

Short Scientific Reports

Seed Germination Studies in Black Pepper*

Black pepper (*Piper nigrum* L.) is one of the crop species with efficient vegetative and sexual reproduction. Commercial gardens are established in black pepper by planting pre-rooted stem cuttings due to the inherent genetic heterozygosity and cross-fertilized nature. However, to evolve varieties combining yield, quality and resistance to important diseases and pests by exploitation of inherent variability, seed propagation is resorted to. Seed germination studies assumes importance in the above context.

Fully ripe seeds from 40 cultivars were collected from different sources in polybags which are provided with many holes for aeration. The seeds were sown at Peruvannamuzhi Farm of Central Plantation Crops Research Institute in seed pans filled with a mixture of forest soil-sand-cowdung powder (3:1:1), kept in nursery sheds and watered regularly. Periodical observations were recorded.

The germination data of some of the common cultivars are given in Table I. The germination is hypogeal and seeds start germinating after periods ranging from 22 to 45 days in various cultivars. The earliest to germinate were the cultivars 'Palulauta' from Karnataka and 'Kottaram' from Kerala. The cultivar 'Murithothan' has taken the

maximum time for initiating germination (45 days), followed by 'Kottanadan' and 'Kalluvally' (41 days). Eight Karnataka cultivars included in the study took an average of 26 days for germination, while the cultivars from the Kerala region took on an average 33 days for initiation of germination.

The time required for completing the germination also varied greatly, 'Veluthanamban' taking 77 days and 'Nastigunda' and 'Murithothan' 72 and 71 days respectively. Twenty one out of the forty cultivars studied took more than 60 days for completing the germination, four took less than 50 days, while the others completed germination in 50-60 days.

Germination varied from 25% in a 'Kalluvally' type to 100% in 'Nastigunda'. Four cultivars gave 80% or more germination, while in 12, the germination was below 50%. Among the Kerala collections, the highest germination was given by 'Chumala' (94.1%) while among the Karnataka cultivar 'Nastigunda' gave the best germination (100%), followed by 'Palulauta' (94.1%).

Same cultivars collected from different areas showed differences in their germination capacity (Table II). In 'Arakkulamunda' the germination varied from 70.0 to 84.0%, in

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Table I. Germination data of common pepper cultivars

| Cultivar | Seeds sown | Days to initiate germination | Days to complete germination | Germination (%) |
|---------------------|------------|------------------------------|------------------------------|-----------------|
| Arakkulamunda | 1500 | 32 | 62 | 71.4 |
| Balancotta | 1800 | 34 | 56 | 72.7 |
| Cholamundi | 2250 | 32 | 52 | 72.0 |
| Cholakkodi | 450 | 27 | 63 | 39.0 |
| Cheriyakaniakkadan | 700 | 33 | 61 | 65.0 |
| Chumala | 420 | 28 | 64 | 94.1 |
| Doddigya | 450 | 24 | 48 | 54.0 |
| Irumaniyan | 380 | 31 | 54 | 42.0 |
| Jeerakamundi | 1000 | 27 | 63 | 39.0 |
| Kalluvally (Type 1) | 800 | 41 | 64 | 25.0 |
| Kalluvally (Type 2) | 700 | 35 | 58 | 67.5 |
| Kalluvally (Type 3) | 2000 | 37 | 65 | 70.0 |
| Karivilanchy | 430 | 27 | 53 | 58.0 |
| Kottanadan | 700 | 41 | 61 | 51.0 |
| Kottaram | 650 | 22 | 59 | 56.8 |
| Karimunda | 3900 | 31 | 65 | 82.5 |
| Karimkotta | 500 | 36 | 55 | 45.8 |
| Kurimalai | 400 | 25 | 45 | 53.5 |
| Kumbhakkodi | 473 | 33 | 55 | 38.8 |
| Kuthiravally | 2350 | 35 | 55 | 57.4 |
| Local (Koppa) | 200 | 23 | 43 | 63.5 |
| Local (Sagar) | 200 | 31 | 51 | 43.5 |
| Malligesara | 400 | 24 | 51 | 50.0 |
| Malabarkkodi | 400 | 31 | 53 | 68.0 |
| Malamundi | 2000 | 31 | 58 | 63.0 |
| Murithothan | 200 | 45 | 71 | 36.0 |
| Narayakkodi | 2000 | 30 | 64 | 70.6 |
| Nastigunda | 170 | 34 | 72 | 100.0 |
| Panniyur-1 | 4000 | 37 | 67 | 50.3 |
| Palulauta | 586 | 22 | 67 | 94.1 |
| Perambramunda | 1400 | 34 | 52 | 60.0 |
| Perumkodi | 1190 | 30 | 61 | 53.0 |
| Poonjaramunda | 650 | 33 | 61 | 51.1 |
| Thommankodi | 850 | 30 | 44 | 66.0 |
| Uddagare | 800 | 26 | 53 | 55.0 |
| Uthirancotta | 1015 | 34 | 64 | 67.7 |
| Valiakaniakkadan | 2000 | 36 | 61 | 46.5 |
| Vellamunda | 450 | 32 | 50 | 50.0 |
| Veluthanamban | 400 | 28 | 77 | 42.3 |
| Wynadan | 700 | 38 | 70 | 27.0 |

Table II. *Percentage variations in germination among different collections*

| Cultivar | Collections | | | | | Mean |
|---------------|-------------|------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | |
| Arakkulamunda | 70.0 | 52.0 | 80.7 | 84.0 | 60.8 | 69.5 |
| Balancotta | 61.6 | 75.0 | 92.4 | 84.0 | 53.0 | 73.2 |
| Karimunda | 49.5 | 72.0 | 76.0 | 83.6 | 86.0 | 73.4 |
| Kuthiravally | 64.8 | 45.0 | 40.7 | 50.0 | — | 52.1 |
| Narayakkodi | 95.0 | 80.0 | 64.0 | 69.0 | 45.0 | 70.6 |
| Panniyur-1 | 82.5 | 43.0 | 25.5 | 23.3 | 41.0 | 43.6 |

'Balancotta' 61.6 to 92.4%, in 'Karimunda' 49.5 to 86.0%, in 'Kuthiravally' 45-65%, in 'Narayakkodi' 45-95% and in 'Panniyur-1' 23.3 to 82.5%.

In the present study, the germination percentages were found to be much higher than what was reported earlier (Anonymous, 1977). In various cultivars the germination data reported earlier ranged from 0 to 43% (Table III). Probably loss of viability as a result of storage and pre emergence infection by pathogenic organisms are some of the factors responsible for such low germination.

Table III. *Pepper seed germination data in comparison with earlier report*

| Cultivar | Germination percentage | |
|--------------------|------------------------|------------------|
| | Present | Earlier report |
| Balancotta | 72.7 | 21.0; 24.0 |
| Cheriyakaniakkadan | 65.0 | 24.0 |
| Chumala | 94.1 | 1.0 |
| Cholakkodi | 39.0 | 17.0 |
| Doddigya | 54.1 | 9.0 |
| Karimunda | 82.5 | 30.0; 28.0; 24.0 |
| Karivally | 47.6 | 5.0 |
| Karivilanchy | 58.0 | 5.0 |
| Kottanadan | 51.0 | 1.0 |
| Kumbhakkodi | 38.8 | 2.0 |
| Kuthiravally | 57.4 | 0 |
| Narayakkodi | 70.7 | 10.0 |
| Palulauta | 94.1 | 6.0 |
| Panniyur-1 | 80.3 | 13.0 |
| Perumkodi | 41.0 | 7.0 |
| Uthirancotta | 67.7 | 43.0 |
| Veluthanamban | 42.3 | 18.0 |

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REFERENCE

ANONYMOUS, 1977. *Report. All India Co-ordinated Spices and Cashewnut Improvement Project, Central Plantation Crops Research Institute, Kasaragod 670 124, Kerala, India.*