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Millets Supply in Global Rice Production

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Abstract

Though the crop improvement work on small millets in India under the co-ordinated programme started in 1964, the launching of a separate co-ordinated millet improvement project in 1969 helped in giving greater attention to these crops with a few centres established in different states for specific millets.

Keywords: Manpower; Small millets; Poultry grain; Economic value; Plant health; Production

Introduction

Five crop specific lead centres were established in 1978-79with IDRC assistance; at Dholi in Bihar for proso millet, Dindori in Madhya Pradesh for kodo millet, Nandyal in Andhra Pradesh for fox tail millet, Semiliguda in Orissa for little millet, and at Almora in Uttar Pradesh for barnyard millet. The establishment of these centres have greatly assisted in building the necessary infrastructure and manpower for these crops. These efforts have started bearing fruit and many new technologies and varieties are now undergoing critical evaluation in different parts of the country. The major goal during the Seventh Five-Year Plan is to further consolidate the outcome of these research efforts and stabilize the productivity of small millets at a higher level [1]. As an important step in this direction a separate All India-Co-ordinated Small Millets Improvement Project has been launched in the Seventh Plan in 1986 with the objectives: Diversification of the varietal base by evolving high yielding, disease resistant and widely adaptable genotypes in various small millets, Development of efficient production technologies using low monetary inputs, Identification of ideal crop mixtures and evolving production systems involving pulses and oil seeds as component crops, Intensification of research on plant health and evolution of cheap and efficient plant protection methods. To identify alternate uses for grain in poultry, dairy and in agro-based industries to enhance their economic value [2]. The above objectives can be achieved only through more research in various disciplines backed up with efforts on transfer of technology. For stabilizing production of small millets the following aspects deserve high priority: Strengthening of both basic and applied research, Identification and utilization of technologies generated from basic and applied research, Quick transfer of technology to the farmer's field for extension. Small millets received less priority in the agricultural development in the past both at National and International level as evidenced by the fact that none of the existing International Institutes is endeavouring for the improvement of any of the small millets. This is so in spite of the fact that these crops occupy more than 25 million hectares at global level. Small millets not only have been less researched but also have received negligible developmental support.

Discussion

The scientists who have gathered here in the First International Workshop on small millets may kindly take note of these facts in their deliberations and come out with suitable recommendations for removing these imbalances. Some of the topics which need specific attention are: Small millets possess a wealth of genetic diversity-India has assembled more than 9,000collectionsof small millets at Bangalore, the headquarters of the Small Millets Improvement Project [3]. Similarly China maintains a rich source of foxtail millet germ plasm; USSR has excellent proso millet collections. Africa has also assembled teff in Ethiopia, finger millet in Kenya and Uganda; The International Crop Research Institute, Hyderabad, India also has built upon of the largest and diverse collections of small millets. However, there are many areas in India as well as in other countries still unexplored and the raisin urgent need to retrieve the genetic diversity under natural conditions. This acquires significance in countries which are faced with chronic drought. The efforts of Ethiopian scientists in this regard are commendable. Besides cultivated land races there is a need to collect related wild species also. Further, an up-to-date inventory of all the available germplasm should be prepared and made available to all small millets researchers to facilitate quick and need based exchange of germplasm. Small millets are highly self-fertilized crops and pure line selection has been primarily used to improve the performance of land races. Quite often the farmer himself has selected varieties in his own way in his fields. Hybridization, however, offers immense potential for combining the desirable features [4]. Contact, hot water and game to cide methods have been used in hybridization with certain amount of success in these crops. The smallness of the spikelets and their delicate nature has been hindering hand emasculation. There is an urgent need to standardize hybridization techniques for changing the genetic background of the local cultivars. The discovery of male sterility in foxtail millet in China augurs well for the improvement of this crop. Similar mechanisms and also mechanisms like protogyny which promote cross pollination need to be looked for in other small millets. Traditionally small millets are the constituents of dry land farming system. However, they also respond to irrigation. Therefore there is an immediate need to select genotypes for better water use efficiency [5]. Small millets are low input crops and often grown in infertile depleted soils. Obviously they respond remarkably to fertilizer management. This further demands identification of genotypes which have high fertilizer use efficiency particularly nitrogen whether it is native or applied. Small millets are vulnerable to different spectrum of field pests and diseases. Finger millet is more vulnerable to diseases like blast and viruses and barn yard millet to smuts. Little and proso millets are more susceptible to pests like shoot fly while borer soccur on finger and

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barnyard millet. The incorporation of genetic resistance offers the best choice in low input crops like small millets. Cultural controls like early planting and appropriate cropping systems could also reduce pest and disease incidence. These methods in addition to cheap chemical control methods deserve attention [6]. Small millets are the staple food of the poor and the working classes and hence their health depends on the quality of food consumed. Any improvement made in nutritive quality of small millet grain would in directly help in bettering the general health of the rural people. So, quality breeding to improve the protein content, mineral composition and amino acid balance should be given due priority. Quality specific genotypes can also be bred in order to widen consumer base to offer a choice of foods and to augment industrial uses of small millets. The manufacture of value added products from small millets will help to upgrade not only the economic status of growers and also their investment resource base. Small millets are generally cooked like rice. They also find their way to the local specific sweets and savouries. Small millets, however, can be used as substitutes to wheat and rice in the food products. They could also be processed into new foods suitable to infants and invalids alike after necessary fortification. Bread could be prepared from finger millet for diabetics and it can also be used in many bakery products. Most small millets could be popped or flaked. As small millets are well protected in glume encasements the processing of the grain to usable form is not only time consuming but also labour intensive [7]. There is therefore a need to develop post-harvest processing technology .in order to reduce human drudgery Small millets maybe defined as millets cultivated for their small grains which are borne on short, slender grassy plants. Pearl millets are excluded. There are many small millets in the world. Some researchers consider that they were developed from the corresponding wild grasses as the result of continued harvesting for food. Others believe that the prior spread of the idea of agriculture was needed in most cases before domestication could begin. Certainly the Alyawara people of central Australia failed to develop domesticated crops, even though some of the wild grasses were morphologically and taxonomically similar to those domesticated elsewhere, and seeds were important in their traditional diet [8]. The millets considered here are those being cultivated in the subtropical and tropical areas of the Old World. The list contains Finger millet, Proso millet, Foxtail millet, Little millet, Barnyard millet, Teff, Fonio millet. Small millets may also be called minor millets, but they are not unimportant. Japanese barnyard millet, proso and foxtail millets have all been important in the past, and are still important today, especially in Asia. Finger millet is an old tropical cereal still widely grown in eastern Africa and south Asia. Kodo and little millets continue to be important in Asia in times of famine or difficulty. The small millets are often grown in difficult conditions, and it is scarcely surprising that they involve high production risks. They have always been crops for situations where there is a risk of famine, as well as offering a low but more reliable harvest-relative to other crops-in low rainfall areas. Kodo millet was traditionally stored in the temples, so that seed would be available in times of crisis. The potential of these millets deserves more study [9]. Food and seed reserves in the village are important, and should not be overlooked. They have good potential for livestock feed in the dry zones. The small millets should be developed both for their potential as good grain producers with modest water needs, and also as producers of forage. They can make good use of any irrigation water available after the main crops have been harvested, and so maybe fitted in to more productive cropping patterns. Finger millet was developed in Africa from E. coracana subsp. africana, probably in the Ethiopian region. It was introduced to India perhaps more than 3,000 years ago. It is a tropical crop, grown from sea-level to 3,000 m asl. This is the most widely grown small millet in India and Africa, and can be very productive. de Wet et al. recognized five races. Proso millet is also an ancient crop. It was probably domesticated in central and eastern Asia, and was cultivated in Europe in Neolithic times. It was well known to the Romans, and became the 'common millet'. This is essentially a crop of the temperate regions, but is also grown in the sub-tropics, and on high ground in tropical winters. Foxtail millet is yet another ancient crop, probably domesticated in eastern Asia, and known to the Chinese as early as 2,700 BC. It is essentially a crop of the sub-tropica land temperate zones. The main production areas are in Japan, China, India and eastern Europe [10]. Cobley noted that more than 12 rather variable groups of cultivars have been recognized. Little millet is grown to a limited extent in India, up to altitudes of 2,100 m. It occurs wild in northern India and south eastern Asia. It will yield some grain and useful fodder under very poor conditions. Some forms mature in as little as two-and-a-half months.

Conclusion

Japanese barn yard millet Echinochloa crusgalli was domesticated in Japan some 4,000 years ago. It belongs essentially to the temperate zone. Barnyard millet, E. colona, was domesticated in India, where it remains an important cereal in some areas. It has also been recorded from the Central African Republic, Tanzania, and Malawi.

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Conflict of Interest

None

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