

Growth and yield of native germplasm of large cardamom in the wild habitat of Arunachal Pradesh

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Received 22 October 2001; Revised 23 May 2002; Accepted 27 November 2002.

Abstract

Surveys were made during 1998 and 1999 to identify and evaluate *in situ* the germplasm of large cardamom available in natural forests of Arunachal Pradesh. It was observed that eight distinct types of large cardamom were present in this state, which differ significantly in their morphological characteristics. Boklok, a high altitude accession, had the highest plant height, number of tillers and panicles, maximum yield and dry weight of fruits. However, fruits panicle⁻¹ was found to be highest in Bebo light red. Jaker green has larger capsules with highest fresh weight of fruits, while Belak had the highest number of seeds fruit⁻¹. The germplasm collected provides good scope for the crop improvement through breeding.

Key words: *Amomom subulatum*, germplasm, large cardamom.

Large cardamom (*Amomom subulatum* Roxb.) is one of the important crops of sub-Himalayan region of India. Besides India, it is also grown in several other countries such as Indonesia, Malaysia, Thailand, Laos and Bhutan (Gupta & Borthakur 1986). It is one of the oldest spices mainly used in food flavouring. The dry capsules of large cardamom are exported to Middle East, Europe and Eastern Asia. India has a competitive advantage in the world market being the largest producer other than Bhutan and Nepal. Considering the export potential, the area under this crop needs to be extended. Arunachal Pradesh in eastern Himalayas has suitable niche for large cardamom plantations as large number of its germplasm is existing in the natural forest ecosystem of this state. There is a need to evaluate the morphological characters and

yield potential of native germplasm. Germplasm collected from Sikkim and Darjeeling District of West Bengal had variation in their morphological characters (Rao *et al.* 1993). Twenty native accessions of Sikkim had significant variations in their yield and morphological characteristics (Anonymous 1990). Keeping these in view, efforts were made to collect and evaluate existing germplasm in Arunachal Pradesh for their morphological characteristics and yield potential.

Surveys were conducted in different parts of Arunachal Pradesh for *in situ* identification and evaluation of indigenous germplasm of large cardamom during 1998–1999. There were eight types of accessions identified on the basis of plant, leaf and capsule characters. Ten full grown plants were selected randomly for recording the data on vegetative growth and

Table 1. Morphological characters of large cardamom germplasm collected from Arunachal Pradesh

Genotype	Plant height (cm)	Tillers clump ⁻¹	Panicles clump ⁻¹	Capsules panicle ⁻¹	Yield clump ⁻¹ (g)	Capsule length (cm)	Capsule diameter (cm)	Fresh weight of capsule (g)	Dry weight of capsule (g)	Dry matter (%)	Seeds capsule ⁻¹
Belak	262	10.70	8.50	10.50	250.50	3.90	1.60	2.75	1.16	42.20	317.00
Bebo light red	210	10.70	7.20	11.50	290.10	2.20	1.80	3.10	0.90	29.03	37.00
Bebo brown	175	9.50	6.40	12.70	410.50	2.40	2.10	5.00	1.36	27.72	55.00
Bebo red	195	10.20	7.00	11.30	375.05	2.80	2.40	5.00	1.04	20.80	55.40
Tali	350	5.40	9.50	9.40	450.50	2.80	2.20	5.00	0.34	6.80	31.80
Jaker red	360	8.50	4.20	7.20	302.50	4.20	2.20	10.00	2.00	20.00	48.20
Jaker green	362	8.00	6.40	8.30	455.30	4.40	2.60	11.50	1.50	13.10	51.00
Boklok	395	12.40	9.70	8.40	605.00	3.40	2.20	9.75	2.15	22.05	57.20
CD (0.05)	0.33	1.88	1.70	2.18	30.96	0.55	0.46	0.52	0.24	7.40	15.71

yield in the location where a particular germplasm was present in the natural forest. Vegetative growth, number of panicles clump⁻¹ and yield were recorded at the collection site. Other morphological characters were recorded on 20 randomly selected capsules from different panicles in each accession. Fresh weight of capsules was taken just after harvesting and dry weight of capsules was recorded after drying capsules at 60±1°C in oven. Seeds were extracted from the capsules and counted.

A perusal of the data presented in Table 1 showed that the germplasm varied significantly with respect to all their morphological characters. Plant height varied from 175 cm to 395 cm. The highest plant height, number of tillers clump⁻¹, panicles clump⁻¹ and yield clump⁻¹ (wet and dry) were recorded in Boklok. Variation in the height of different germplasm accessions was also reported by Rao *et al.* (1993). Number of tillers also varied significantly among the germplasm identified and it was Boklok that produced the highest number of tillers plant⁻¹ (12.40) which was statistically on par with Belak and Bebo light red (10.70) while the least number was found in Tali (5.40). Jaker green was the best for capsule characters viz. capsule length, capsule diameter and fresh weight of capsules. It was Bebo brown which produced the highest number of capsules panicle⁻¹ (12.70) which was at par with Bebo light red (11.50) and Bebo red (11.30).

However, highest dry weight of capsule was recorded in Boklok (2.15 g), which was at par with Jaker red (2.00 g). Dry matter recovery also differed significantly among the germplasm and the maximum dry matter recovery was recorded in Belak (42.20%) followed by Bebo light red (29.03%) which did not have significant difference with Bebo brown (27.72%).

It is clear from the data that number of seeds capsule⁻¹ had significant difference among germplasm identified. Highest number of seeds capsule⁻¹ was recorded in Belak (317) followed by Boklok (57.20).

Based on the above findings it is concluded

that indigenous large cardamom of Arunachal Pradesh can be used for commercial cultivation after some improvement through clonal selection and may have potential in breeding programme.

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