

Demand of Different Varieties of Pearl Millet/Bajra in Various States of India

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Abstract

Pearl millet is an important grain of Indian Diet, a vast variety of pearl millet is cultivated in various parts of the country, every variety has specific taste and according to that specific taste a particular variety is sold in much greater quantity in various geographical locations of the country. But which variety is liked more than other variety of Sorghum in every state of India is a matter of research, by finding the data of the variety of millet which is in high demand, it will become more convenient to produce the variety that is in the great demand. Thus, the current research puts light on finding the consumption of different varieties of pearl millet in various state of India and opens the future perspective to conduct more research on the connection of different varieties of cereals and pulses and average consumption of that specific variety in a particular state.

Keywords: ICM4-155, MH-306, NBH-149, NH-338, Pearl Millet, VBH-4

Introduction

Bajra or Pearl millet (PM) is the type of millet that is commonly grown. Sorghum is cultivated in Africa and the India since a long time. The Sahel area of West Africa is the recommended cultivation location for the pearl millet. During 2000 to 2500 BC the Sahel zone of north Mali is analysed the existence of local pearl millet according to current archaeo botanical research. Production eventually increased and landed to India across the oceans. According to ancient data of archaeology of India of around 2000 BC, and 1500 BC, shows the existence from Hallur site that Pearl Millet is cultivated. Cultivation also widened through Africa's east and southern parts. PM is mainly cultivated in Nigeria's north-east parts of (particularly in Yobe and Borno state). PM is a prominent food source to the villager of these area. The crops are easily cultivated in these area because of the capacity to bear extreme weather condition like flood and drought. There exists records for PM growth in the United States of America and the launching of crop was done 1960s in Brazil[1] Figure 1: Shows the steps involved in the cultivation of the Pearl Millet crop from the selection of the climatic condition to the final yield[2]

3 – 4 mm PM with ovoid grains have biggest kernel in every types of millet (not including sorghum) it may be almost pale yellow, white, grey, brown, purple or slate blue. The weight of seed may be an average of 8 gram in the range of 2.5 to 14 g. The length of the crop varies from 0.5 – 4 m. PM is known to be cultivated in high temperature, low soil fertility, and drought. PM is cultivated well in low pH soils with greater salinity. As a result of resistance to crucial rising environment, PM is cultivated in areas where wheat or maize do not retain[3] PM is cultivated in summer season, the yearly crop is better-suitable for rotation and double cropping. PM is cultivated on over 260,000 km² of land globally. PM holds nearly 50% of the global millet cultivation[4].

1. Benefits of PM/Bajra Consumption

- May aid weight loss.
- May be a good choice for people with diabetes.
- Contains nutrients that may support healthy hair, skin, and nails.
- Good for Heart Patients with Heart Related Diseases

2. India

The biggest cultivator of PM is India. Before 3200 BCE the cultivation of millet started in India. It is certainly not known in what way PM entered India. In India, Rajasthan is the biggest-cultivator of millet. The PM's first hybrid variety is cultivated in 1965 in India and named as HB1. In Tamil Nadu (TN), PM is known as Kambu, and is a significant crop throughout the Tamil Nadu. The second significant food of TN is PM and is used primarily in summers having hot and humid climate starting from February to July. Gruel is made from millet and usually eaten with butter milk or eaten as idly or dosa[5]

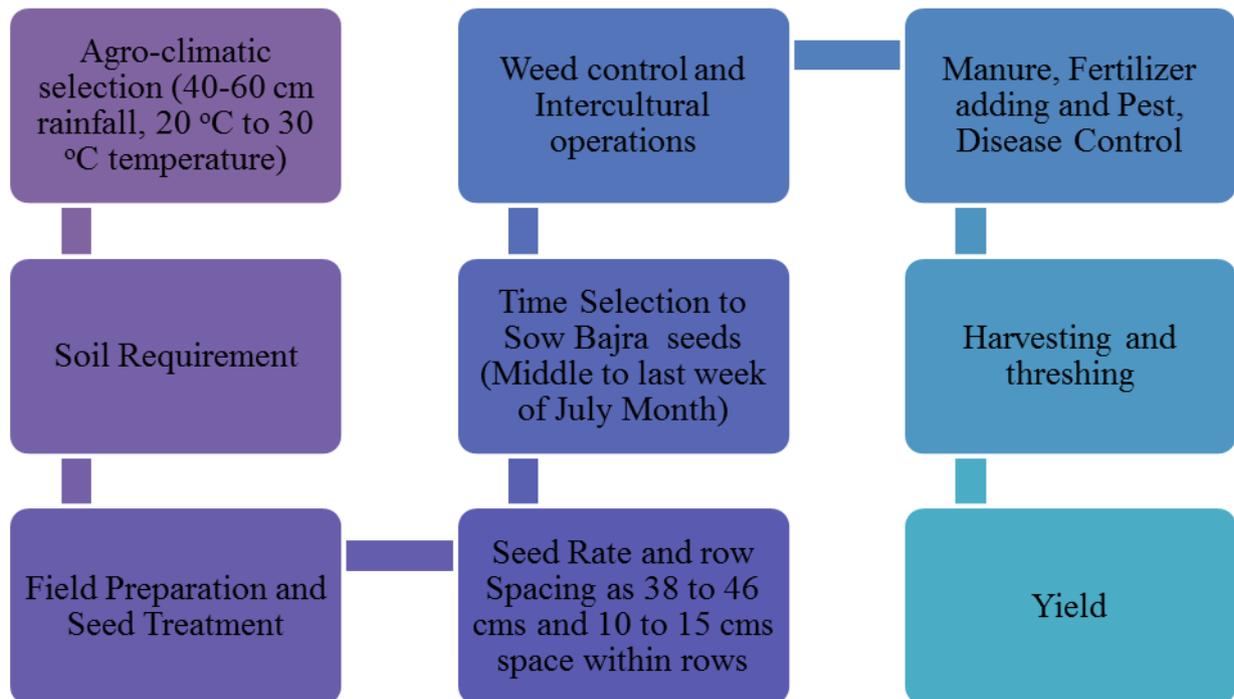


Figure 1: Shows the Steps Involved in the Cultivation of the Pearl Millet Crop from the Selection of the Climatic Condition to the Final Yield[2]

3. Africa

3.1. Sahel

From the top second highest manufacturer of PM and the production started first here, Africa successfully brought back the crop which was lost. PM is a significant crop throughout the Africa especially Sahel region. PM is a primary crop (in continuation with sorghum) in a large area of Niger, north Nigeria, Burkina Faso and Mali. PM is mainly cultivated with cowpea and sorghum in Nigeria, the varied habits of growth, drought resistance and growing time of the triple crop increases

complete efficacy and reduces the danger of complete failure of crop. PM is usually made into flour by grinding, parboiled, rolled in big ball, liquid paste is made by using milk in fermented form, lastly consuming in the form of beverage[7]

3.2. Namibia

PM in Namibia is usually called as "mahangu", cultivated mostly in northern part of the country, in that area Pearl Millet is a food that is consumed the most. The drought, dry climate favours cultivation well in comparison to other crops like maize. Cooking of Mahangu is mainly done to form a porridge called "oshifima" (or "oshithima"), Mahangu is fermented to form a drink named "ontaku" or "oshikundu"[8].

Mahangu is traditionally beaten with wood having big pieces in an area termed 'pounding area'. The base of the room is sheltered similar to concrete made up of termite mound material. Due to which, small quantity of grit and sand get mixed into the mahangu which is pounded, so eatables like oshifima are normally not chewed and directly swallowed. Winnowing is done after pounding so as to separate the chaff[9]

Few commercial process of grain facility are now available, Namib Mills operates some of them. Efforts are made in order to create processing at smaller scale with the help of other means or food extrusion. The mahangu is milled into a puree in a food extruder and then is forced via die of metal. Product made following the route involve porridge, cereals breakfast, pasta shapes, puffed grains and rice [10]

REVIEW OF LITERATURE

Andrew D.J conducted a study on PM for feed, forage and food, and concluded that in case of low-resource cultivation, the pearl millet gain will be obtained after research in grain processing and food item along with the research in plants breeding. PM items are easily cooked just like items from wheat, rice, and flour. In India almost 25% of the crop of PM is commercialised, which is two to five time higher than in Africa FAO, 1990 (Food and Agriculture Organization). The PEARL MILLET: FEED, FOOD, FORAGE 127 is a critical aspect in growing continual researches and helping a hybrid seeds sector in our country. Although the prime restrictions for the cultivation for PM in Africa are identified as low levels of soil nutrient along with less rainfall according to Fussell et al., in1987, the premium benefit/cost return are observed by the acceptance of new cultivators. The rise in PM production of 2.3% per year in last 20 years in our country by adopting new cultivars. The study does not put light on the consumption of pearl millet varieties in West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab [11]

Ong et. al. carried a study on the response of PM to temperature and light find that Temperature puts a serious impact on the rate of crop plant growth & also depends on process of extension and broadening. Light finds the growth rate (i.e., dry matter production) at any level of growing stage. But there are significant dealing: development can be lowered by low amount of light and growth may be restricted when the temperature is very high or very low. The data available shows that the ground temperature at which growth stops is varied for different varieties: the time and the rate of specific growth process also vary [12]

R.K Jain and S. Bal conducted a research on Three varieties of pearl millet seed, comprising of two hybrids GHB 30 and Bajra 28 – 15, and one Babapuri, a conventional variety, were graded , desiccated to 4% moisture availability on dry basis and functions of the prominent fraction were

analysed . The shape factor of the grain was 1.07 for GHB 30, 1.01 for Bajra 28 – 15 and 1.06 for the Babapuri varieties. The porosity of the bulk ranged from 45 and 49%. The angle of repose was from 23° to 25°. Hybrid seed constituted about 4.5% oil and the old Babapuri variety 7.3% [9]

Research Questions:

Which is the most commonly used Pearl Millet variety in West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab?

METHODOLOGY

Design:

A Questionnaire form is distributed in all wholesale markets of different cities of West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab. The questionnaire form shown in Table 1 was distributed amongst all wholesale grain dealers and the questionnaire form filled by the wholesale dealers of pearl millet was considered for further analysis and depending upon the data entered by the wholesale dealer’s further study was conducted.

Table 1: Shows the Questionnaire Form Distributed Amongst the Wholesale Dealers of Grains in Different Cities of West Bengal, Uttar Pradesh, Andhra Pradesh ad Punjab

NAME:	
AGE:	
OCCUPATION:	
How long you are doing wholesale dealing of grains? :	2 to 6 years: 6 years or more:
What all cereals you sell? :	Wheat: Maize: Pearl Millet: Barley:
What quantity of Pearl Millet you sell monthly? :	1,000 lakh Kg: More than 1,000 lakh Kg:
Which variety of Pearl Millet is demanded the most? :	ICM4-155: VBH-4: NBH-149: MH-306: NH-338:

Data Collection:

The questionnaire form distributed amongst the wholesale grain dealers of different locations of West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab and grain dealers who were mainly dealing with Pearl Millet primarily were considered for the survey and an average result of different locations of a state is considered as the result of that state, a total data of 10 dealers was considered for the analysis.

Data Analysis:

The results of average consumption of various Pearl Millet varieties i.e. ICM4-155 as 22%, VBH-4 as 22 %, NBH-149 as 11%, MH-306 as 31 %, and NH-338 as 14% in West Bengal. The results of average consumption of various Pearl Millet varieties i.e. ICM4-155 as 37%, VBH-4 as 27 %, NBH-149 as 14%, MH-306 as 13 %, and NH-338 as 9% in Uttar Pradesh. The results of average consumption of various Pearl Millet varieties i.e. ICM4-155 as 28%, VBH-4 as 24 %, NBH-149 as 9%, MH-306 as 35 %, and NH-338 as 4% in Andhra Pradesh, and the results of average consumption of various Pearl Millet varieties i.e. ICM4-155 as 50%, VBH-4 as 22 %, NBH-149 as 11%, MH-306 as 10 %, and NH-338 as 7% in Punjab.

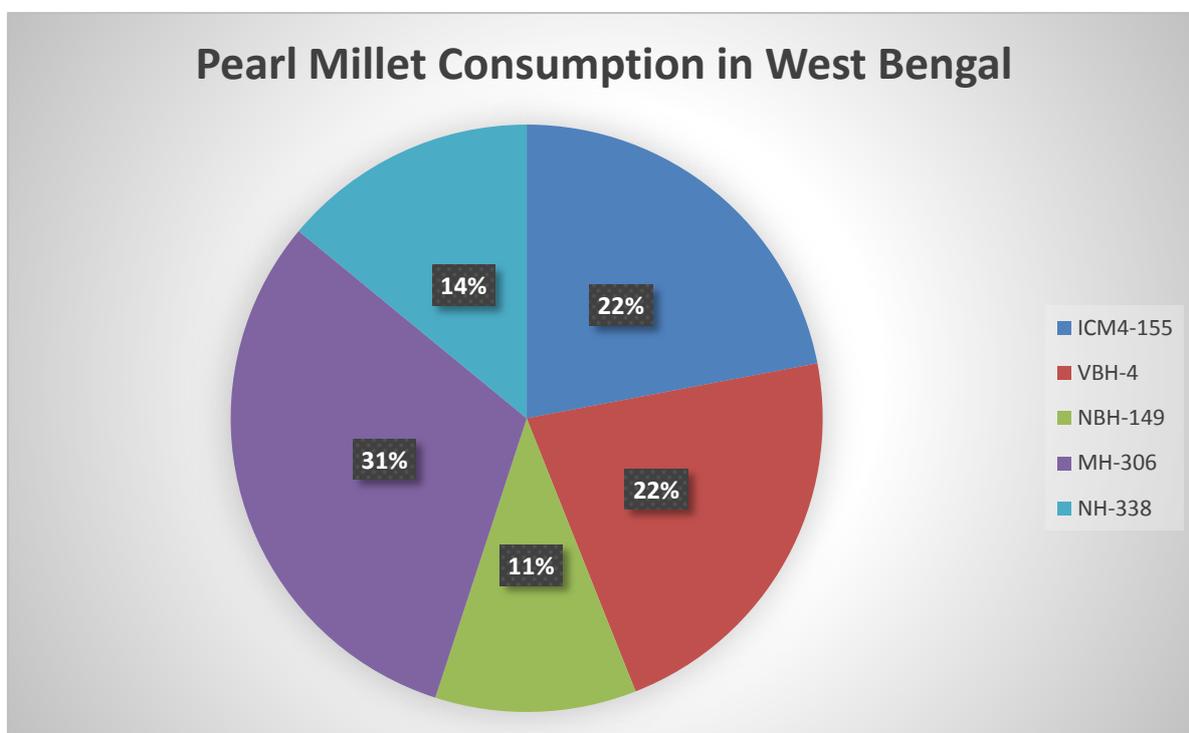


Figure 2: Shows the Results of Average Consumption of Various Pearl Millet Varieties i.e. ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in West Bengal.

The results of average consumption of various Pearl Millet varieties i.e. ICM4-155 as 22%, VBH-4 as 22 %, NBH-149 as 11%, MH-306 as 31 %, and NH-338 as 14% in West Bengal.

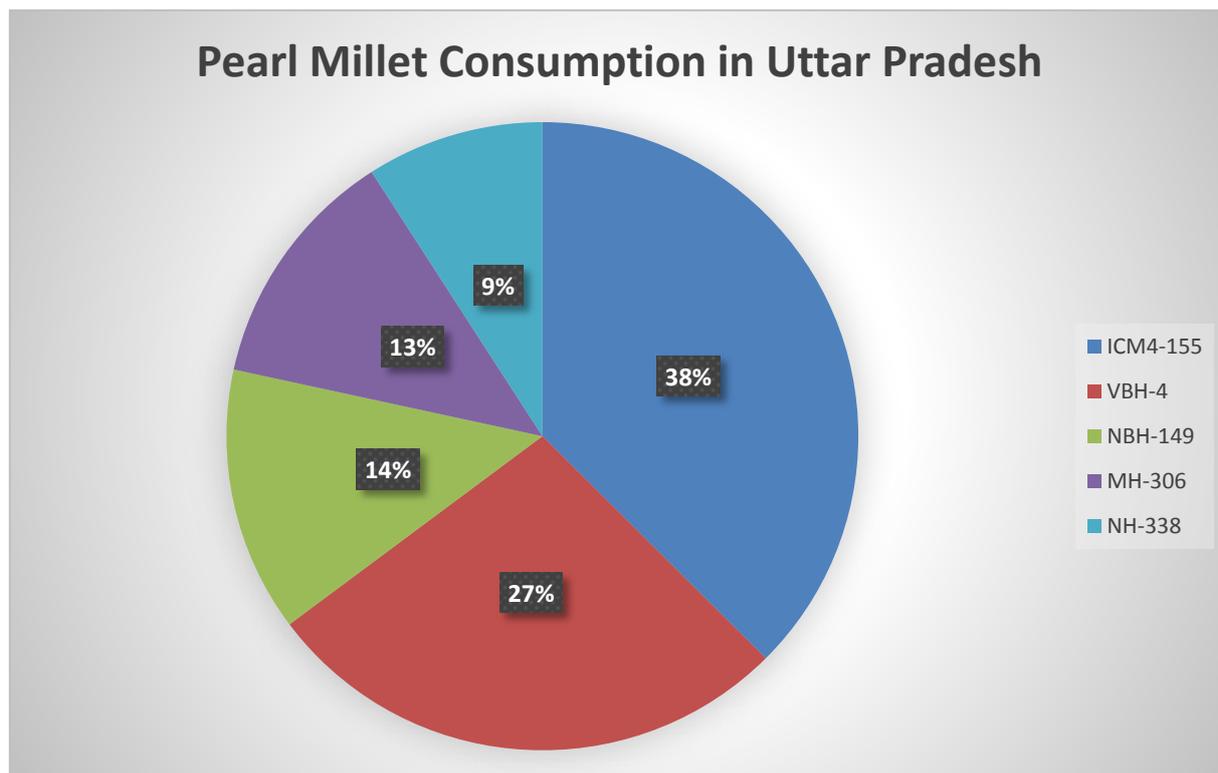


Figure 3: Shows the Results of Average Consumption of Various Pearl Millet Varieties i.e. ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in Uttar Pradesh.

The results of average consumption of various Pearl Millet varieties i.e. ICM4-155 as 37%, VBH-4 as 27 %, NBH-149 as 14%, MH-306 as 13 %, and NH-338 as 9% in Uttar Pradesh.

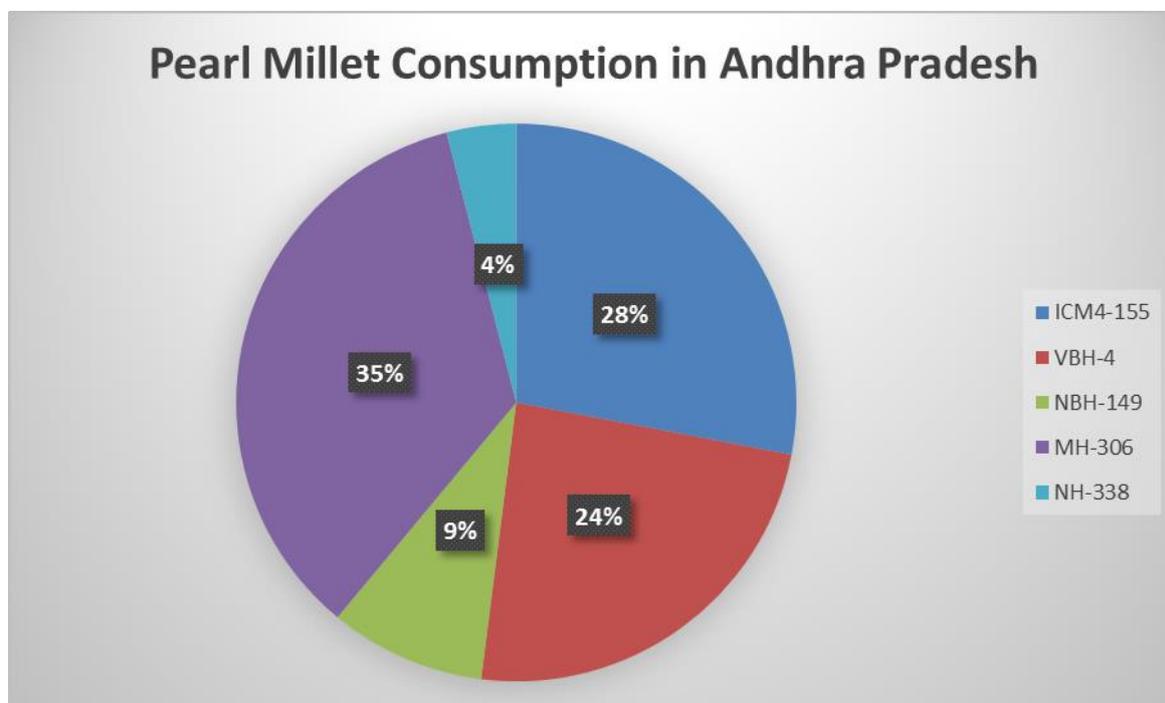


Figure 4: Shows the Results of Average Consumption of Various Pearl Millet Varieties i.e. ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in Andhra Pradesh

The results of average consumption of various Pearl Millet varieties i.e. ICM4-155 as 28%, VBH-4 as 24 %, NBH-149 as 9%, MH-306 as 35 %, and NH-338 as 4% in Andhra Pradesh.

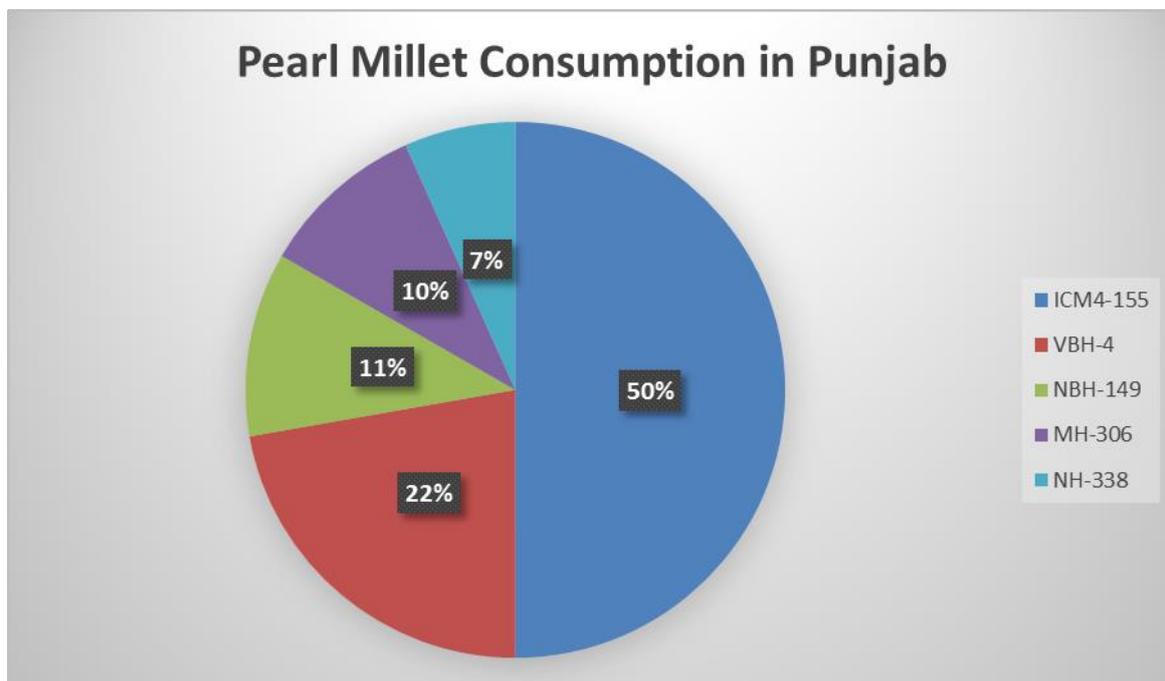


Figure 5: Shows the Results of Average Consumption of Various Pearl Millet Varieties i.e. ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in Punjab

The results of average consumption of various Pearl Millet varieties i.e. ICM4-155 as 50%, VBH-4 as 22 %, NBH-149 as 11%, MH-306 as 10 %, and NH-338 as 7% in Punjab.

Figure 2, 3, 4, and 5, Shows the results of average consumption of various Pearl Millet varieties i.e. ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab.

RESULT AND DISCUSSION

Pearl Millet is widely known for its health benefits including Weight Management: complex carbs present in Pearl Millet are absorbed slowly from our digestive tract, resulting in greater satiety while ensuring a continuous flow of energy. Gluten Free: making it a good change from the daily meals that are gluten heavy, Gut Health: rich source of insoluble fibre and works as a pre-biotic thus helps in keep our digestive healthy. Insoluble fibre also helps prevent overeating Helps Manage Diabetes: It is a good source of magnesium thus; it is good for heart patients.

The results of the study conducted to find out the average consumption of different Pearl Millet varieties ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in different states shows that shows that the average consumption of ICM4-155 the Pearl Millet variety was 22% in West Bengal, 37% in Uttar Pradesh, 28% in Andhra Pradesh, and 50% in Punjab. The average consumption of VBH-4 Pearl Millet variety was 22% in West Bengal, 27% in Uttar Pradesh, 24% in Andhra Pradesh, and 22% in Punjab. The average consumption of NBH-149 the Pearl Millet variety was 11% in West Bengal, 14% in Uttar Pradesh, 9% in Andhra Pradesh, and 11% in Punjab. The average consumption of MH-306 the Pearl Millet variety was 31% in West Bengal, 13% in Uttar Pradesh, 35% in Andhra Pradesh, and 10% in Punjab. The average consumption of NH-338 Pearl Millet variety was 14% in West Bengal,

9% in Uttar Pradesh, 4% in Andhra Pradesh, and 7% in Punjab. Table 2: Shows the average consumption of different Pearl Millet varieties ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab according to the data collected by the survey.

Table 2: Shows the average consumption of different Pearl Millet varieties ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab according to the data collected by the survey.

State	Average consumption of ICM4-155 Pearl Millet	Average consumption of VBH-4 Pearl Millet	Average consumption of NBH-149 Pearl Millet	Average consumption of MH-306 Pearl Millet	Average consumption of NH-338 Pearl Millet
West Bengal	22%	22%	11%	31%	14%
Uttar Pradesh	37%	27%	14%	13%	9%
Andhra Pradesh	28%	24%	9%	35%	4%
Punjab	50%	22%	11%	10%	7%

CONCLUSION

Bajra is commonly known as “pearl millet” and comes from Gramineae family. Bajra grain is generally originated from Africa or India. Pearl Millet is a crop of coarse grain and is looked as the poor man’s staple food that provides nourishment and is preferably cultivated in dryland. Major Indian states manufacturing bajra are Uttar Pradesh, Gujarat, Haryana, Maharashtra, Rajasthan, and. Bajra is also used as a significant animal fodder. PM is the prime crops of India, Arabia, China, Sudan, Nigeria, Pakistan, South-Eastern Asia, & Russia,

The results of the survey carried to find out the average consumption of various Pearl Millet varieties ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 in different states clearly states and shows that the average consumption of ICM4-155 the Pearl Millet variety was 22% in West Bengal, 37% in Uttar Pradesh, 28% in Andhra Pradesh, and 50% in Punjab. The average consumption of VBH-4 the Pearl Millet variety was 22% in West Bengal, 27% in Uttar Pradesh, 24% in Andhra Pradesh, and 22% in Punjab. The average consumption of NBH-149 the Pearl Millet variety was 11% in West Bengal, 14% in Uttar Pradesh, 9% in Andhra Pradesh, and 11% in Punjab. The average consumption of MH-306 the Pearl Millet variety was 31% in West Bengal, 13% in Uttar Pradesh, 35% in Andhra Pradesh, and 10% in Punjab. The average consumption of NH-338 Pearl Millet variety was 14% in West Bengal, 9% in Uttar Pradesh, 4% in Andhra Pradesh, and 7% in Punjab. Thus a specific common pattern of eating a particular variety of Pearl Millet is observed in Uttar Pradesh and Punjab, whereas a similar pattern of eating ICM4-155, VBH-4, NBH-149, MH-306, and NH-338 is seen in Andhra Pradesh and West Bengal. Thus, current research puts light on finding the consumption of different varieties of Pearl Millet in state of West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab and opens the future perspective to conduct more research on the connection of different varieties of cereals and pulses and average consumption of that specific variety in a particular state.

REFERENCES

1. tom, "Pearl Millet," Wikipedia, 2010. [Online]. Available: https://en.wikipedia.org/wiki/Pearl_millet.
2. Jagdish Reddy, "Bajra cultivation," Agrifarming, 2019.
3. A. S. M. Saleh, Q. Zhang, J. Chen, and Q. Shen, "Millet grains: Nutritional quality, processing, and potential health benefits," *Compr. Rev. Food Sci. Food Saf.*, 2013.
4. L. Dykes and L. W. Rooney, "Sorghum and millet phenols and antioxidants," *Journal of Cereal Science*. 2006.
5. J. Rebouillat et al., "Molecular genetics of rice root development," *Rice*. 2009.
6. lara, "Bajra," wiki, 2000.
7. Government of India, "Agricultural Statistics at a glance 2017," Minist. Agric. Farmers Welf. Dep. - Dep. Agric. Coop. Farmers Welf. Dir. Econ. Stat., 2017.
8. J. R. N. Taylor and J. Kruger, "Millets," in *Encyclopedia of Food and Health*, 2015.
9. R. K. Jain and S. Bal, "Properties of pearl millet," *J. Agric. Eng. Res.*, 1997.
10. I. Amadou, M. E. Gounga, and G. W. Le, "Millets: Nutritional composition, some health benefits and processing - A review," *Emirates J. Food Agric.*, 2013.
11. D. J. Andrews and K. A. Kumar, "Pearl millet for food, feed, and forage," *Adv. Agron.*, 1992.
12. C. K. Ong and J. L. Monteith, "Response of pearl millet to light and temperature," *F. Crop. Res.*, 1985.