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## Evaluation of ash gourd genotypes grown as an intercrop in coconut garden under Bastar (Chhattisgarh) condition

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**Abstract :** Ash gourd (*Benincasa hispida*) is a popular cucurbitaceous vegetable grown round the year. It is being cultivated since ancient time and India seems secondary center of diversity and endowed with rich variability specially in fruit characters. An investigation was carried out during the year 2009-10, to study the variability of ash gourd under Bastar plateau agro-climatic zone of Chhattisgarh. The survey work for collection of variability is done in different places of Bastar division. This paper documents the available diversity in the ash gourd collected from the tribal areas of Bastar (Chhattisgarh). Wide range of variability was recorded in the quantitative traits for fruit, yield and seed characters viz., days to germination, days to 1<sup>st</sup> male flower anthesis, days to 1<sup>st</sup> female flower anthesis, node no. of 1<sup>st</sup> male flower, node no. of 1<sup>st</sup> female flower, days to 1<sup>st</sup> fruit harvest, no. of branches per vine, vine length, fruit length, fruit girth, individual edible fruit weight, no. of fruits per vine, fruit yield per vine, no. of seeds per fruit and 100-seed mass. An increase in nut yield/palm/year of 8.17 (12.91%) was observed from intercropped block as compared to 5.58 (8.42%) from monocrop.

**Key words :** Ash gourd, Genetic diversity, Intercrop, Coconut

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Indian subcontinent had rich diversity of cucurbits and is believed to be the primary and secondary center of origin of several gourds and melons (Chaudhary, 1996). Ash gourd (*Benincasa hispida*; Syn. White gourd, Wax gourd White pumpkin) is an important vegetable mainly valued for its long storage life and having a good scope for value addition. The fruit are consumed as baked, fried, boiled, pickled or candied/preserved. World famous confectionary known as 'Petha' is prepared using ripe flesh in sugar syrup. Fruit contains 0.4 per cent protein, 1.9 per cent carbohydrate, 0.3 per cent minerals and traces of vitamin A, B and D per 100 g of edible portion (Aykroyd, 1963). Ash gourd is considered good for people suffering from nervousness and debility (Nadkarni, 1927). Indo-china region being a center of diversity is endowed with great variability in terms of morphological characters especially growth habit, maturity included shape, size and fruit thickness of fruits (Rubatzky and Yamaguchi, 1997). In the recent past, economy of coconut farmer had

weakened due to fluctuation in the price of coconut, copra and coconut oil. Adoption of coconut based multiple cropping system emerges as a viable way for improving the economic status of coconut farmers. Growing of elephant foot yam is a profitable proposition without affecting the performance of coconut. Hence an attempt has been made to compile the diversity status of the ash gourd germplasm from this region. This paper deals with the variability in fruit characters of the ash gourd germplasm grown as intercrop in coconut garden, collected from the Bastar region of Chhattisgarh.

### RESEARCH METHODS

The experimental materials included ten diverse entries (SGAG-1, SGAG-2, SGAG-3, SGAG-4, SGAG-5, SGAG-6, SGAG-7, SGAG-8, SGAG-9 and SGAG-10) were sown in randomized block design with three replications during the summer of 2011 at AICRP on Palms field S.G. College of Agriculture and Research Station

Kumharawand, Jagdalpur (Bastar) Chhattisgarh, row to row and plant to plant spacings were maintained at 2m and 1m, respectively. The soil of the experimental site was silty-loam to clay-loam, rich in silicon, prone to excessive cementing nature with low contents of organic matter, zinc, nitrogen, phosphorus, potash and boron. pH of soil is 6.5. The zone receives high rainfall coupled with comparatively lower temperatures and higher humidity. All the recommended agronomic package of practices was followed to grow a healthy crop. Scheduled agronomical management practices with fertilizer dose @ 400:200:750 g NPK/Palm/year was followed in coconut under both intercropped and monocropped plots. In each replication, randomly five plants in each genotype were marked for observation. Observations were recorded on fruit Shape, fruit surface colour, days to germination, days to 1<sup>st</sup> male flower anthesis, days to 1<sup>st</sup> female flower anthesis, nodes no. of 1<sup>st</sup> male flower, nodes no. of 1<sup>st</sup> female flower, days to 1<sup>st</sup> fruit harvesting, number of branches per vine, vine length (m), length of edible fruit (cm), girth of individual edible fruit (cm), individual edible fruit weight (g), number of fruits per vine, fruit yield per vine, number of seeds per fruit and 100-seed mass (g). Random and biased sampling methods were followed for the collection of fruits from population/individual plants. Distinct morphotypes were collected from the tribal villages of Bastar region. Selected qualitative and quantitative characters of fruit and seed were recorded using standard descriptors. The recorded data were analyzed as suggested by Panse (1957) for analysis of variance.

**RESEARCH FINDINGS AND DISCUSSION**

The mean sum square was highly significant for all traits, indicating the presence of wide variability in the genotypes (Table 1). Early germination (7.05, DAS) was recorded in SGAG-2 whereas late germination (11.45, DAS) in SGAG-10. Days to first male flower anthesis and days to first female flower anthesis registered considerable variability, which ranged from 40.89 (SGAG-1) to 61.57 (SGAG-10) and 54.98 (SGAG-6) to 78.85 (SGAG-4), respectively. The present set of genotypes possessed an average of 5.64 node number for first male flower, which ranged from 4.02 (SGAG-5) to 6.55 (SGAG-4), while in case of node number of first female flower ranged from 7.00 (SGAG-3) to 11.02 (SGAG-5). Days to first fruit harvesting varied 91.5 (SGAG-3) to 120.5 (SGAG-5). Maximum number of branches per vine (6.50) was recorded in SGAG-1 and minimum in SGAG-3 (3.25) whereas vine length was maximum (4.23 m) and minimum (2.01 m) in SGAG-9 and SGB-3, respectively.

Genotype	Days to germination	Days to 1 <sup>st</sup> male flower	Days to 1 <sup>st</sup> female flower	Nodes no. of 1 <sup>st</sup> male flower	Nodes no. of 1 <sup>st</sup> female flower	Days to 1 <sup>st</sup> fruit harvesting	No. of branches per vine	Vine length (m)	Length of edible fruit (cm)	Girth of individual edible fruit (cm)	Individual edible fruit weight (g)	No. of fruits per vine	Fruit yield per vine (kg)	No. of seeds per fruit	100-seed mass (g)
SGAG-1	7.05	55.2	61.57	6.55	6.50	100.00	6.50	4.23	10.2	28.50	9.55	3.89	37.7	33.20	23.25
SGAG-2	7.05	56.98	61.57	6.25	7.50	90.05	7.50	2.7	25.0	26.12	6.50	5.78	37.51	285.25	5.7
SGAG-3	9.07	64.25	78.85	7.58	3.25	91.50	3.25	2.01	26.22	25.98	7.88	5.11	40.26	350.7	50.2
SGAG-4	11.07	78.85	78.85	6.55	6.20	105.60	6.20	3.98	38.9	30.7	9.05	2.78	22.77	150.21	35.58
SGAG-5	9.00	70.98	110.02	4.02	5.58	120.50	5.58	1.01	37.7	29.21	9.0	1.08	36.88	325.5	20.75
SGAG-6	7.65	57.98	61.57	6.02	7.25	92.05	7.25	2.78	25.73	27.12	6.85	1.81	32.9	299.25	7.67
SGAG-7	10.07	58.2	71.85	6.5	5.0	101.60	5.0	3.78	36.25	30.05	8.89	3.55	31.55	155.21	33.98
SGAG-8	11.17	60.75	76.75	6.00	5.56	99.56	5.56	3.90	36.9	31.7	9.5	5.6	49.95	100.21	37.58
SGAG-9	9.30	56.78	72.78	5.02	5.3	110.50	5.3	1.23	37.2	28.5	9.7	3.71	31.7	336.5	20.87
SGAG-10	11.45	61.57	76.78	6.7	6.7	115.60	6.7	3.78	38.78	30.75	9.03	5.7	49.12	152.21	35.78
CV (%)	1.23	0.83	0.83	0.63	0.87	1.77	0.87	0.63	1.00	0.58	0.71	0.75	0.76	0.58	0.71

**Table 2 : Influence of different cropping model on yield of coconut**

Years	Monocrop block		Intercropped block	
	Nut yield/Palm /Year	Percentage increased over initial	Nut yield/Palm /Year	Percentage increased over initial
2008	60.65	-	58.72	-
2009	62.84	3.48	63.95	8.17
2010	66.23	8.45	67.43	12.91
Mean of two year (2009 & 2010)	64.53	-	65.69	-
Increased at the end of experiment	5.58	-	8.71	-

SGAG-1 exhibited maximum length (40.24 cm) of edible fruit, while it was minimum (25.04 cm) in SGAG-2. Girth of edible fruit ranged from 31.14 cm (SGAG-8) to 25.98 cm (SGAG-3). The maximum (9.55 kg) and minimum (3.50 kg) individual edible fruit weight was recorded in genotype SGAG-1 and SGAG-2, respectively. Number of fruits per vine showed a wide range 2.48 (SGAG-4) to 5.78 (SGAG-2). The fruit yield per vine showed a wide range 19.96 kg to 44.49 kg was recorded in SGAG-4 and SGAG-8, respectively. Number of seeds per fruit varied from 455.21 (SGAG-7) to 285.25 (SGAG-2). Maximum 100- seed mass (35.98 g) was recorded in SGAG-7, whereas minimum (15.14 g) in SGAG-2.

There are reports that fruit weight ranges from 7.5 to 45 kg depending upon the genotype and the production system utilized (Rubatzky and Yamaguchi, 1997; Stephens, 1988). Grubben (2004) reported that ash gourd fruit contain 15-45 g of seed.

Ching (1998) evaluated *Benincasa hispida* for fruit yield, vine growth, size and shape characteristics concluded that *B. hispida* genotype (green water melon) had an average yield of 105.7 kg/plant while the fuzzy white guard genotype produced an average yield of 27.3 kg/plant. Hamid *et al.* (1989) evaluated the local germplasm and observed a wide range of variability for vine growth, flowering habit, fruit weight and size.

### Influence of different cropping model on yield of coconut:

Intercropping of ash gourd under coconut with normal package of practices affect the nut yield of coconut (Table 2). The pre-experimental (2009) nut yield from monocrop and intercrop plot was 60.65 and 58.72 nuts/palm/year, respectively. The average nut yield after the experimentation (2010) was 66.23 and 67.23 nuts/palm/ year, respectively from monocrop and intercrop plot. An increase in nut yield of 5.58 (8.42%) and 8.71 (12.91%), respectively were observed over initial. The observed data showed the beneficial effect of intercrop on the yield of coconut. The findings of present

investigation are in agreement with Nath (2002) and Chowdhury and Deka (1997).

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