



PEARL MILLET CHARACTERISTICS IN FUTCHIMIRAM, NORTHEASTERN YOBE STATE, NIGERIA

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Abstract

Africa is home to diverse varieties of pearl millet which because of their qualities survive and sustain the livelihood of millions of people in the harshest parts of the continent. In spite of all these qualities, local varieties of millet have been disappearing at a rapid phase in most parts of the world hence this study was conducted to examine the varieties of pearl millet in Futchmiram village, northeastern Yobe State, Nigeria with a view to providing information for enhanced farming systems in the area. A total of six household heads were sampled using snowball sampling technique based on their advance knowledge of pearl millet cultivars in the study area as well as 30 years of its planting. Methods used for data collection involved transect walk and in-depth interview. Transect was conducted with two local guides provided by the village head in order to make an inventory of pearl millet varieties in the study area. In-depth interview was conducted with the six household heads to examine the characteristics of the inventoried pearl cultivars. This study found that a total of four varieties out of which three are indigenous in the area. These are: buduma (MLVF₁), moro (MLVF₁), argum kundirya (MLVF₁) and maida (MLVF₁). Buduma is early maturing while Maida takes between 120 to 140 days to mature making it a late variety. Maida produce low yield while others produce medium to high grains. The seeds of Argum Kundirya are covered with hair while others have their seeds exposed. All the four varieties are drought resistant. This study recommended that farmer-based millet crop selection and improvement should be encouraged through initiatives like community seed banks, seed fairs, and farmer networks.

Key words: Pearl millet, Cultivars, Semi-arid northern Nigeria

INTRODUCTION

Millet is a highly variable grasses believed to have originated from West African wild grasses over 40,000 years ago (National Research Council, 1996). They are identified by their small grain sizes and are considered as the 6th most important world cereal and also a fundamental crop in the drylands of Sub-Saharan Africa, including the Sahel region (Singh *et al.*, 2003; Basavaraj *et al.*, 2010). It originates from Africa and spread to Asia, the Americas and Oceania where it is cultivated predominantly as forage and/or mulch



component of minimum tillage-based cropping systems (Newman *et al.*, 2010; Department of Agriculture, Forestry and Fisheries, 2011).

There are diverse groups of millet typical of different parts of the world (Obilana and Manyasa, 2002). The genuinely African millets are pearl and finger millets. Four other types of millets are cultivated across several countries in three sub-regions of Africa. Finger millet is cultivated mostly in Eastern, Southern and Central Africa, Uganda, Western Kenya, Sudan and Eritrea, Zimbabwe, Zambia, Malawi, Madagascar, Rwanda, and Burundi (Asungre, 2014). Fonio is only cultivated in West Africa mostly in Mali, Burkina Faso, Guinea Conakry and Nigeria (Obilana and Manyasa, 2002). Others such as fonio (*Digitaria exilis*), black fonio (*Digitaria iburua*), and guinea millet (*Brachiaria deflexa*) are dominant in West African drylands (FAO / ICRISAT, 1996). These are often classified as "minor" millets because their cultivation is limited to specific geographic areas and have no relevance in international agricultural trade beyond the farmer grassroots (Gari, 2001).

Local landraces (varieties named by farmers) still contribute strongly to food security of rural populations and to the resilience of farming systems (Jarvis *et al.*, 2008; Sahri *et al.*, 2014). Therefore so many studies have been carried out on landraces of pearl millet in various parts of the world. Mohammed (2005) reported that there are about six local landraces of pearl (resulting from years of continuous cultivation) in use by smallholder farmers in semi-arid northern Nigeria. Delêtre *et al.* (2011) have shown a strong coincidence between ethno-linguistic boundaries and genetic discontinuities for cassava at the regional scale in Gabon. More recently, Westengen *et al.* (2014) have shown that the population genetic structure of sorghum landraces in Africa coincided with the main languages families. Labeyrie *et al.* (2014) in a study within a small-scaled contact zone between three ethno-linguistic groups on Mount Kenya, suggested that sorghum seed exchanges are limited for local landraces but not for improved varieties. Dussert *et al.* (2015) have shown that the genetic diversity of domesticated populations of pearl millet is mainly structured along a west/east axis in the Sahelian region. Naino *et al.* (2017) show the existence of a genetic structure of pearl millet mainly associated with ethno-linguistic diversity in the western side of the Lake Chad. There is also a limit to gene flow between landraces grown by different ethno-linguistic groups.

Despite enormous knowledge from the outcomes of those studies and the fact that they were conducted in different geographical areas, time and in socio-cultural setting far from this study area, no study used qualitative approach to examine the characteristics, qualities and various adaptive measures of pearl millet in Futchimiram village. Thus, the aim of this study was examine the characteristics of pearl millet with a view to finding view to identifying the varieties with good characteristics for sustainable food security in the area. It also examined pearl millet management practices of the area for enhanced co-operation among different and/or neighbouring ethno-linguistic groups in north-eastern Nigeria at large.



STUDY AREA

Futchimiram village is located between latitudes $12^{\circ} 35'N$ to $12^{\circ} 45'N$ and longitude $12^{\circ} 45'E$ to $12^{\circ} 52'E$. It is located at the Northeast of Yobe State at 70 to 80 km east of Geidam. Its inhabitants are mainly Bodowai speaking Kanuri. The study area has an 'AW' type of climate as identified by Koppen's climatic classification. According to this classification, this climate is a tropical one with clear wet and dry season. The coolest period is normally experienced between December/January with temperature of less than $18^{\circ}C$. The dominant climatic influence throughout the areas is the Inter-tropical Convergence Zone (ITCZ) also known as the Inter-tropical Discontinuity (ITD). It is a mobile zone where two opposing air masses meet. This zone is noted to follow the apparent movement of the sun, North and South of the equator (Rowland, 1993; Hess, 1999).

A very marked relationship between rainfall and latitude has been identified in the whole of West Africa. Mortimore (1999) noted that the ITD advances steadily northwards until about August when it halts and begins to retreat southwards while the humid maritime air mass advances northwards and increase in depth causing rainfall there also to increase. Thus, rain does not fall in any of the study areas until the ITD has moved north of it sufficiently for an established pattern to occur. The onset of the rains in the study areas generally starts mid-July in the extreme North. Mortimore (1989) noted that the area fall within the vegetation zone called the 'Manga grassland'. This is as a result of the availability of grass cover on the landscape within the ecological setup.

Subsistence crops cultivation and livestock rearing are their major activities. The major crops grown include pearl millet, sorghum and cowpea. Small-holder subsistence farming, using mainly local landraces, is the dominant mode of production in this region (Mohammed, 2005). Pearl millet is the main crop in the western side of the lake as well as in the Sahelian part of Chad, whereas sorghum is nowadays the most important cereal in northern Cameroon and in the Sudanian part of Chad (Naino et al., 2017).

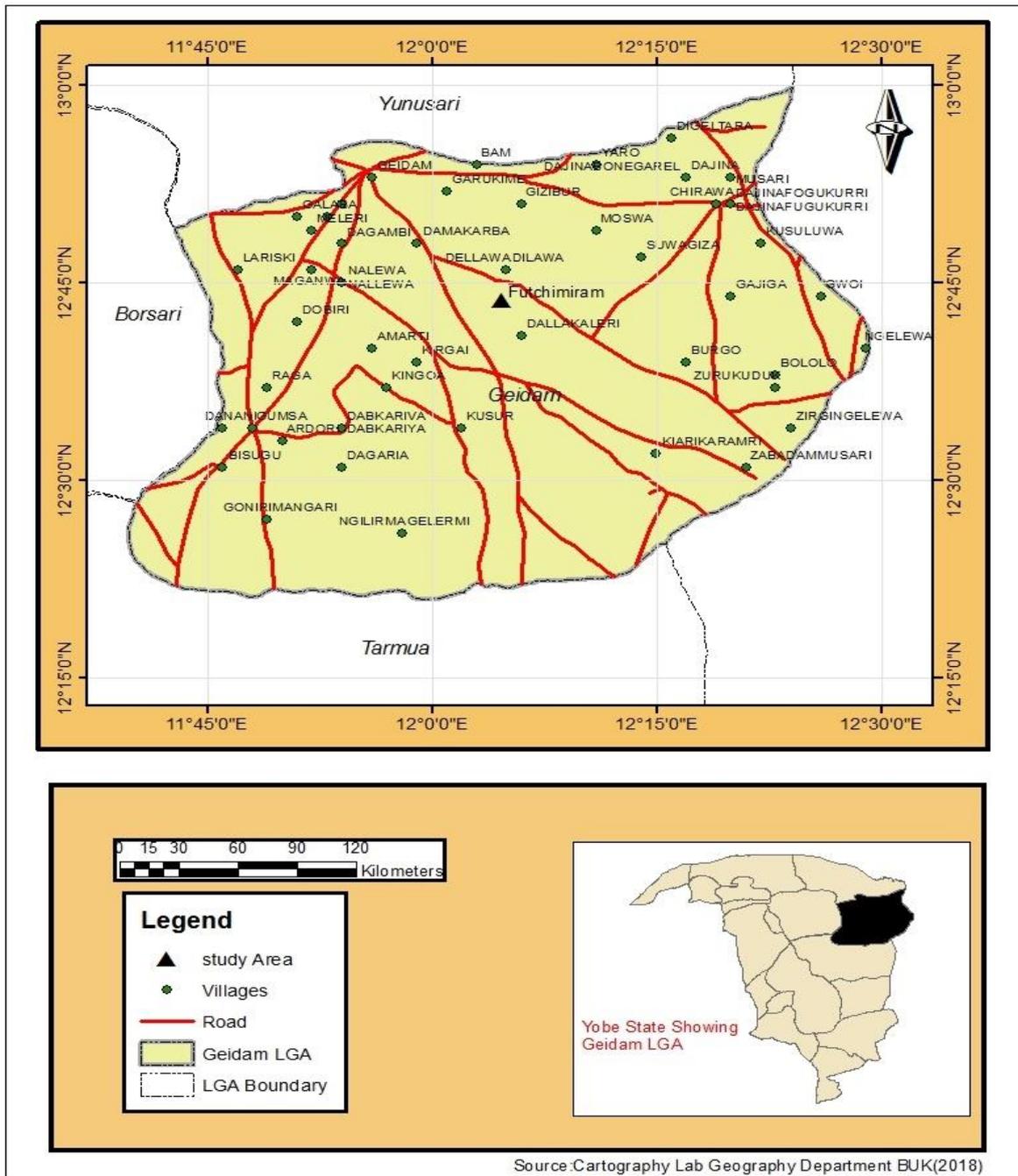


Figure 1: Futchimiram in Yobe State Northern Nigeria



MATERIALS AND METHODS

Sampling Procedures

Purposive sampling was employed to select a total of six household heads that have 30 years of pearl millet cultivation as well as advance knowledge of its breeding in the area. The age range of these farmers was between 60 and 70 years.

Procedures for Data Collection

Reconnaissance survey was conducted in early 2017 with a view to carrying out preliminary assessment of farming practices of pearl millet in the study area. This study employed a qualitative approach: transect walk and in-depth interview to identify pearl millet varieties and examine their general characteristics and qualities in the study area. Sampling of pearl millet cultivars was done through transect walks with two local guides provided by the village head. Landrace identification was based on information given by farmers, who recognize varieties on the basis of inflorescence shape and seed size and colour. For each landrace, seed sampling was carried out on inflorescences identified by farmers as potential seed sources for the following year sowing in line with Naino et al. (2017).

In-depth interviews were carried out to acquire detailed information on the diversity and management of pearl millet cultivars with the six household heads. The discussions were done in Hausa but the names of the landraces were in Kanuri.

RESULT AND DISCUSSION

Result of this study indicated that Futchimiram possessed a total of four cultivars of pearl millet (Table 1). Despite impeding aridity, three of the varieties are indigenous while only Buduma was introduced (Table 1). This study found that maturing period differs among the four varieties. Buduma matures early below 100 days while Maida takes longest period between 120 to 140 days to mature. In terms of yield, Maida produce low while Budama give high. Nature of seeds which determine susceptibility of birds attack also vary among the cultivars with only Argum-kundirya covered with hair. All the four varieties are drought resistant hence are preferred by the people despite the fact that others exist in neighbouring communities.

Table 1: Pearl Millet Characteristics in Futchimiram, Yobe State, Nigeria



		PEARL MILLETS CHARACTERISTICS AND QUALITIES																			
STUDY VILLAGES	INVENTORIED PEARL MILLET VARIETIES	CODE NUMBERS OF VARIETIES	MATURITY PERIODS			ORIGIN		MODE OF ACCESS				GRAIN YIELD			NATURE OF SEED		LENGTH OF STALK			RESPONSE TO DROUGHT	
			EARLY MATURING (40-70) DAYS	AVERAGE MATURING (70-120) DAYS	LATE MATURING (120-140) DAYS	INDIGENOUS	INTRODUCED	GIFT	EXCHANGE	LOAN	SELF-CULTIVATION	HIGH	MEDIUM	LOW	COVERED WITH HAIRS	EXPOSED	LONG MORE (2m)	MEDIUM LESS THAN (2m)	SHORT LESS THAN (1.5m)	DROUGHT ESCAPING	DROUGHT TOLERANT
FUTCHIMIRAM	BUDUMA	MLVF ₁	✓				✓	✓	✓			✓			✓			✓	✓		
	ARGUM KUNDIRYA	MLVF ₂		✓		✓		✓	✓			✓		✓		✓				✓	
	MORO	MLVF ₃		✓		✓		✓	✓			✓		✓		✓				✓	
	MAIDA	MLVF ₄			✓	✓		✓	✓				✓	✓	✓					✓	

Source: Field work (2017)

Species and varietal diversities in small-holder farming systems are valuable for coping with environmental variability and for specific usages (Altieri, 2004; Labeyrie, 2016), hence farmers in the area were found to diversity of those four cultivars in their fields. This study found that environmental, socioeconomic and cultural factors may contribute to the diversification of landraces. In line with Weltzien *et al.*, (1998) and (Christinck *et al.*, 2000) farmers in dry regions prefer to rely on landraces specifically adapted to harsh agronomic and climatic conditions. It has been found that in most Zarma-Songhay and Hausa villages in south Niger and northern Nigeria, farmers grow both early and late-flowering landraces for agronomical reasons (De Rouw, 2004) and also for culinary purposes and cultural preference (Lakis *et al.*, 2012). In Niger, the current aridification process has led to the rarefaction of late-flowering landraces in the northern part of their cultivation area, but they are still present in numerous villages despite severe droughts in the last decades (Naino *et al.*, 2017).

CONCLUSION

Futchimiram village possessed four varieties of pearl millet with good qualities such as drought resistance, early maturity and tolerance that have the propensity of improving the area's farming systems and resilience against climate change. This study understands that the knowledge of pearl millet characteristics and management is fundamental to the area for it to survive adverse conditions of continuous or intermittent drought.

Three among the cultivars were indigenous. Hence this study found high symbolic value of pearl millet among Kanuri speaking people of the area where seeds were exchanged from



relatives or neighbours who grow the same landraces. Accordingly, life in the area is based on material and symbolic life to the crop.

RECOMMENDATIONS

1. Farmer-based crop selection and improvement methods should be encouraged through initiatives like community seed fairs, farmer networks, and ICT to ensure the conservation of genetic and phenotypic diversity of pearl millet in the study area and northern Nigeria at large.



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