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Research Article

Importance of Neglected Pigmented Landrace Maize Varieties

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Abstract

Nutrition is a basic necessity that contributes highly to the development of a nation. Most sub-Saharan African countries count on maize as their staple food crop. Maize supplies calories to both humans and livestock. White hybrid maize has been highly adopted due to its high yield production. However, studies have revealed that high dependency on one variety leads to loss of biodiversity in food crops. This affects the resilience and livelihoods of small-scale farmers in different provenances. Small-scale farmers continue to cultivate Pigmented Landrace Maize Varieties (PLMVs) in their provenances. PLMVs have many advantages that need to be exploited and harnessed. Flint PLMVs are highly resistant to pests hence increased availability and access during lean time. This mini review therefore aims at reporting some of the importance's of PLMVs cultivated in different provenances globally.

Keywords: Pigmented landrace maize; Nutrition; Small-scale farmers; Staple food; Provenances

Introduction

Maize is globally cultivated as a source of energy to both humans and livestock [1,2]. Currently white hybrid maize has been highly adopted due to its higher yielding compared to other verities when all the inputs are supplied accordingly [1,3]. The biased adoption has led to dwindling of PLMVs in Malawi and elsewhere. This tendency has a huge negative effect on food crop diversity which is important in food and nutrition security [4]. Although this biased adoption is high, small-scale farmers continue to cultivate PLMVs. Across the globe small-scale farmers save a small portion of their land and use it to cultivate PLMVs [5]. Small-scale farmers outline several reasons of continued cultivation of PLMVs. No wonder, even in the areas where white maize has been highly adopted PLMVs continue to exist. Some of the notable reasons for continued cultivation of PLMVs are yield stability, high germination rate, storability and aptness in preparing traditional food [1]. PLMVs also act as a repository of gene pool and have a great role in sustaining ecological systems [4]. Studies have revealed that physicochemical and phytochemical composition of PLMVs are significantly higher when compared with white hybrid maize. Within the PLMVs physicochemical and phytochemical composition also do vary. The variations are attributed to varietal differences but also climatic conditions of the areas where these varieties are grown [6,7]. Phytochemicals are very beneficial to human beings because of their high utilization in pharmaceutical industry [8-10]. Apart from PLMVs Phytochemicals are also supplied by different food crops such as fruits, vegetables, legumes and other cereals

[11-18]. Several studies in other food crops have recommended the use of indigenous food crops in the diets for healthy living [19-22]. It was therefore the aim of this mini-review to highlight some of the importance's of the neglected PLMVs.

Materials and methods

This work is a product of reviewing different published papers. The papers were obtained from different databases such as PubMed, science direct and Google scholar through searching key terms.

Findings and Discussions

Small-scale farmers continue to cultivate PLMVs and other food crops of nutritive importance because they do well in different provenances [1,4,6]. PLMVs seeds are readily available to farmers and they don't need to buy each and every year. Apart from the fact that PLMVs are early maturing, some have high germination rate and yield stability compared to the white hybrid maize [5,1,3]. Research has shown that PLMVs have a lot of benefits to health and nutrition status of humans. PLMVs and other food crops rich in carotenoids and phenolic compounds help to improve vision and reduce oxygen radicals thereby preventing degenerative diseases in human [1,2,5,9,23-27]. Physicochemical attributes of PLMVs are high compared to white hybrid maize [2,4]. Among the PLMVs and many other food crops including fruits, the differences in chemical composition is a factor of environmental conditions and many other factors that contribute to crop growth such as mineral availability in the soil but also pH [4,6,7]. The corn type which is flint in PLMVs help to be easily stored and prevent damage from the pests which contribute highly to post harvest food crop losses [1,14]. It has been reported that food and nutrition insecurity in today's world are not mainly due to crop failure. Food and nutrition insecurity are as post-harvest losses as a result of pests that feed on the dent corn of the highly adopted white maize crop including many other factors in the other food crops such as fruits [1,14]. Post-harvest handling of food crops has a great impact on availability of essential nutrients in the diet of human beings since some may be degraded due to high thermal exposure and long period of storage [1,14,23,28]. (PLMVs also help to uplift small-scale business that rely on flour from these varieties [5]. Looking at the many importance's of PLMVs it is plausible to re-introduce these varieties so that both subsistence and commercial farmers should venture into its production for increased availability and access. It could be very easy to re-introduce PLMVs because it has been reported that successful re-introduction is not necessarily related to understanding of nutritional advantages [30]. In this era of climate change, there is need to harness the hardy crop varieties to conserve biodiversity for improved food and nutrition security.

Conclusions and Recommendations

Despite the high adoption of white hybrid maize varieties, small-scale farmers continue to cultivate PLMVs in their provenances. PLMVs are highly advantageous in both chemical composition and agricultural production aspects such as yield stability, germination rate and stress resistance. It can therefore be recommended that production of PLMVs should be scaled up to increase its availability and access to maximise benefits in the diet of the majority. This can be done by formulating deliberate policies such as multiplying seeds and freely distributing them to farmers. Inorder not to lose biodiversity PLMVs should be promoted alongside white hybrid maize without biasness.

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