

## Study On Genetic Variability in Coriander (*Coriandrum sativum* L.)

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### **ABSTRACT**

An experiment was conducted Research Farm, Department of Horticulture, Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj, Uttar Pradesh during *Rabi* 2023-2024. In which 14 varieties with three replication each of coriander viz., T<sub>1</sub>: CIMPO S-33, T<sub>2</sub>: Imp KCOH-0801, T<sub>3</sub>: Pant Haritma, T<sub>4</sub>: GDLC-1, T<sub>5</sub>: Kashmiri, T<sub>6</sub>: Green Valley, T<sub>7</sub>: LS-800, T<sub>8</sub>: K.S Deshi, T<sub>9</sub>: Saurabh, T<sub>10</sub>: Heena (Bold), T<sub>11</sub>: Japany-47, T<sub>12</sub>: Cross (91), T<sub>13</sub>: Green King, T<sub>14</sub>: Local Ajmer, were evaluated among each other's for quality, growth parameter and quantity parameters. In which among all the varieties used in the experiment the best and most promising variety was found to be Japany-47 in all the aspects i.e plant height, (132.33cm) number of primary branches (17.6) number of umbels (25.19) Days to maturity (155.86) seed yield (15.35) test weight (17.04), cost benefit ratio 2:12.

**Keywords:** *Coriander, Plant height, number of primary branches, quality attributes, Cost benefit ratio, Seed yield.*

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## INTRODUCTION

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“Coriander is also known as the Chinese Parsely, Cilantro, Dizzycorn, and Japanese parsely. India is also known as “Home of Spices Coriander (*Coriandrum sativum* L.) is an aromatic spice crop belonging to the family Apiaceae and its chromosome number is  $2n=22$ . Coriander (*Coriandrum sativum* L.) is a highly cross-pollinated annual crop valued as spic for its aroma and flavour. India has leading position in cultivation and production of coriander. At present, coriander is grown widely in parts of western and central India in the states of Gujarat and Rajasthan. Germplasm collection with good variability for the desirable characters is the basic requirement of any crop improvement program” (Moniruzzamanal.2013). “Again, in order to exploit the yield potential of coriander, the factors affecting yield and yield component ought to be thoroughly investigated. These factor consist of environment and cultural practices which directly affect the yield. The development of suitable plant type is of pronounced importance for all the crops through planned design programme. Attempts have therefore been made by some scientists to analyse different morphological characters to make available meaningful information about the significance of characters in relation to seed yield in coriander. An ideal plant ideotype would only be defined if the different components of coriander seeds are analysed and their relative importance can be assessed. In the present study, genetic diversity of coriander genotypes collected from different sources were examined and yield component analyses were carried out to identify important coriander seed yield components”. (Moniruzzamanal.2013)

“In India, coriander is cultivated in the state of Madhya Pradesh, Rajasthan, Gujarat and Tamil Nadu. The productivity of this crop is very low. In India, it occupies an area of 516.00 MH with a production of 496.00 MT with an average productivity of 0.7 million t/ha. The crop is also cultivated in Tamil Nadu, Karnataka, Orissa and Haryana Madhya Pradesh is the producing coriander Area 160.00 MH, production 75.00 MT and productivity 0.47 t/h of coriander” (Anonymous, 2015). “However, the crop is also cultivated in considerable acreage in Kymore plateau & satpura hills region of Madhya Pradesh. The cultivation of local varieties, are very low yielder and susceptible to diseases and pest. This crop is exported to other countries like Malaysia, Singapore, USA, Australia and Europe etc. It alarms for breeding of improved high yielding varieties of coriander through systematic breeding programmes”. (Anonymous, 2015)

Coriander is not commonly grown under Prayagraj agro-climatic conditions, Hence different genotypes of coriander were collected from local, public and private sectors to find out the most suitable coriander genotypes for growth and yield attributes in Prayagraj agro-climatic conditions as well as to find out the economics of different genotypes.

Keeping the above point of view, the present investigation entitled "Genetic Variability in Coriander (*Coriandrum sativum* L.)" was taken up during 2023-2024 with the following objectives.

## **MATERIALS AND METHODS**

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### **1. Experimental site:**

The experiment was conducted during rabi season of the year 2023–24 at Horticulture Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj. The experimental site is located in the sub-tropical region which is located at 25. 271 N latitude, 81. 561 E longitude and 98 m above the mean sea level.

### **2. Climate:**

Prayagraj is situated at an elevation of 98 meters above sea level at 25.87° N latitudes and 81.15° E longitudes. This region has a sub-tropical climate prevailing in the South-East part of U.P. with both the extremes in temperature, fe., the winter and the summer. In cold winter months (Dec-Jan), the temperature falls 2-5°C or even low, while in summer months (May-June) it reaches as high as 49°C. The average rainfall is about 850-1100mm which occurs mostly during July-September months with occasional showers in winter too.

**Table.1 Details of the treatments**

|    |               |                                 |
|----|---------------|---------------------------------|
| T1 | CIMPO S-33    | National seeds corporation LTD. |
| T2 | Imp KCOH-0801 | National seeds corporation LTD. |
| T3 | Pant Haritma  | National seeds corporation LTD. |
| T4 | GDLC -1       | National seeds corporation LTD. |
| T5 | Kashmiri      | Famous seeds company            |
| T6 | Green Valley  | Famous seeds company            |

|     |              |                                 |
|-----|--------------|---------------------------------|
| T7  | LS – 800     | National seeds corporation LTD. |
| T8  | K.S Deshi    | Famous seeds company            |
| T9  | Saurabh      | Famous seeds company            |
| T10 | Heena (Bold) | Famous seeds company            |
| T11 | Japany- 47   | Famous seeds company            |
| T12 | Cross (91)   | Famous seeds company            |
| T13 | Green King   | Ajmer                           |
| T14 | Local Ajmer  | Ajmer                           |

**2.1 Statistical analysis** the statistical analysis of the data was carried out using STATISTICA (7.0) software

### 3. Result and Discussion

The data pertaining to the growth parameters like days of germination, plant height, primary branches secondary branches of different genotypes differed significantly in various growth stages are presented in (table.2), The minimum number of days taken to germination of plants with the treatment (6.33 days) was observed in T<sub>4</sub> (GDLC-1) followed by T<sub>1</sub> (CIMPO S-33), (7.33 days respectively) Maximum number of days to germination was found the treatment T<sub>12</sub> (Cross 91) .

Maximum height was reported (132.33 cm) in T<sub>11</sub> (Japany-47) followed with an average height recorded in T<sub>8</sub> (KS Desi) (110.00 cm) and T<sub>3</sub>. All the treatments significantly Increase plant height as compared to control. Where as the minimum plant height (28.67 cm) was found to be in T<sub>4</sub> (GDLC-1).

The highest number of primary branches per plant at 90DAS (8.3) was observed in T<sub>5</sub> (Kashmiri) which were statistically at par with all other treatments. Least number of primary branches per plant was recorded in T<sub>6</sub> (Green Valley) (6.20 respectively).

The More number of umbels per plant (25.25) was observed in T<sub>11</sub> (Japany-47) followed by T<sub>7</sub> (LS-800) (20.85). Where as the less number of umbels per plant was found in T<sub>4</sub> (GDLC-1) (9.53 respectively).

The maximum number of umbellets per umbel was observed in T<sub>11</sub>(Japany-47) (25.99) significantly higher from rest of the treatments. followed by T<sub>14</sub> (Local Ajmer) (25.53) which were found to be at par. Whereas the minimum number of umbellets per umbel was present in T<sub>4</sub>

(GDLC-1) (15.85).

The more diameter of Umbel (5.25) was observed in T<sub>11</sub> (Japany-47) followed by T<sub>6</sub> (Green Valley)(4.92 respectively) . Whereas the less diameter was observed in T<sub>4</sub> (GDLC-1) (3.06).

The more number of days taken for maturity (155.86) was observed in T<sub>11</sub> (Japany-47) followed by T<sub>13</sub> Green King (152.19). Where as the less number of days taken for maturity was observed in T<sub>4</sub> (GDLC-1) (122.19).

The highest leaf yield per plant (17.34 g) was found in T<sub>6</sub>(Green Valley) (followed by T<sub>2</sub> (ImpKCOH-0801) (15.40 g). Whereas the lowest leaf yield per plant was found in T<sub>10</sub> (Heena Bold) (12.84 g).

The maximum seed yield per plant (7.45 g) was obtained in T<sub>11</sub> (Japany-47) However, the treatment T<sub>6</sub>(Green Valley) (7.18 g), Whereas the minimum seed yield per plant was obtained in T<sub>4</sub> (GDLC-1) (4.81 g).

The highest Test weight was found in T<sub>11</sub> (Japany-47) are superior than all over the treatments (17.04 g) followed by T<sub>7</sub> LS-800 (15.21 g), (15.16 respectively) which were on par. Whereas the lowest Test weight was found in T<sub>4</sub> (GDLC-1) (10.30 g).

**Table.2 Growth parameter of coriander (*Coriandrum sativum L.*) for germination**

| S. No.           | Varieties      | Days to Germination | Plant Height (cm) |             |             |
|------------------|----------------|---------------------|-------------------|-------------|-------------|
|                  |                |                     | 30 DAS            | 60 DAS      | 90 DAS      |
| T1               | CIMPO S-33     | 7.33                | 7.33              | 70          | 95.67       |
| T <sub>2</sub>   | Imp KCOH -0801 | 8.00                | 8.00              | 66          | 93.67       |
| T <sub>3</sub>   | Pant Haritma   | 7.67                | 9.33              | 61          | 101.00      |
| T <sub>4</sub>   | GDLC -1        | 6.33                | 5.67              | 51          | 28.67       |
| T <sub>5</sub>   | Kashmiri       | 11.00               | 8.33              | 69          | 86.33       |
| T <sub>6</sub>   | Green valley   | 12.00               | 8.33              | 75          | 54.00       |
| T <sub>7</sub>   | LS-800         | 12.67               | 8.00              | 76          | 38.00       |
| T <sub>8</sub>   | KS Deshi       | 12.33               | 7.00              | 60          | 110.00      |
| T <sub>9</sub>   | Saurabh        | 13.00               | 8.00              | 61          | 76.33       |
| T <sub>10</sub>  | Heena (Bold)   | 12.33               | 8.33              | 96          | 94.00       |
| T <sub>11</sub>  | Japany -47     | 13.00               | 10.00             | 111         | 132.33      |
| T <sub>12</sub>  | Cross (91)     | 15.67               | 8.67              | 96          | 37.33       |
| T <sub>13</sub>  | Green king     | 8.67                | 8.67              | 69          | 75.33       |
| T <sub>14</sub>  | Local Ajmer    | 9.00                | 8.67              | 60          | 51.33       |
| <b>F-Test</b>    |                | <b>S</b>            | <b>S</b>          | <b>S</b>    | <b>S</b>    |
| <b>C.D. (5%)</b> |                | <b>1.11</b>         | <b>0.70</b>       | <b>0.70</b> | <b>1.36</b> |

|                 |              |              |             |             |
|-----------------|--------------|--------------|-------------|-------------|
| <b>S.E. (d)</b> | <b>2.29</b>  | <b>1.43</b>  | <b>1.44</b> | <b>2.80</b> |
| <b>CV</b>       | <b>12.81</b> | <b>10.45</b> | <b>3.52</b> | <b>2.18</b> |

**Table.3 Growth parameter of coriander (*Coriandrum sativum L.*) for branches per plant**

| S. No.           | Varieties      | Number of primary branches per plant |              | Number of Secondary branches per plant |              |
|------------------|----------------|--------------------------------------|--------------|--|--------------|
|                  |                | [at 90 DAS]                          | [at 120 DAS] | [at 90 DAS]                            | [at 120 DAS] |
| T1               | CIMPO S-33     | 4.26                                 | 6.5          | 11.3                                   | 14.75        |
| T <sub>2</sub>   | Imp KCOH -0801 | 3.93                                 | 6.7          | 15.6                                   | 20.59        |
| T <sub>3</sub>   | Pant Haritma   | 3.26                                 | 6.6          | 10.2                                   | 14.49        |
| T <sub>4</sub>   | GDLC -1        | 3.12                                 | 6.2          | 9.1                                    | 12.59        |
| T <sub>5</sub>   | Kashmiri       | 4.56                                 | 8.3          | 10.3                                   | 16.95        |
| T <sub>6</sub>   | Green valley   | 4.93                                 | 6.1          | 10.9                                   | 13.83        |
| T <sub>7</sub>   | LS-800         | 5.06                                 | 7.6          | 9.1                                    | 12.75        |
| T <sub>8</sub>   | KS Deshi       | 5.36                                 | 6.5          | 13.9                                   | 17.75        |
| T <sub>9</sub>   | Saurabh        | 5.65                                 | 7.6          | 9.3                                    | 13.43        |
| T <sub>10</sub>  | Heena (Bold)   | 5.94                                 | 6.3          | 13.7                                   | 18.95        |
| T <sub>11</sub>  | Japany -47     | 6.94                                 | 8.3          | 17.6                                   | 21.99        |
| T <sub>12</sub>  | Cross (91)     | 6.55                                 | 7.5          | 11.5                                   | 16.09        |
| T <sub>13</sub>  | Green king     | 6.24                                 | 7.3          | 13.0                                   | 17.09        |
| T <sub>14</sub>  | Local Ajmer    | 6.15                                 | 6.9          | 13.3                                   | 12.56        |
| <b>F-Test</b>    |                | <b>S</b>                             | <b>S</b>     | <b>S</b>                               | <b>S</b>     |
| <b>C.D. (5%)</b> |                | <b>0.03</b>                          | <b>0.05</b>  | <b>0.01</b>                            | <b>0.01</b>  |
| <b>S.E. (d)</b>  |                | <b>0.06</b>                          | <b>0.10</b>  | <b>0.02</b>                            | <b>0.02</b>  |
| <b>C.V</b>       |                | <b>0.70</b>                          | <b>0.82</b>  | <b>0.12</b>                            | <b>0.09</b>  |

**Table.4 Yield parameter in coriander (*Coriandrum sativum L.*) for umbels per plant**

| S. No. | Varieties  | No of umbels per plant | No of umbellets per plant | Umbel diameter (cm) | Days to maturity |
|--------|------------|------------------------|---------------------------|---------------------|------------------|
| T1     | CIMPO S-33 | 17.19                  | 21.85                     | 4.53                | 122.53           |

|                  |                |             |             |             |             |
|------------------|----------------|-------------|-------------|-------------|-------------|
| T <sub>2</sub>   | Imp KCOH -0801 | 14.59       | 15.99       | 3.49        | 147.19      |
| T <sub>3</sub>   | Pant Haritma   | 9.95        | 21.39       | 4.44        | 132.19      |
| T <sub>4</sub>   | GDLC -1        | 9.49        | 15.85       | 3.06        | 122.19      |
| T <sub>5</sub>   | Kashmiri       | 10.69       | 19.33       | 4.22        | 138.53      |
| T <sub>6</sub>   | Green valley   | 9.49        | 16.85       | 4.92        | 130.92      |
| T <sub>7</sub>   | LS-800         | 20.80       | 24.05       | 4.44        | 131.19      |
| T <sub>8</sub>   | KS Deshi       | 12.49       | 25.20       | 4.60        | 126.86      |
| T <sub>9</sub>   | Saurabh        | 14.29       | 22.86       | 3.32        | 148.19      |
| T <sub>10</sub>  | Heena (Bold)   | 16.49       | 20.13       | 4.64        | 123.19      |
| T <sub>11</sub>  | Japany -47     | 25.19       | 25.99       | 5.25        | 155.86      |
| T <sub>12</sub>  | Cross (91)     | 15.39       | 24.60       | 3.84        | 128.19      |
| T <sub>13</sub>  | Green king     | 16.95       | 18.34       | 4.47        | 152.19      |
| T <sub>14</sub>  | Local Ajmer    | 11.29       | 25.53       | 4.22        | 138.86      |
| <b>F-Test</b>    |                | <b>S</b>    | <b>S</b>    | <b>S</b>    | <b>S</b>    |
| <b>C.D. (5%)</b> |                | <b>0.01</b> | <b>0.13</b> | <b>0.01</b> | <b>0.01</b> |
| <b>S.E. (d)</b>  |                | <b>0.01</b> | <b>0.26</b> | <b>0.02</b> | <b>0.02</b> |
| <b>C.V</b>       |                | <b>0.06</b> | <b>0.73</b> | <b>0.26</b> | <b>0.01</b> |

**Table.5 Yield parameter in coriander (*Coriandrum sativum L.*) for Leaf and seed yield**

| S. No.         | Varieties      | Leaf yield |          |         | Seed yield |          |         |
|----------------|----------------|------------|----------|---------|------------|----------|---------|
|                |                | per/plant  | per/plot | per/ha. | per/plant  | per/plot | per/ha. |
| T <sub>1</sub> | CIMPO S-33     | 13.20      | 316.72   | 29.33   | 6.02       | 136.85   | 12.32   |
| T <sub>2</sub> | Imp KCOH -0801 | 15.40      | 369.52   | 34.21   | 4.90       | 142.51   | 13.18   |
| T <sub>3</sub> | Pant Haritma   | 17.38      | 417.20   | 38.63   | 6.01       | 137.23   | 12.26   |
| T <sub>4</sub> | GDLC -1        | 14.53      | 348.72   | 32.29   | 4.81       | 107.82   | 9.95    |
| T <sub>5</sub> | Kashmiri       | 13.95      | 334.72   | 31.00   | 6.16       | 141.01   | 12.80   |
| T <sub>6</sub> | Green valley   | 17.48      | 419.52   | 38.84   | 7.18       | 164.39   | 15.09   |
| T <sub>7</sub> | LS-800         | 13.52      | 324.48   | 30.04   | 5.91       | 133.92   | 15.29   |
| T <sub>8</sub> | KS Deshi       | 14.81      | 355.36   | 32.90   | 6.27       | 143.88   | 12.15   |

|                  |                 |              |               |              |             |             |             |
|------------------|-----------------|--------------|---------------|--------------|-------------|-------------|-------------|
| T <sub>9</sub>   | Saurabh         | 14.00        | 335.92        | 31.10        | 6.31        | 144.76      | 13.05       |
| T <sub>10</sub>  | Heena<br>(Bold) | 12.84        | 308.08        | 28.53        | 6.01        | 129.64      | 13.08       |
| T <sub>11</sub>  | Japany -47      | 13.73        | 329.44        | 30.50        | 7.45        | 172.12      | 15.35       |
| T <sub>12</sub>  | Cross (91)      | 12.93        | 310.32        | 28.73        | 5.68        | 155.16      | 12.22       |
| T <sub>13</sub>  | Green king      | 13.62        | 326.96        | 30.27        | 6.74        | 138.39      | 11.51       |
| T <sub>14</sub>  | Local Ajmer     | 13.09        | 314.96        | 29.08        | 5.99        | 137.48      | 14.07       |
| <b>F-Test</b>    |                 | <b>S</b>     | <b>S</b>      | <b>S</b>     | <b>S</b>    | <b>S</b>    | <b>S</b>    |
| <b>S.E.(d)</b>   |                 | <b>1.016</b> | <b>24.338</b> | <b>2.258</b> | <b>0.50</b> | <b>0.75</b> | <b>0.21</b> |
| <b>C.D. (5%)</b> |                 | <b>2.089</b> | <b>50.130</b> | <b>4.642</b> | <b>1.04</b> | <b>1.55</b> | <b>0.44</b> |

## CONCLUSION

According to the current research the use of different varieties had a significantly positive impact on the growth and development of corianders. Among the various treatment that were evaluated, T<sub>11</sub> Yield the most favourable result in terms of growth viz. plant height ,number of primary branches, umbels, umbellets and diameter and yield viz. leaf yield, diameter of plant, number of umbels per plant seed yield per plant. Furthermore T<sub>11</sub> had the highest benefit cost ratio of 2.12.

## REFERENCES:

**Rajput, S. S. and Singh, D. 2003.** Variability in coriander (*Coriandrum sativum* L.) for yield and yield components. *J. Spices and Aromatic Crops* 12: 162-164.

**Idhol, B. D., Desai, R. T., Khandelwal, V. and Ghodke, U. R. 2009.** Genetic variability, character association and path analysis studies in coriander (*Coriandrum sativum* L.). Published in National Workshop on "Spices and Aromatic Plants in 21 st century India" held at S.K.N. college of Agriculture, Jobner (Rajasthan)

**Moniruzzaman M, Rahman MM, Hossain MM, Karim AJMS, Khaliq QA.** Evaluation of coriander (*Coriandrum sativum* L.) genotypes for seed yield and yield contributing characters. *Bangladesh Journal of Agricultural Research*. 2013; 38(2):189-202

**Akshata Hongal, N. Basavaraja, Shivanand Hongal, N.K. Hegde and Sudheesh Kulkarni.**

(2018). Evaluation of Coriander (*Coriandrum sativum L.*) Genotypes for Yield and Quality under Hill Zone (Zone-9) of Karnataka, India. Int. J. Curr. Microbiol.App.Sci (2018) 7(5): 2494-2502

**Singh SP, Prasad R, Singh D.** Variability and character association of grain yield and its component character in coriander. Journal of Applied Bioscience. 2006; 32(1):64-67.

**Bhati, D. S., Dharma, R. K. and Bhargava, S. C. (1988).** Effect of icaf plucking in coriander. Indian Cocoa, Arecanut Spices J, 11(3): 4

**Rajput SS, Singh D.** Variability in coriander (*Coriandrum sativum L.*) for yield and yield components. J Spices Aromatic Crops 2003;12(2):162-164.

**Singh SP, Katiyar RS, Rai SK, Yadav HK, Tripathi SM, Nigam HK et al.** Studies on genetic variability and character association in coriander (*Coriandrum sativum L.*) grown on sodic soil. J Medicinal Aromatic Plant Sci 2008;30(2):164-167.

**Dhokle, G. C., Naik, P. G., Suryawanshi, A. B., and Phad, G. N. (2010).** Performance of different varieties of coriander for yield, quality and germination under Marathwada conditions. Asian J. Hort, 4: 355-357

**Dhuan, D., Partap, P. S., Rana, M. K. and Baswana, K. S. (2005).** Effect of rhizobium inoculation and greens leaf cutting on test weight and seed yield of fenugreek genotypes. Haryana J. Hort. Sci., 34(1-2): 156-160.

**Easwarareddy, S., Venkateswarlu, K. and Narayanareddy, Y. (1988).** Studies on the sowing time and efficacy of certain coriander cultivars in biomass production. Indian Cocoa Arecanut Spices J., 11(3): 110-112

**Giridhar, K. and Sarada, C. (2005).** Identification of coriander (*Coriandrum sativum L.*) genotypes for vertisols of Andhra Pradesh. Nat. Symp. Cur. Trends in Onion, Garlic, Chillies and Seed Spices-Production, Marketing and Utilization, SYMSAC-II, NRCOG, Rajgurunagar, p. 92.

**Panase VG.** Application of genetics to plant breeding inheritance of quantitative Literature Cited 77 characters. Genet 1940;48:283-302.

**Hariprasadrao, N. and Srinivasrao, G. (2001).** Studies on the performance of exotic and indigenous coriander (*Coriandrum sativum L.*) genotypes for greens. The Andhra Agric J., 48(3-4): 324-326.

**Agnihotri P, Dashora SL, Sharma RK.** Variability, correlation and path analysis in fennel

(*Foeniculum vulgare* Mill) J. Spices and Aromatic Crops, 1997; 6(1):51-54.

**Jindla, L. N., Singh, T. IL, Allahrang and Bansal, M. L. (1985).** Stability for seed yield and its components in coriander (*Coriandrum sativum L.*). Indian J. Genet. Plant Breed 45: 358-361.

**Kalidasu G, Sarada Cand Reddy TY (2008).** Efficacy of biofertilizers on the performance of rainfed coriander (*Coriandrum sativum L.*) in vertisols. J Spices and Aromatic Crops 17(2): 98-102.

**TP. Malik and S. K. Tehlan (2013).** Performance of coriander (*Coriandrum sativum L.*) varieties for growth and seed yield. International J. Seed Spices 3(2), July 2013:89-90

**Reddy PV, Rao TSR, Rao SBSN, Reddy AN.** Genetic variability in coriander. Indian Cocoa, Arecanut and Spices J, 1989; 12(3):90-92.

**Mohideen, M. K., Mohammad, A. J. B. M. and Muthuswami, S. (1984).** Coriander, a crop of good prospects for Tamil Nadu. Indian Cocoa, Arecanut Spices J, 8: 82- 83.