



DOMESTICATION OF *SETARIA GLAUCA* (L.) P. BEAUV. AND *BRACHIARIA RAMOSA* STAPF. PROMISING SMALL MILLETS IN SAKRI TAHSILOF DHULE DISTRICT, MAHARASHTRA STATE, INDIA.

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Setaria glauca P.Beauv. which is a weed or only a mixed crop in some parts of the country, is cultivated in pure strands in Sakri tahsil of Dhule district in Maharashtra. It's protein content is higher than finger millet. There are two landraces of this species one variety is non sticky with low carbohydrate content and the other one is sticky variety with comparatively more and-carbohydrate content. On the other hand, *Brachiaria ramosa* Stapf.is cultivated only in one tahsil, that too as a mixed crop in rice fields. No landraces were found for this species. The process of their domestication and utilization as a small millet by local tribals is discussed.

INTRODUCTION:

Setaria italica Beauv. is known as foxtail millet and grown in many parts of hill and dry land agro ecosystems of India, but *Setaria glauca* P.Beauv. is known only as a crop weed in many Southern parts of North India, it is cultivated in bordering regions of Andhra Pradesh, Karnataka, Tamil Nadu and in certain parts of Orissa in South India. There it is grown as a mixed crop along with little millet. On the otherhand *B. ramosa* is cultivated largely in Orissa along with upland rice and in Bihar along with Kodo millet (Kimata *et. al.*, 2000). There are no reports of cultivation of these two species in M.S. However, domesticated form of *B. ramosa* from M.S. was reported by Chandra and Koppar (1990).

MATERIALS AND METHODS:

Area of study: Several field visits were conducted in the Sakri tahsil of Dhule district, to collect germplasm of small millets. Dhule district forms border with Gujrat in the West side and M.P. in the East and North directions. Satpura hill ranges, sub tropical climate, two westward flowing rivers, Tapi and Narmada and tribal population to the extent of 45% make the district geographically distinct. Among all tahsils of Dhule, Sakri tahsil is inaccessible with Sahyadri ranges. More population in the tahsil is belonging to Konkani tribe.

Survey and collection:

Ethnobotanical principles were followed for collection of these two small millets in different parts of the Sakri tahsil. Accession numbers were given to the samples and their passport information was recorded separately. For biochemical analysis total carbohydrates were extracted by method of Hegde and Hofreiter (1962) and estimated by employing the method of McCready *et.al.* (1950). The proteins were measured by Lowry *et.al.*, (1951). The method of Harding and Maclean (1916) was employed for total amino acids. All the accessions along with the passport information were deposited at Botany department, M.J.P.V.Arts, Commerce & Shri.V.K.Kulkarni Science College Dhadgaon, Tal, Akrani, Dist: Nandurbar.(M.S.)

RESULTS AND DISCUSSION:

During a small millet germplasm collection expedition it was found that *S. glauca* is popular small millet in study area. The millet is known by the names Bhadi, Bhadli, Padla and Padli in different parts of tahsil. *S. glauca* differs from foxtail millet in inflorescence characters. Its inflorescence is sea green in colour turning to yellow on maturity. It has bigger and more compact spikelets. The inflorescence of *S. glauca* is awnless, while that of *S. italica* is with awns. The authors could collect two distinct landraces based on the character of cooking quality. One landrace called Chikni bhadi is sticky, while the other landrace called Bhadi is non-sticky, as in the case of Japonica and Indica rice varieties, the pudding of Chikni bhadi is paste like, while that of Bhadi is normal with intact grain.

In the Table-1 biochemical analysis reveals the contents of total carbohydrates, insoluble proteins and total amino acids of the grains of *S. glauca* landraces and *B. ramosa*. The total carbohydrate content of Chikni bhadi was 32 percent, while that of Bhadi was 50 percent. The insoluble proteins content was found to be higher (5.68 %) in Chikni bhadi than in Bhadi variety (4.5 %). There was however, very little difference in total amino acid content of the two landraces. The tribals prefer pudding of Bhadi in dinner. According to them it is more palatable and nutritious. The pudding made of Bhadi is given to the patients suffering from fever and also to lactating mothers. They also said that Bhadi would perform and yield better than foxtail millet (Rala) under severe drought conditions. Similar observation was made by Kimata *et. al.* (2000) in South India. However, the area under the cultivation of Bhadi in the Sakri tahsil is less as compared to the area under the cultivation of Barti (*Echinochloa frumentacea* Blat.&McCann.).

The cultivation of *B. ramosa* is restricted to only one village called Amla, of Sakri tahsil of the district. It is grown as mixed crop in upland rice fields. The grains of *B. ramosa* called Sava by tribals. It is utilized in making pudding, roti and kheer (sweet dish). Its total carbohydrate content was 40 percent. The contents of insoluble proteins and total amino acids were 3.64 % and 0.50 % respectively (Table-1). The restricted area of cultivation, cultivating as a mixed crop and less importance given to the utilization of the grain show that *B. ramosa* is not undergone proper domestication process in Nandurbar district. On the other hand the domestication process of *S. glauca* continued uninterrupted leading into its cultivation in pure strands. Further the availability of two distinct races and cultivation in Sakri taluka of Dhule district, support the view that, the domestication of *S. glauca* in Dhule district, has occurred simultaneously along with the process in South India. However the mimics and associated weeds of *S. glauca* and *B. ramosa* are yet to be collected from the district. Looking to palatability of the grain and better performance in low soil moisture regimes, it is important to introduce the cultivation of *S. glauca* in other hill and dry land agro ecosystems of South Asian Countries. The presence of sticky and non-sticky varieties in this species will help in its introduction into other parts of Asia.

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Table-1 Total carbohydrates, insoluble proteins, total amino acids levels in *S. glauca* & *B. ramosa* land races grown in Sakri Tahsil of Dhule district of Maharashtra state.

Landrace	Insoluble Proteins g/100g	Total Amino acids g/100g	Total Carbohydrate g/100g	Remark
<i>Setaria glauca</i>				
Bhadi	4.56	1.68	50.0	Bhat non-sticky and palatable.
Chikni bhadi	5.68	1.80	32.0	Sticky and pasty.
<i>Brachiaria ramosa</i> (Sawa)	3.64	0.50	40.00	Grains are white and some are black coloured.



(a) (b) (c) (d)

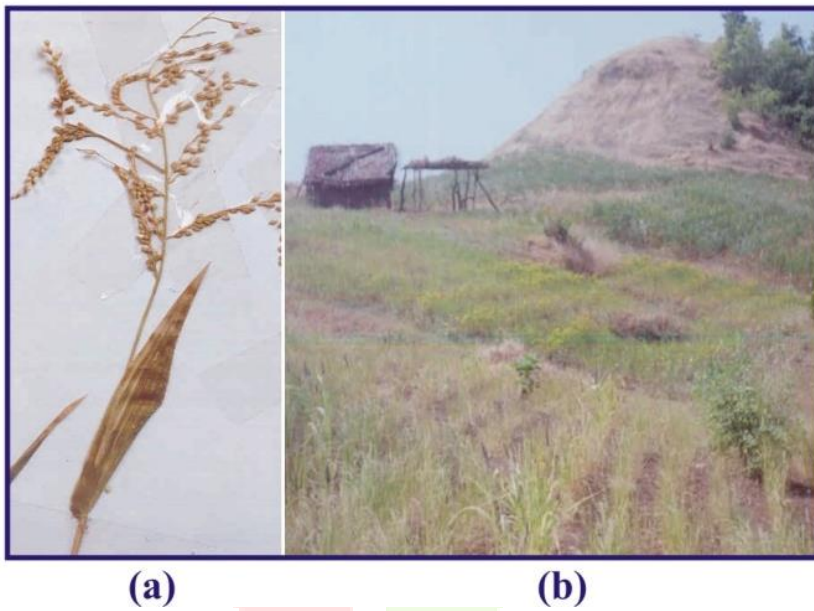
Fig. 1-Foxtail millets:

- (a) Burali rala
- (b) Rala
- (c) Bhadi
- (d) Chikni bhadi



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Fig.2- Bhadi under cultivation.



(a)

(b)

Fig.3- Showing a) Sava B.ramosa

b) Sava cultivation along the hill slope as mixed crop with rice.