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## Evaluation of yield and quality characteristics in dill (*Anethum graveolens* L.)

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**Abstract**

Dill (*Anethum graveolens* L.) is an annual herb in Umbelliferae family. An experiment conducted during *rabi* 2018-2019 at Chilli and Vegetable Research Unit, Dr. PDKV, Akola for evaluation of Yield and Quality Characteristics of Dill (*Anethum graveolens* L.). Among the sixteen genotypes *viz.*, AKDIL-01, AKDIL-02, AKDIL-03, AKDIL-04, AKDIL-05, AKDIL-06, AKDIL-07, AKDIL-08, AKDIL-09, AKDIL-10, AKDIL-11, AKDIL-12, AKDIL-13, AKDIL-14, AKDIL-15, AKDIL-16 and one check-Shiva. The experiment was laid out in a RBD with three replications. Among the genotypes plant height was ranged from 107.33 cm (AKDIL-07) to 153.33 cm (AKDIL-10) over check. Variation in yield and yield contributing characteristics were found among the sixteen dill genotypes. The genotype AKDIL-4 produced the maximum branches (6.40) followed by AKDIL-13 (6.33). A similar trend was also noticed in number of umbellets per umbel among the genotypes. The highest seed yield per plant was recorded in the genotype AKDIL-13 (14.7 g) while, it was the lowest in AKDIL-7 (3.67 g). For seed production potentiality, the genotype AKDIL-13 produced the highest amount of seed yield per plot (362.00 g) since it produced the maximum number of seeds per umbel (344.33). Seed yield per plot varied from 40.00 g to 362.00 g.

**Keywords:** dill, genotypes, growth, yield, quality

**Introduction**

In recent years, the volume of use of Medicinal and Aromatic Plants (MAPs) increases with the formation of new usage areas and increasing the demand for natural products day by day. One of these plants is dill (*Anethum graveolens* L.), which is usually an annual herb in Umbelliferae (Apiaceae) family. Dill is a seed spice crop and an important aromatic herb, that is used for flavoring, tea, pickles, and confectionery. Dill leaves are rich in minerals and fibre. The seeds are mainly used for spice, culinary and medicinal purposes. It is also used as a vegetable and as aromatic herb (Sharma, 2004) [4].

Dill is normally grown as a spice crop for seed purposes. Dill grows up to 40-60 cm as the leafy vegetable purpose and up to 145-155 cm, when grown for the seed production. Dill has slender hollow stems and alternate, finely divided, softly delicate leaves of 10-20 cm length. The ultimate leaf divisions are 1-2 mm broad, slightly broader than similar leaves of fennel, which are thread-like, less than 1 mm thick, and straight to slightly curved with a longitudinally ridged surface. Usually, there were two types of dill seeds exist in cultivation. One is European dill and another is Indian dill. Dill is probably native to south-west Asia or south-east Europe and also has been cultivated since ancient times. India and Pakistani are the most producer countries of this plant. Moreover, USA, UK, Mexico, Germany, Hungary and Netherlands produce high amounts of dill. In addition to growing naturally, it also is grown in gardens in our country frequently.

In India, dill is grown with the name of *Shepu* or *Shatapushpa* or *sowa* (*Anethum sowa*) also known as Indian dill, in the states of Rajasthan, Gujarat, Maharashtra, Andhra Pradesh, and Madhya Pradesh for its seed. Dill is primarily a summer crop of the temperate region, but it has also adapted to grow in warmer areas. In the northern Indian plains, it is grown during the *rabi* season. In India, total area, production, and productivity of dill is 26.698 ha, 33,090 tonnes, and 1239.41 kg/ha respectively (Anonymous, 2012) [1].

## Material and Methods

The experiment entitled "Genetic variability and correlation studies in dill (*Anethum graveolens* L.)" was carried out at Chilli and Vegetable Research Unit, Dr. P.D.K.V., Akola during the *rabi* season of 2018-19. Total sixteen genotypes were included *viz.*, AKDIL-01, AKDIL-02, AKDIL-03, AKDIL-04, AKDIL-05, AKDIL-06, AKDIL-07, AKDIL-08, AKDIL-09, AKDIL-10, AKDIL-11, AKDIL-12, AKDIL-13, AKDIL-14, AKDIL-15, AKDIL-16 and one check-Shiva. All the cultural practices were followed to raise the normal crop.

The study was undertaken on sixteen genotypes including one check-Shiva of dill using Randomized Block Design with three replications. The observations were recorded on five randomly selected plants of each genotype in each replication for fourteen characters and average values were used for statistical analysis. The data was recorded on quantitative as well as qualitative parameters like Plant height, number of branches, numbers of umbels per plant, number of umbellets per umbel, seed yield per plant, number of seeds per umbel, number of seeds per umbellets, test weight, oil content, days to 1<sup>st</sup> flowering, days to 50% flowering, days to maturity, germination percentage, seed yield per plot.

## Results and Discussion

The analysis of variance was calculated for all fourteen characters studied and their mean squares values are presented in table 1. The mean square due to genotypes was highly significant for all characters, while the mean square due to replication were highly non-significant for all characters. The mean performance of all genotypes presented in table 2. Among the sixteen genotypes AKDIL-10 produced maximum plant height (153.33 cm) whereas, AKDIL-7 exhibited minimum plant height (107.33 cm) followed by AKDIL-14 and AKDIL-12. The number of branches was in between 3.67 to 6.40. AKDIL-4 had produced maximum branches (6.40) followed by AKDIL-13, AKDIL-05, AKDIL-06, AKDIL-02 and AKDIL-15 while, AKDIL-7 exhibited minimum branches (3.67). Similar findings were reported by Jyothi *et al.* (2017) [3] in coriander, under Rajendranagar conditions.

AKDIL-5 had fabricated the maximum (6.53) umbels of dill it was found at par with AKDIL-10, AKDIL-13, AKDIL-03,

AKDIL-01, AKDIL-12, AKDIL-04, AKDIL-08 and AKDIL-15 while, genotype AKDIL-7 was produced minimum umbels (5.00). Among all AKDIL-4 was able to produce maximum (19.67) umbellets and found at par with AKDIL-16, AKDIL-13 and AKDIL-14 while, AKDIL-7 had exhibited minimum (16.83) umbellets per umbel. AKDIL-13 (14.07 g) was able to produce maximum yield per plant and it was followed by AKDIL-4 while, AKDIL-7 fabricated minimum (6.03 g) seed yield per plant. Similar findings were reported by Singh *et al.* (2008) [5] in ajwain under Ajmer conditions, AKDIL-13 produced a maximum (344.33) number of seed per umbel and found at par with AKDIL-5 and AKDIL-4 whereas, AKDIL-7 had produced a minimum (96.00) seeds per umbel. Among all AKDIL-4 produced a maximum (15.00) seeds per umbellets and found at par with AKDIL-5, AKDIL-08, AKDIL-11, AKDIL-13, AKDIL-15, AKDIL-01, AKDIL-12, AKDIL-02, AKDIL-17, AKDIL-14, AKDIL-03, AKDIL-10 and AKDIL-16 while, AKDIL-7 exhibited a minimum (9.00) number of seeds per umbellets. Similar findings were reported by Dhakad *et al.* (2017) [2] in coriander under Jabalpur conditions.

AKDIL-16 (3.46 g) was maximum test weight and found at par with AKDIL-12 while, AKDIL-7 (2.29 g) was reported a minimum test weight. Among all AKDIL-6 was found with maximum (9.67%) oil content which was found at par with AKDIL-10. while, AKDIL-12 exhibited a minimum (6.60%) oil content. AKDIL-15 was the earliest one (62.67) in flowering which is desirable while, AKDIL-7 was a late genotype (74.67). Earliest days to 50% flowering observed for AKDIL-4 (71.00) while, AKDIL-7 was late (82.33) for 50% flowering. AKDIL-4 was earliest maturity (143.00) while, the genotype AKDIL-7 (156.00) was late for maturity. AKDIL-14 and AKDIL-15 expressed a maximum (96.33%) germination percentage where, genotype AKDIL-3 was reported with minimum (71.67%) germination percentage. AKDIL-13 produced a maximum (362.00 g) seed yield followed by AKDIL-4 and AKDIL-5 while, genotype AKDIL-7 exhibited minimum yield per plot (40.00 g). Similar results were reported by Solanki *et al.* (2014) [6] in dill under Udaipur conditions.

**Table 1:** Analysis of variance for different characters of dill

Characters	Replication (2)	Treatment (16)	Error (32)
Plant height	5.353	386.061**	52.999
Number of branches	0.217	1.181**	0.116
Numbers of umbels per plant	0.551	0.491**	0.186
Number of umbellets per umbel	0.236	1.421**	0.536
Seed yield per plant	0.01	15.79**	0.252
Number of seeds per umbel	825.961	10,739.30**	381.315
Number of seeds per umbellets	6.725	6.713**	2.434
Test weight	0	0.355*	0.001
Oil content	0.018	1.96*	0.289
Days to 1st flowering	30.353	34.478**	13.103
Days to 50% flowering	23.529	19.865**	7.509
Days to maturity	0.235	39.664**	14.881
Germination percentage	56.137	229.505*	19.012
Seed yield per plot	287.137	19,840.07**	399.158

\*,\*\* Significant at 5% and 1% level, respectively

( )value in parentheses indicates degree of freedom

**Table 2:** Mean performances of seventeen dill genotypes

Genotypes	Plant height (cm)	Number of branches	Number Umbels per plant	Number of umbellets per umbel	Seed yield per plant (g)	Number of seed per umbel	Number of seed per umbellet	Test weight	Oil content (%)	Days to 1 <sup>st</sup> flowering	Days to 50% flowering	Days to maturity	Germination test (%)	Seed yield per plot (g)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
AKDIL-01	136.67	5.20	6.10	18.33	6.73	297.33	13.67	3.37	7.67	68.33	74.67	149.00	79.33	104.33
AKDIL-02	144.00	5.87	5.47	17.80	10.47	280.67	13.33	3.39	8.40	68.00	77.00	146.33	92.00	230.33
AKDIL-03	136.00	5.40	6.13	17.83	8.90	263.00	12.67	2.98	7.60	70.67	77.67	150.00	71.67	146.00
AKDIL-04	136.00	6.40	6.00	19.67	12.20	289.67	15.00	2.73	7.60	64.33	71.00	143.00	75.33	319.67
AKDIL-05	133.33	6.20	6.53	17.80	10.80	314.67	14.67	2.60	7.40	66.33	73.67	145.00	83.67	217.33
AKDIL-06	151.67	6.00	5.17	18.30	10.53	179.33	11.33	2.73	9.67	65.67	72.67	148.33	92.33	207.67
AKDIL-07	107.33	3.67	5.00	16.83	6.03	96.00	9.00	2.29	8.40	74.67	82.33	156.00	73.67	40.00
AKDIL-08	138.00	5.20	6.00	18.17	6.80	252.33	14.33	3.35	7.80	66.00	74.67	152.33	85.33	100.33
AKDIL-09	146.00	5.13	5.73	18.27	6.53	208.00	11.67	2.86	8.60	69.00	76.33	147.33	74.00	99.33
AKDIL-10	153.33	5.40	6.33	17.77	7.77	181.33	12.67	3.11	9.33	66.33	73.00	146.00	95.33	123.33
AKDIL-11	146.00	5.47	5.53	17.90	10.47	224.00	14.33	3.35	8.60	66.67	75.33	150.33	92.33	160.00
AKDIL-12	126.00	5.60	6.07	17.30	9.77	250.33	13.67	3.44	6.60	73.00	75.67	153.00	85.00	143.00
AKDIL-13	139.33	6.33	6.27	19.00	14.07	344.33	14.33	3.36	7.93	70.67	75.67	143.33	94.67	362.00
AKDIL-14	120.67	5.80	5.67	18.70	10.47	297.00	13.00	3.07	6.63	66.00	74.67	144.67	96.33	162.33
AKDIL-15	144.67	5.87	5.93	18.33	9.83	274.67	14.33	3.28	8.47	62.67	73.33	147.33	96.33	169.33
AKDIL-16	140.67	5.47	5.77	18.10	7.87	227.33	12.33	3.46	8.07	63.33	77.67	148.33	90.00	151.67
AKDIL-17	140.33	5.33	5.73	19.23	6.23	238.67	13.33	3.23	8.13	63.33	73.67	143.67	93.33	104.00
Mean	137.65	5.55	5.85	18.20	9.15	248.16	13.16	3.09	8.05	67.35	75.24	147.88	86.51	167.10
RANGE	107.33 - 153.33	3.67 - 6.40	5.00 - 6.53	16.83-19.67	6.03 - 14.07	96.00 - 344.33	9.00 -14.67	2.29- 3.46	6.60 - 9.67	62.67- 74.67	71.00 - 82.33	143.00 - 156.00	96.33 - 71.67	40.00 - 362.00
SE(d)	5.94	0.28	0.35	0.60	0.41	15.94	1.27	0.02	0.44	2.96	2.24	3.15	3.56	16.31
SE(m)	4.20	0.20	0.25	0.42	0.29	11.27	0.90	0.02	0.31	2.09	1.58	2.28	2.52	11.53
CV	5.29	6.13	7.37	4.02	5.49	7.87	11.86	0.92	6.67	5.37	3.64	2.61	5.04	11.96
CD @ 5%	12.16	0.57	0.72	1.22	0.84	32.62	2.61	0.05	0.90	6.05	4.58	6.45	7.28	33.38

\*,\*\* significant at 5% and 1% level, respectively

## Conclusion

Among the genotypes, the genotypes AKDIL-13 AKDIL-04 and AKDIL-05 showed better performance especially in respect of seed yield per plot. AKDIL-6 performed well for oil content and AKDIL-7 showed high vegetative growth. Therefore, these genotypes can be taken under consideration for commercial cultivation.

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