually required. This may be due to the low germination percentage and loss of viability during storage. The present study aims to explore the possibility of making use of the seeds collected in one season for the next year and to work out the actual seed requirement for unit area. With this aim, the germination capacity and viability period of seeds were worked out.

Seeds (fluff) of the lemongrass variety OD 19 and the palmarosa variety ODP 1 collected during March 1985 from the Aromatic and Medicinal Plants Research Station, Odakkali were used for the study. Ten grams each of the fluff were kept in separate polythene bags and stored under laboratory conditions. Each lot of the fluff was then sown at fortnightly intervals for 12 months starting from April 1985. The fluff was sown under controlled conditions in trays kept inside the laboratory. Ten grams of lemongrass and palmarosa fluff contained an average of 19040 and 9920 seeds respectively. Germination count was taken at weekly intervals for a period of one month from the date of sowing.

Seeds of lemongrass and palmarosa started germinating from the third day onwards and continued upto a period of four weeks (Table 1 and 2). The germination percentages were comparatively low in April for both lemongrass (18.26%) and palmarosa (7.21%) but gradually increased in subsequent months. This may be due to partial dormancy of the seeds. Ghosh and Chatterjee (1981) reported complete dormancy for lemongrass upto 30 days and for palmarosa upto 90 days and maximum germination for both after 180 days of storage. In the present study maximum germination was observed in July, i. e., after a storage period of three months, for both lemongrass (44.5%) and palmarosa (30.58%). A marked reduction in the viability of the seeds was noticed from September onwards. By December, germination was negligible for both lemongrass (3.08%) and palmarosa (0.2%). In lemongrass, stray germination was noted upto the first fortnight of March while palmarosa seeds failed to germinate from February onwards. According to Nair and Nair (1981) maximum germination of palmarosa seeds is in May and no germination of the seed could be observed from August onwards. The present study indicates that the seeds of lemongrass and palmarosa could not be stored for more than four months and every year fresh seeds have to be collected for sowing.

Table 1
Seed germination in lemongrass at weekly intervals

Time of sowing		Seedsgerminated				Total	Germination %
Month	Fortnight	1st week	2nd week	3rd week	4th week		
April	1	3281	153	42	2	3478	18.26
	2	3200	350	92	—	3642	19.12
May	1	3400	516	—	—	3915	20.56
	2	5563	278	7	—	5849	30.71
June	1	6957	234	37	6	7233	37.99
	2	6603	677	—	—	7280	38.23
July	1	7855	93	11	—	7959	41.80
	2	8255	210	8	—	8473	44.50
August	1	4383	—	—	—	4383	23.10
	2	7143	18	—	—	7171	37.46
September	1	5727	14	—	—	5741	30.15
	2	4007	463	—	—	4470	23.47
October	1	2053	226	17	—	2296	12.05
	2	2500	140	—	—	2640	13.86
November	1	1826	56	—	—	1882	9.88
	2	1248	—	—	—	1248	6.55
December	1	546	47	—	—	588	3.08
	2	456	—	—	—	456	2.39
January	1	380	—	—	—	380	1.99
	2	312	—	—	—	312	1.63
February	1	282	—	—	—	282	1.48
	2	276	—	—	—	276	1.45
March	1	171	—	—	—	171	0.89
	2	—	—	—	—	—	—
Percentage of the total seeds germination at weekly intervals		95.39	4.33	0.27	0.01	100.00	—

* Ten grams of seeds were sown. Average number of seeds per 10 g is 19040.

From the data on weekly germination of seeds in all the sowings at fortnightly interval, it was observed that maximum germination occurred in the first week itself for both lemongrass (95.39%) and palmarosa (98.26%). Hence it could be assumed that the seeds which did not germinate within one week might not germinate later, for practical purposes. In such cases fresh seeds could be sown immediately to save time.

Table 2
Seed germination in palmarosa at weekly intervals

Time of sowing		Seeds germinated				Total	Germination %
Month	Fortnight	1st week	2nd week	3rd week	4th week		
April	1	716	—	—	—	716	7.21
	2	687	60	4	—	751	7.57
May	1	945	20	3	—	968	9.75
	2	2024	39	—	—	2063	20.79
June	1	2463	27	14	2	2506	25.26
	2	2375	14	—	—	2389	24.08
July	1	2035	31	9	—	2075	20.92
	2	3010	22	2	—	3034	30.58
August	1	1857	—	—	—	1857	18.71
	2	2227	5	—	—	2232	22.50
September	1	1366	—	—	—	1366	13.77
	2	232	46	—	—	278	2.80
October	1	433	36	9	—	478	4.81
	2	315	9	—	—	324	3.26
November	1	216	16	—	—	232	2.33
	2	116	—	—	—	116	1.17
December	1	15	—	—	—	20	0.20
	2	46	—	—	—	46	0.46
January	1	7	—	—	—	7	0.07
	2	4	—	—	—	4	0.04
February	1	—	—	—	—	—	—
	2	2	—	—	—	2	—
March	1	—	—	—	—	—	—
	2	—	—	—	—	—	—
Percentage of the total seeds germinated at weekly interval		98.26	1.54	0.19	0.01	100.00	—

* Ten grams of seeds were sown. Average number of seeds per 10 g is 9920.

The Kerala Agricultural University (Anon., 1986) recommends 10 kg of lemongrass seeds for transplanting 1 ha land with two or three seedlings per hill at 15 to 20 cm spacing. The number of seedlings that can be planted in 1 ha is 1333305 at the rate of three seedlings per hill with 15 cm spacing. One kilogram of lemongrass seed contains approximately 1904000 seeds. With 40% germination in June-July months, only 1750 g of seed is required to raise seedlings to transplant

1 ha of land at the rate of three seedlings per hill with 15 cm spacing. Considering the fluctuations in germination percentage and weather changes under field conditions, the seed rate of lemongrass can be fixed at 1750-2000 g per hectare for transplanting.

The present seed rate recommended for palmarosa is 12.5 kg to transplant 1 ha land with two seedlings per hill at 30 x 20 cm spacing. The number of seedlings that can be planted in 1 ha is 333330 at the rate of two seedlings per hill with 30 X 20 cm spacing. One kilogram of palmarosa seed contains approximately 992000 seeds. With 25% germination in June-July months only 1350 g of seed is required to raise seedlings to transplant 1 ha land at the rate of two seedlings per hill with 30 x 20 cm spacing. Taking into account the variation in germination percentage and weather, the seed rate of palmarosa can be fixed at 1350-1500 g per hectare.

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