

RESEARCH PAPER

Studies on germination, seedling morphology and vigour index of coriander (*Coriandrum sativum* L.) genotypesJ.E. ADELIN VINILA*, P. PARAMAGURU AND G. VAIDEHI
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ABSTRACT

A field experiment was carried out to screen the coriander germ plasm for germination studies at Horticultural College and Research Institute, TNAU, Coimbatore. Preliminary screening was done with 240 accessions and 50 accessions were selected based on yield performance along with check CO (Cr) 4 and the seeds were sown in pots. The experiment was carried out with three replications in Randomized Block Design. Germination percentage, Height of the seedlings, Root Length and Vigour index were maximum in accession (ACC 18) compared to check.

Key Words : Coriander, Germination, Vigour

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Coriander (*Coriandrum sativum* L.) is an annual herb, which belongs to the family Apiaceae. It is native of Mediterranean region. The plant is named by the Greek word koris, meaning bug because of the special odour of coriander leaves and unripened fruits. Green coriander is also called as Cilantro, Chinese parsley, Mexican parsley and Japanese parsley. The major producers are Morocco, Canada, India, Pakistan, Romania and Russia. Other producers include Iran, Turkey, Egypt, Israel, China, Thailand, Myanmar, Poland, Bulgaria, Hungary, France, Netherlands, USA, Argentina and Mexico.

In India, coriander is mainly cultivated in Rajasthan and Gujarat with a sizeable acreage in Madhya Pradesh, Haryana, Punjab, Uttar Pradesh, Andhra Pradesh, Tamil

Nadu and Bihar. It is cultivated in an area of 5,91,090 hectares with a production of 3,38,260 tonnes (Kallapurackal and Ravindran, 2003). Rajasthan alone shares 40-45 per cent of the area and production. Coriander is valued for its tender leaves and grains. The essential oil present in the coriander adds aroma and flavour to the food. The dried fruit is an important ingredient of curry powder and is also used in pickling spices, sauces, seasoning, confectionary and in medicine (Dimri *et al.*, 1976). Despite its importance, the productivity of coriander in India continues to be low. The average productivity is only 519 kg ha⁻¹. Thus, there is great scope for crop improvement in coriander for increasing yield potential (Choubey *et al.*, 1991). Germination is very important. Water stress is critical to

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Table A : Selected accessions to raise in Coimbatore location for germination studies

Sr. No.	Accession	Source
1.	ACC 13	Regional Agrl station – Lam
2.	ACC 14	Regional Agrl station – Lam
3.	ACC 15	NBPGR
4.	ACC 16	Hissar
5.	ACC 18	Guntur A.P.
6.	ACC 32	Guntur A.P.
7.	ACC 33	Guntur A.P.
8.	ACC 50	Jobner
9.	ACC 51	Coimbatore
10.	ACC 76	Coimbatore
11.	ACC 86	Coimbatore
12.	ACC 87	Coimbatore
13.	ACC 103	Hissar
14.	ACC 110	Coimbatore
15.	ACC 114	Coimbatore
16.	ACC 115	Coimbatore
17.	ACC 116	Coimbatore
18.	ACC 118	Coimbatore
19.	ACC 119	Coimbatore
20.	ACC 129	Coimbatore
21.	ACC 130	Coimbatore
22.	ACC 131	Coimbatore
23.	ACC 134	Coimbatore
24.	ACC 144	Coimbatore
25.	ACC 145	Coimbatore
26.	ACC 158	Coimbatore
27.	ACC 185	Coimbatore
28.	ACC 186	Coimbatore
29.	ACC 192	Coimbatore
30.	ACC 194	Coimbatore
31.	ACC 196	Coimbatore
32.	ACC 201	Bulgarian
33.	ACC 202	Coimbatore
34.	ACC 203	Coimbatore
35.	ACC 204	Coimbatore
36.	ACC 213	TNAU
37.	ACC 219	LAM
38.	ACC 225	Jobner
39.	ACC 228	Hissar
40.	ACC 230	Namdhari
41.	ACC 231	NDUA and T Faizabad
42.	ACC 232	NDUA and T Faizabad
43.	ACC 233	NDUA and T Faizabad
44.	ACC 234	NDUA and T Faizabad
45.	ACC 235	NDUA and T Faizabad
46.	ACC 236	NDUA and T Faizabad
47.	ACC 237	NDUA and T Faizabad
48.	ACC 238	NDUA and T Faizabad
49.	ACC 239	NDUA and T Faizabad
50.	ACC 240	NDUA and T Faizabad

seed germination and seedling growth phases (Levitt, 1980). Many research workers have studied the germination of coriander.

In coriander there are many varieties and accessions available, inspite of it, no varieties have so far been screened in Tamil Nadu, especially with good germination percentage, seedling morphology and vigour index and the work done on this line is much scanty. With this background in view, the present study was undertaken.

RESEARCH METHODOLOGY

In the present study, for preliminary screening 240 accessions were raised in a plot size of 1 m × 1m in a Randomized Block Design. From the 240 accessions, 50 accessions along with check CO (Cr) 4 obtained from Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore-3 and were selected based on yield performance. The following 50 accessions were selected and were utilized for germination studies and CO (Cr) 4 was used as check variety (Table A).

Germination studies were carried out with the selected 50 accessions including check. The seeds of coriander accessions were slightly pressed to separate them into two mericarps. Thirty seeds in each accession were counted and were sown in pots in three replication. Germination percentage, Height of seedlings, Root length and Vigour index (Abdul-Baki and Anderson, 1970) was recorded. The data were statistical analysed (Panse and Sukhatme, 1985).

RESULTS AND REMONSTRATION

The accessions exhibited a wide degree of variation from 25.33 to 87.33 per cent (Table 1). The germination percentage was significantly on the higher side in ACC 18 (87.33%) when compared to CO (Cr) 4 (69.67%). Low percentage of germination was recorded in ACC K-Selection (25.33%). The shoot length of the accessions ranged from 3.67 to 11.33 cm (Table 1). The shoot length was significantly higher in ACC 18 (11.33 cm) when compared to CO(Cr) 4 (8.40cm). The lowest shoot length was recorded in ACC 213 (3.67cm). The root length of the seedlings among the different accessions showed significant deviation ranging from 2.47 to 9.27cm. The root length was significantly on the higher side in ACC 18 (9.27 cm) when compared to CO(Cr) 4 (7.47cm). The lowest root length (2.47cm)

Table 1 : Studies on germination, seedling morphology and vigour index of coriander accessions					
Sr. No.	ACC. No	Germination (%)	Shoot length (cm)	Root length (cm)	Vigour index
1.	ACC13	45.00	5.47	4.40	444.15
2.	ACC14	70.00	9.40	7.73	1199.10
3.	ACC15	49.00	6.47	5.47	585.06
4.	ACC16	69.00	9.40	7.47	1164.03
5.	ACC18	87.33	11.33	9.27	1799.00
6.	ACC32	54.00	6.40	5.47	640.98
7.	ACC33	66.00	8.47	7.60	1060.62
8.	ACC50	50.00	5.47	4.47	497.00
9.	ACC51	70.00	9.40	7.40	1176.00
10.	ACC76	70.00	8.53	7.53	1124.20
11.	ACC86	67.33	8.07	8.40	1108.93
12.	ACC87	72.00	10.27	7.67	1291.68
13.	ACC103	68.33	9.07	7.47	1130.18
14.	ACC110	70.00	9.80	7.47	1208.90
15.	ACC114	53.00	8.00	2.60	561.80
16.	ACC115	61.00	9.47	6.60	980.27
17.	ACC116	26.00	6.47	5.60	313.82
18.	ACC118	44.67	6.13	3.50	430.17
19.	ACC119	49.67	6.87	3.47	513.59
20.	ACC129	71.33	7.00	8.53	1107.75
21.	ACC130	44.00	5.20	4.40	422.40
22.	ACC131	27.67	6.20	3.73	274.76
23.	ACC134	66.00	8.47	7.47	1052.04
24.	ACC144	70.00	5.27	4.73	700.00
25.	ACC145	34.00	7.73	5.40	446.42
26.	ACC158	45.67	5.47	2.47	362.62
27.	ACC185	53.00	4.73	5.33	533.18
28.	ACC186	67.00	7.60	8.33	1067.31
29.	ACC192	50.00	4.53	3.40	396.50
30.	ACC194	53.00	6.60	5.60	646.60
31.	ACC196	48.67	6.53	4.67	545.10
32.	ACC201	33.00	5.53	2.73	272.58
33.	ACC202	45.00	5.53	14.53	452.70
34.	ACC203	55.33	5.40	4.53	546.15
35.	ACC204	26.00	6.47	5.47	310.44
36.	ACC213	36.00	3.67	2.67	228.24
37.	ACC219	70.67	8.53	7.37	1123.65
38.	ACC225	39.67	6.47	5.60	478.82
39.	ACC228	72.67	7.60	7.47	1095.14
40.	ACC230	37.33	5.53	4.37	369.57
41.	K selection	25.33	6.53	5.47	303.96
42.	ND – CO- 2	45.00	5.47	3.53	405.00
43.	ND – CO-19	78.33	9.53	8.20	1388.79
44.	ND – CO- 20	68.00	7.60	7.40	1020.00
45.	ND – CO- 22	54.00	3.53	2.53	327.24
46.	ND – CO- 26	48.67	5.60	4.53	493.03
47.	ND – CO- 31	66.67	7.53	6.67	946.71
48.	ND – CO- 34	71.67	7.47	6.60	1008.40
49.	ND – CO- 38	58.67	6.47	5.53	704.04
50.	ND – CO- 50	68.00	7.53	7.40	1015.24
51.	CO (Cr) 4	69.67	8.40	7.47	1105.66
Mean		55.732	7.062	5.955	752.54
S.E. ±		3.808	0.479	0.313	57.6
C.D. (P=0.05)		7.555	0.951	0.622	114.3

was recorded in ACC 158 (Table 1) Vigour index was significantly different among the genotypes. Vigour index ranged between 274.76 and 1799.00 per cent. High vigour index was noticed in the ACC 18(1799.00%), whereas, the ACC 131 showed low vigour index of 274.76 per cent. In CO(Cr) 4 the vigour index recorded was 1105.66 per cent.

The germination percentage of coriander accessions ranged between 25.33 and 87.33 per cent. The percentage was more in ACC 18 (87%) among the varieties. It had performed better by recording maximum value and the ACC K-selection had recorded the lowest value. The increase in germination might be due to the additive effect of both water potential and osmotic potential and even the absorption or uptake of water. The morphological characters such as length of the root and shoot was high in ACC 18 (11.33 and 9.27). The vigour index was worked out based on the root, shoot length and germination percentage. In ACC 18 vigour index was high. Pollock and Roos (1972) has indicated that there is difference in germination due to environment and genetic inheritance, provided germination levels are confirmed to be high upto 80 per cent.

REFERENCES

- Abdul-Baki, A.A. and Anderson, J.D.** (1970). Vigour determination in soybean seed by multiple criteria. *Crop Sci.*, **13** : 630-633.
- Choubey, P.C., Sharma, B.R., Verma, B.K. and Banafar, R.N.S.** (1991). Variability studies in coriander (*Coriandrum sativum* L.). *Scientific Hort.*, **2** : 137-144.
- Dimri, B.R., Khan, M.N.A. and Narayana, M.R.** (1976). Some promising selections of Bulgarian coriander (*Coriandrum sativum* L.) for seed and essential oil with a note on cultivation and distillation of oil. *Indian Perfumer*, **20** : 13-21.
- Levitt, J.** (1980). *Plant responses to environmental stress.* (2nd Ed.) Acad. Press, NEW YORK, USA.
- Panse, V.G. and Sukhatme, P.V.** (1985). *Statistical methods for agricultural workers.* ICAR, NEW DELHI, INDIA.
- Pollock, B.M. and Roos, E.E.** (1972). Seed and seedling vigour. In: *Seed Biology –1 9Ed.*) T.T. Kozolowski. Academic Press, New York. pp. 313-387. Kallapurackal, J.A. and Ravindran, P.N. 2003. Hints for cultivation of coriander, cumin, fennel and fenugreek. *Spice India*, **16** : 2-21.

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