

## Performance of dill germplasm as intercrop and mono-crop in the Gangetic plains of West Bengal

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Dill (*Anethum sowa*) is a spice crop belongs to the family Apiaceae. Its young aromatic foliage is used in culinary and the essential oil derives from its seed having antioxidant and medicinal properties (Rajeswari *et al.*, 2006). Dill is mainly cultivated in winter in Northern Indian plain. Dill is a new introduction in West Bengal. Therefore, the choice of a suitable cultivar/germplasm is of paramount importance for successful cultivation of this crop. Tezpat (*Cinnamomum tamala*) is an evergreen aromatic tree. Leaves are generally used for flavoring meats, sausages and sauces. Leaves contain essential oil. Curry leaf (*Murraya koenigii* Spreng) is a condiment of Rutaceae family used in South India culinary preparations, mainly to increase the flavor and taste of the food. It is also used as a remedy in rheumatism, leprosy, epilepsy, piles, diarrhoea, fever, worms. It is laxative, analgesic, astringent, antioxidant, hypoglycemic, improves brain and cures eye disease

Intercropping refers to growing annuals or biennials in the interspaces of the main crop. The concept of inter cropping is not too familiar among the growers of West Bengal mainly because of their lack of knowledge and poor economic condition. Natural resources of crop production *viz.*, soil, space and solar energy are not utilized fully by tezpat and curry leaf as a monocrop, particularly at their initial stage of development. Since no work has been reported regarding intercropping of dill with tezpat or curry leaf in our country and abroad the present study was undertaken to evaluate the suitability of dill as intercrop in tezpat and curry leaf and evaluation of germplasms as inter crop and monocrop under new gangetic plains of West Bengal.

The experiment was conducted at HRS, Mondouri, BCKV, Nadia, West Bengal during October, 2009 to April, 2011. The age of tezpat and curry leaf was 3 and 5 years respectively. Six germplasm of dill namely AD-1, AD-2, AD-22, AD-32, AD-44 and SSK were included. Three types growing condition of dill were considered  
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*i.e.*, i) dill as monocrop, ii) dill+tezpat and iii) dill+curry leaf. The experiment was laid out in split plot design with three replications, assigning growing condition in the main plot and germplasm in the sub plot.

Both tezpat and curry leaf were spaced at 3.0 x 3.0 m spacing. The beds of 3.0 x 1.0 m size were prepared for dill in between two rows of curry leaf and tezpat, leaving 1.0 m radius from base of the main crop. Dill seeds were sown at 60 x 25 cm (20 plants plot<sup>-1</sup>) spacing during last week of October in both the years. The uniform application of FYM @ 20 tonnes ha<sup>-1</sup> along with NPK @ 80:40:40 kg ha<sup>-1</sup> were done for dill. FYM was applied during land preparation. Full amount of P and K and half of N were applied at the time of sowing. Rest nitrogen was applied at 45 days after sowing (Krishnamoorthy, 2005). The manures and fertilizer schedule for tezpat and curry leaf were 20 kg compost + NPK @ 20:20:25 g plant<sup>-1</sup> (KAU, 1993) and 20 kg compost + NPK @ 200:100:100 kg ha<sup>-1</sup> respectively. Observations on growth and yield attributing parameters were made from five randomly selected plants per replication.

Data presented in table 1, revealed that, dill plants grown as monocrop recorded maximum height (168.26 cm) followed by plants under tezpat plantation (160.26 cm) and minimum in curry leaf (140.40cm). In respect of sole effect of germplasm(s), maximum plant height was recorded in AD-22 (169.49cm) followed by AD-2 (164.50cm) and lowest in AD-32 (143.11cm). Among interaction highest plant height (178.49 cm) was observed in AD-22 followed by AD-2 (172.27cm) grown as monocrop and minimum plant height was observed in AD-32 (100.72cm) grown as intercrop in curry leaf. Significant variation was observed in both sole and interaction effect.

Maximum number of umbels per plant (73.54) was noticed in plants under monocrop condition followed by plants grown as intercrop under curry leaf (64.57) and least in tezpat (45.55) plantation. In case of sole effect of germplasm(s), maximum number of umbels

**Table 1: Growth and yield of dill germplasms under different cropping system**

Germplasms (G)	Plant height (cm)			No. of umbels plant <sup>-1</sup>			No. of flowers umbel <sup>-1</sup>			Seed yield plot <sup>-1</sup> (g)		
	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
AD-1	169.67	153.62	149.52	59.33	44.89	61.78	582.33	537.56	556.70	231.27	179.80	128.70
AD-2	172.27	171.38	149.84	78.58	46.55	89.33	783.78	680.89	669.22	187.00	184.30	150.40
AD-22	178.49	170.22	159.77	69.44	32.55	44.67	970.44	690.53	979.33	204.47	136.07	146.67
AD-32	166.26	162.33	100.72	76.55	37.67	56.56	413.11	360.73	333.78	185.07	181.47	107.80
AD-44	170.22	153.78	155.38	68.78	48.33	55.11	788.52	716.76	624.12	138.87	149.20	164.07
SSK	152.67	150.22	127.16	88.56	63.33	79.96	577.55	798.00	748.00	182.73	148.77	219.20
Mean	168.26	160.26	140.40	73.54	45.55	64.57	685.96	630.74	651.86	188.23	163.27	152.81
	<b>C</b>	<b>G</b>	<b>CxG</b>	<b>C</b>	<b>G</b>	<b>CxG</b>	<b>C</b>	<b>G</b>	<b>CxG</b>	<b>C</b>	<b>G</b>	<b>CxG</b>
<b>LSD (0.05)</b>	<b>35.82</b>	<b>48.27</b>	<b>83.61</b>	<b>10.75</b>	<b>12.62</b>	<b>21.03</b>	<b>1.69</b>	<b>1.67</b>	<b>2.89</b>	<b>13.11</b>	<b>17.81</b>	<b>30.85</b>

Note: C<sub>1</sub> : Dill ( Monocrop), C<sub>2</sub> :Dill+ Tezpat ,C<sub>3</sub> : Dill+ Curry leaf

was associated with SSK (77.29) followed by AD-2 (71.49) and lowest in AD-22 (48.89). Germplasms AD-32 (56.99), AD-1(55.33) and AD-44 (57.41) are statistically *at par*. As per as the interaction effect, highest number of umbels per plant was recorded in AD-2 (89.33) as intercrop under curry leaf plantation followed by SSK as monocrop (88.56) and lowest in AD-22 (32.55) as intercrop under tezpat plantation (Table.1).

Maximum number of flowers per umbel was associated with plants grown as monocrop (685.96) followed by as intercropping under curry leaf (651.86) and tezpat (630.74) plantation. In respect of sole effect of germplasm(s) maximum number of flowers per umbel was recorded in AD-22 (880.10) followed by AD-2 (711.29) and lowest number of flowers was recorded in AD-32 (369.21). Among interactions highest number of flowers per umbel was recorded in AD-22 (979.33) grown as intercrop in curry leaf condition followed by AD-22 (970.44.) as monocrop and lowest in AD-32 under curry leaf plantation (333.78).

In respect to yield plot<sup>-1</sup> as presented in table 1, the highest yield was observed in plants grown as monocrop (188 23 g) followed by as intercrop under tezpat condition (163.27g) and least under curry leaf (152.81 g).Among germplasm(s), maximum yield plot<sup>-1</sup> was obtained in SSK (183.57g 3sq.m<sup>-1</sup>) followed by AD-1 (179.92g 3sq.m<sup>-1</sup>) and lowest yield was observed in AD-44 (150.71g 3sq.m<sup>-1</sup>). Interaction between growing conditions and different germplasms of dill highest yield was recorded in AD-1 (231.27 g 3sq.m<sup>-1</sup>) as monocrop followed by SSK (219.20 g 3sq.m<sup>-1</sup>) as intercrop in curry leaf plantation and AD-22 (204.47g 3sq.m<sup>-1</sup>) and lowest in AD-32 (107.80 g 3sq.m<sup>-1</sup>) as intercrop in curry leaf condition. Like this experiment yield of all the inter crops grown under different agroforestrysystem were slightly low as compared to

mono-cropping system. It is recommended that integration of tree and fruit crops with arable crops in a multi-tier crop model helps in increasing the biomass productivity of the existing cropping systems in red and laterite zone of West Bengal (Dhara and Banerjee, 2011). Banerjee *et al.* (2009) was also observed the immense possibility of growing rice ,groundnut ,pigeon pea ,cowpea , lady's finger ,bottle gourd ,turmeric ,elephant foot yam and colocasia as inter crop in bamboo plantation for livelihood security to the poor farmers of western parts of West Bengal through self employment and higher income.

Considering the growth, yield and yield contributing parameters, the germplasm SSK, AD-1 and AD-22 were found suitable for cultivation in the non-traditional belt of West Bengal. The performance of dill was better when grown as monocrop, indicating preference of sunny condition.

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