



## Some traditional genotypes of *Sorghum* from Hingoli district, Maharashtra

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### Abstract

Hingoli is one of the districts of Maharashtra state, it occupies an area of 4,526 km<sup>2</sup> comprising five talukas viz. Aundha-Nagnath, Hingoli, Kalamnuri, Sengaon and Basmath. Hingoli is a drought prone area. Nearly 32 % of its area comes under the rain shadow region. Annual average rainfall is 1011mm and drought is a permanent features. About 65% of agriculture is dry land farming and *Jowar* is the major crop after cotton and *soyabean*. Present paper deals with some traditional Genotypes of *Jowar* found in Hingoli district. Most of them are rare. They are used as medicinal plants and economically very important. It is the need of time to conserve them for the use of next generation. In the present paper the traditional genotypes of *Jowar* like *Talki*, *Dadar*, *Dhamna*, *Bhendi*, *Goli*, *Mahu*, *Gunjavali*, *Pivli* and *Dukri* etc, will be discussed.

**Keywords:** traditional genotypes, *jowar*

### Introduction

*Sorghum* [*Sorghum bicolor* (L.) Moench] ranks fifth among cereals in both production and area planted worldwide (FAOSTAT, 2008). *Sorghum* (*Sorghum bicolor* (L.) Moench) is the fifth most economically important crop among cereals in the world. It is grown on approximately 44 million hectares of land (Prakash *et al.*, 2010) <sup>[13]</sup>, in 99 countries (ICRISAT, 2009) <sup>[9]</sup> with an annual production of 60 million tons (Iqbal *et al.*, 2010) <sup>[10]</sup>. *Sorghum* (*Sorghum bicolor* (L.) Moench) is an important cereal crop in the semiarid tropics. In India, which is the secondary centre of diversity, *Sorghum* is third in importance after *rice* and *wheat*, and is currently grown on 8.7 million hectares with an annual production of 7.2 million tons in India (Food and Agriculture organization (FAO) 2006) <sup>[8]</sup>. It has a number of advantages which have made it the traditional staple cereal crop in subsistence or low-resource agriculture in the hot semi-arid regions (Nagaraja *et al.* 2008) <sup>[12]</sup>. *Sorghum* is the principal staple food of Maharashtra, and is also an important food of Karnataka, Madhya Pradesh, Tamil Nadu and Andhra Pradesh (Anonymous, 2006,) <sup>[1, 2, 3]</sup>. *Sorghum* is used for human consumption in many of the developing countries in a variety of ways (Carter *et al.*, 1989; Asante, 1995; Tuinstra *et al.*, 1997) <sup>[6, 4, 14]</sup>. *Sorghum* is an important staple food for the rural poor people in the Semi-Arid tropics. Together with millets, *Sorghum* represents a main source of energy and protein for about one billion people in the semi-arid region of tropics and it is part of the staple diet of more than 300 million people in developing countries, representing their major source of energy and nutrients (Ilaria *et al.*, 2015) <sup>[11]</sup>. *Sorghum* (*Sorghum bicolor* (L.) Moench) is a drought-resistant crop and an important food resource in terms of nutritional as well as social-economic values, especially in semi-arid environments (Ilaria *et al.*, 2015) <sup>[11]</sup>. It is being grown in India in both kharif (rainy) and *rabi* (post rainy) seasons. The *Rabi sorghum* crop accounts for 45% of the total area under cultivation and 32% of the total production.

Although *rabi sorghum* is highly valued because of its good grain quality, but its yields are lower (750 kg/ha) compared to kharif yields (1100 kg/ha) (Anonymous, 2006) <sup>[1, 2, 3]</sup>.

*Sorghum* is cultivated in areas considered to be too dry and hot for other cereals. It is widely grown in Africa, China, USA, Mexico and India. *Sorghum* (*Sorghum bicolor*) is a multipurpose crop grown for food, animal feed and industrial purposes.

*Sorghum* is an important source of human food in semi-arid regions of Hingoli district. In present day, *Jowar* is major crop that undergoes large scale cultivation having commercial importance. Unfortunately, traditional landraces of *jowar* have been marginalized and their distribution is threatened. The traditional genotype of *jowar* is very important but there are lesser people known these genotypes. *Jowar* is grown extensively by indigenous farmers in rural areas for their nutritional content and resistance to drought.

### Study Area

Hingoli is one of the district of Maharashtra state it occupies an area of 4,526 km<sup>2</sup> comprising five taluka's viz. Aundha Nagnath, Hingoli, Kalamnuri, Sengaon and Basmath. Hingoli is a drought prone area which is an administrative district in the state of Maharashtra in India. The district headquarters are located at Hingoli. The district occupies an area of 4,526 km<sup>2</sup> and has a population of 11, 77,345 of which 15.60% were urban (as of 2011). Hingoli lies at the northern part of Marathwada in the state of Maharashtra. The district is located between 19°40' to 20°05' N latitudes and 76°53' to 77°02' E longitudes. It comprises of 710 villages.

Geographically Hingoli is situated at the northern part of Marathwada in Maharashtra. Borders of Hingoli are surrounded by Washim districts and Yavatmal in northern side, Parbhani in western side, and Nanded at south-eastern side. Nearly 32 % of its area comes under the rain shadow region. Annual average rainfall is 1011mm and drought is a

permanent features. About 65% of agriculture is dry land farming and *Jowar* is the major crop after *cotton* and *soya-bean*.

Agriculture plays an important role in the Indian economy. Agriculture is the backbone of our country. It includes farming of crops, Over 58 % rural households primarily depend upon agriculture. In Hingoli *jowar* is the main staple food of the people, which is grown over an area of 38,636 hector with an annual production of 310 .47 tones.



Fig 1

### Materials and Methods:

An intensive survey was conducted to collect the top traditional genotypes of *Jowar* from Hingoli district. The results of the foregoing study guided survey conducted and total of nine genotypes of *jowar* from Hingoli districts were collected. Details of each crop, uses were elicited from informants and make herbarium specimens. The sites selected for this research work were located in both seasons i.e. *rainfed* as well as *kharif* season. Specific information was collected using the following methods: (1) Knowledge holders were requested to accompany us to the field and identified the genotypes; (2) Specimens were brought to the village and shown to knowledge holders for sharing information; and (3) Photographs taken from the field crops for further study. A farm is purposefully chosen to initiate the survey and noted the names and ages as well as their handwritten opinion about these genotypes. The collection study of the areas was initiated from various localities of the districts. The places visit frequently to gather the information of genotypes. The verification generally made on the basis of repeated information. Vernacular names of the traditional genotypes of *Sorghum* appeared interesting and therefore have been also noted while investigating in the districts. The seed samples were collected from the localities of Hingoli districts.

## Morphology of Traditional Genotypes

### 1) Talki

Morphological characters:

- Height is 215-225 cm.
- Bend panicle is the characteristics feature of this genotype.
- It produces more fodder having good quality for cattle.
- It requires less water, Duration for maturity is 110-120 days.
- Recommend for low rainfall.
- Quality of *roti* is very good.
- Special for young roasted grains i.e. *Hurda* purpose.
- Production 6-7 q/ acre. It has a sweet grain and used for roasting purpose at dough stage of crop.



Fig 2: Morphology of Talki.

### 2) Dadar

- Height is 185-210 cm.
- Feathered and broader at the lower part panicle is the distinct feature of this genotype.
- It is disease resistance.
- Quality of *roti* is good.
- Grains is lustrous bold and white.
- *Dadar* is adapted to moisture condition.
- Fodder preferred by cattle.
- Production 8-10 q/ acre.



Fig 3: Morphology of Dadar.

### 3) Bhendi

- Height 180-235 cm.
- Panicle is much feathered.
- Early maturity.
- Grains shiny reddish in color.
- Bread (*Roti*) quality is very good.
- Dried grains roasted to produce *Lahya*, Light weight fodder.
- Medicinal valuable.
- Suitable for deep soil in irrigated area.
- Production 7-8 q/ acre.



Fig 4: Morphology of *Bhendi*.

### 4. Gunjavali

- Height 160-175 cm.
- Panicle compact oval, short to medium.
- Grains red, bold hard and attractive.
- Good fodder quality, stalk is sweet.
- Good grain quality.
- Resistant to drought.
- It is best genotype for heavy soil.
- Production 7-8 q/ acre.



Fig 5: Morphology of *Gunjavali*.

### 5. Goli

- Height up to 235-250 cm.

- Large semi-compact panicle.
- It is dual purpose.
- Grains yellowish white.
- Grain quality good.
- Fodder is expensive.
- Demand in market.
- Heavy to medium soil is well for this genotype.
- High production, 12-15 q/acre.



Fig 6: Morphology of *Goli*.

### 6. Pivli

- Height 165-175 cm.
- Panicle compact and rigid.
- Grain dark yellow.
- Good fodder quality.
- This genotype is suitable under good moisture condition.
- It is not suited to higher elevation (More than 1200).
- It has medicinal value against diabetes.
- Medium production, 5-6 q/ acre.



Fig 7: Morphology of *Pivli*

### 7. Dhamna

- Height is 200-225 cm.
- Loose panicle.
- Taste of *hurda* is good.

- Demand in the market, economically profitable.
- Easy grain threshability during *hurda* stage.
- Grains bold.
- Production 7-9q/ acre.



Fig 8: Morphology of *Dhamna*.

### 8. Dukri

- Height 160-167 cm.
- Panicle is inverted, compact and rigid therefore birds are not easily feed.
- This genotype is more popular due to its lustrous bold grain.
- Grains shiny, yellowish white and lustrous and heavy.
- Bread quality is good.
- Fodder quality very good.
- Production 6-7 q/ acre.



Fig 9: Morphology of *Dukri*.

### 9. Mahu

- Height up to 235 -250cm.
- Grain yellowish white.
- Grain quality good.
- Fodder is expensive.
- Demand in market.
- Heavy to medium soil is well for this genotype.
- It has easy threshability with desirable fragrance.
- High production, 12-15 q/acre.



Fig 10: Morphology of *Mahu*.

Table 1: Grain Purity Test

Sr. No.	Name of Traditional Genotype	Total Wt. of 100 grains (gm).
i)	<i>Talki Jowar</i>	1.20 gm
ii)	<i>Dadar Jowar</i>	1.30 gm
iii)	<i>Bhendi Jowar</i>	1.38 gm
iv)	<i>Goli Jowar</i>	1.40 gm
v)	<i>Gunjavali Jowar</i>	2.74 gm
vi)	<i>Pivli Jowar</i>	3.15 gm
vii)	<i>Dhamna Jowar</i>	2.25 gm
viii)	<i>Dukri Jowar</i>	3.20 gm
ix)	<i>Mahu</i>	2.33 gm

### Result and Discussion

Geographically Hingoli district has low rainfall and humidity. The major crop in that area is *cotton*, *soyabean* and *jowar*. Rural people and farmers conserve these traditional genotypes.

Data obtained from field survey are presented in this study 09 traditional genotypes belonging from 05 tehsil's have recorded and collected. The grains contain high fiber and non-starchy polysaccharides and starch with some unique characteristics. Protein quality and essential amino acid profile of *Sorghum* is better than many of the cereals (Chavan U.D. *et al.*, 2017) [7]. This contributes the remedies on several diseases. Many genotypes are useful as several remedies of these 09 genotypes 02 genotypes used as antirheumatic and 02 are used as antidiabetic, 05 genotypes used as miscellaneous uses.

Out of 09 traditional genotype *Dukri* genotype found heavier in weight and *Talki* genotype found very lighter weight among the all traditional genotypes.

It is interesting to note that, the traditional farmers collect the traditional seeds and conserve seeds for next season with hanging the panicle at homes or packed in knots.

It is observed that, *Pivli jowar* is given to diabetic patient to cure diabetetis. The grains belonging to different genotypes vary in height. The height of plant, panicle, Colour of grains, taste, yields, uses are variable from genotypes to genotypes. The rural people have knowledge to conserve the traditional genotypes.

### Summary and Conclusion

Some traditional genotypes are endemic to particular region, some are cultivated and some are very rare. The ethno botanical survey of the Hingoli district revealed that the area having good source of traditional genotypes. These traditional genotypes of *Sorghum* need proper conservation. Among 09 genotypes *Talki* is commonly cultivated and *Pivli* is rare in Hingoli district.

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