Main Marketing Constraints for Frafra Potato in Ouagadougou Markets

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Abstract
Frafra potato (Solenostemon rotundifolius) is a herbaceous specie of the family of Lamiaceae. It is cultivated in the tropical regions of Asia and Africa, mainly by the small holder farmers, as a subsistence tuber crop. The crop is grown both for domestic consumption and also sold to supplement household income. In Burkina Faso, Ouagadougou is known to be an important city of consumption of frafra potato. Previous research activities have revealed that profits made from marketing of frafra potato is decreasing compared to that of other tuber crops (yams, sweet potato). All the traders in Frafra potato of three main tubers markets in Ouagadougou were interviewed in 2015 to identify the main marketing constraints for frafra potato. The rapid tuber deterioration and the lack of efficient methods of conservation, the small size of tuber and the short period of tubers availability on the markets were identified to be the main constraints of Frafra potato marketing. The average tubers diameter varied from1.2 to 2.4 cm and the length ranged from 2.7 to 4.2 cm. The small size of most of its tubers (less than 1.8 cm in diameter) is a major constraint for Frafra potato marketing. The Frafra potato variety with black skin color is identified to be the preferred variety. Future breeding program should increase tuber size.

Key words: frafra potato, marketing constraints, tuber size.

Principales Contraintes de Commercialisation de la Pomme de Terre dans les Marchés de Ouagadougou

Résumé
La pomme de terre Frafra (Solenostemon rotundifolius) est une espèce herbacée de la famille des Lamiaceae. Il est cultivé dans les régions tropicales d'Asie et d'Afrique, principalement par les paysans, en tant que tubercule de subsistance. La culture est cultivée pour la consommation domestique et également vendue pour compléter le revenu du ménage. Au Burkina Faso, Ouagadougou est connue pour être une importante ville de consommation de pomme de terre Frafra. Des recherches antérieures ont révélé que les bénéfices tirés de la commercialisation de la pomme de terre frafra diminuent par rapport à ceux d'autres tubercules (igname, patate douce). Tous les commer□ants de la pomme de terre Frafra des trois principaux marchés de tubercules de Ouagadougou ont été interviewés en 2015 pour identifier les principales contraintes de commercialisation de la pomme de terre frafra. La détérioration rapide des tubercules et le manque de méthodes efficaces de conservation, la petite taille des tubercules et la courte période de disponibilité des tubercules sur les marchés ont été identifiés comme étant les principales contraintes de la commercialisation de la pomme de terre. Le diamètre moyen des tubercules variait de 1,2 à 2,4 cm et la longueur

variait de 2,7 à 4,2 cm. La petite taille de la plupart de ses tubercules (moins de 1,8 cm de diamètre) est une contrainte majeure pour la commercialisation de la pomme de terre frafra. La variété de pomme de terre à chair noire est identifiée comme étant la variété préférée. Le futur programme de recherche devrait augmenter la taille des tubercules.

Mots clés: pomme de terre, contraintes de commercialisation, taille des tubercules.

Introduction

Solenostemon rotundifolius (Poir.) J. K. Morton) (Lamiaceae) is an important tropical crop cultivated in various parts of Africa and Asia for its edible tubers. It is also known as Chinese potato, Innala, Hausa potato, Zulu round potato, Sudan potato, Saluga, fabirama or frafra potato. It is an annual herbaceous plant, 15-30 cm high, with ascending or prostrate stem and thick leaves having aromatic smell (Sugri *et al.,* 2013). Frafra potato is adapted to the sahelian and soudano-sahalian regions of Burkina Faso. It grows well in large zone receiving annual rainfall between 400 and 1200 mm (Nanema *et al.,* 2010). Local varieties of frafra potato produce many small sized tubers of up to 70/plant;3.78 cm long and 1.53 cm width (Nanema, 2010). Yields usually range from 7 to 15t/ha.

Three local varieties were identified in Burkina Faso based on the tuber skin color (white, red and black) (Nanema, 2010). These varieties are mainly grown by small holder farmers for domestic consumption and contribute to food security in a large part of the country. Frafra potato is one of the most nutritious tuber crop (Gouado *et al.,* 2003).A part of the harvest can be sold to supplement household income. The tubers are mainly boiled and are recognized to be one of the best tasted tubers.

Despite its adaptation to the local farming conditions and its importance as foodstuff, frafra potato is currently a minor crop. Previous research activities have mentioned that profits made from marketing of frafra potato is decreasing compared to other tuber crops (yams, sweet potato). However, significant information on marketing for frafra potato are not available. Understanding the marketing conditions of Frafra potato tubers is an important step toward the objective of valorization of its genetic resources.

Methodology

This study was a survey that addressed the marketing constraints for Frafra potato in Ouagadougou from October to December 2015, coinciding with the period of marketing for Frafra potato. Ouagadougou is known to be an important center of marketing for Frafra potato during a short period after the harvests.

The traders in Frafra potato in three main markets of Ouagadougou with at least 3 years of experience were interviewed. The expected number of traders for this study was sixty but the information were generated from ten respondents, representing all the traders identified in the three markets. These markets were: the market of "Dassasgho"(in the east of Ouagadougou)and the main markets of "Gounghin" and "Pissy"(in the west of Ouagadougou). The respondents were all women whose ages ranged from 30 to 65.

The questionnaire captured data on the importance and the income implications of Frafra potato in the market. Information was also generated on their methods of conservation and the main constraints of marketing. Based on their own appreciation of the tuber sizes, each respondent divided a lot of their

tubers into 3 categories. These categories were:1- small tubers; 2- intermediate tubers; 3- big tubers. From each category, ten tubers were randomly selected and the weight, the length and the width of the tubers were measured.

Data analysis (frequency, mean value and variation for the different parameters) was carried out using SPSSS tatistics 20.

Results

Importance and income implications of frafra potato

The discussions confirmed the fact that frafra potato is a minor tuber crop. For all the respondents, frafra potato is not the main crop or the main tuber they sold. The main period of frafra potato tubers availability varied from September to December. The tubers sold in the markets came from the southern region of Burkina Faso (particularly from the province of Sissili) or from the center of the central region (examples : "Kokologho" and "Tanghin Dassouri").

During the period of availability, the quantity of tubers sold varied from 16 to 32 Kg/day/person. According to the period and the tubers availability, the prices varied from 600 FCFA to 1500 FCFA/Kg. This important variation of prices (250%) showed the economic potential of frafra potato.

Traders preferred varieties

The local varieties with black or red skin color were mentioned to be the most common varieties in the market. However, the variety with black tuber skin is the main variety sold by all the traders and the preferred one. The big size of the tubers, their good taste and the ease of peeling compared to the other varieties were identified as the main preferred characteristics of the black skin frafra potato.

Tubers size and weight

The three categories of tubers (small, intermediate and big) significantly differed for the diameter and the weight (Table 1). The tubers diameter varied from 1.2 cm (for small tuber) to 2.4 cm (for the big tubers). The length varied from 2.7 cm to 4.2 cm and the weight from 7 g to 15 g/tuber.

Main marketing constraints for Frafra potato

Many marketing constraints were identified. The most critical one is the rapid deterioration of tubers in storage. The method of storage involves keeping the tubers at room temperature in a bag or in a basket. This method of tuber preservation did not allow tuber storage more than one month because of deterioration of some of the tubers.

The short period of tuber availability and the small size of the tubers were identified as important marketing constraints. Tubers were only available from September to December and the traders did not meet frafra potato tubers demand. They also mentioned the consumers' preference for big tubers.

Table 1 : Tuber size and weight

Categories of tubers	Diameter (cm)	Length (cm)	Weight (g)
Small	1.2^{a}	2.7^{a}	7^{a}
Intermediate	$1.8^{a/b}$	3.5^{a}	$11^{a/b}$
Big	2.4^{b}	4.2^{a}	15^{b}
df	2	2	2
F	9.616	2.905	6.443
p value	0.007	0.112	0.032

Priorities for future research on Frafra potato

All the respondents recognized the marketing potential of frafra potato but some characteristics needed to be improved. The black tuber skin frafra potato is preferred for its good taste that should be conserved. However, a short term research objective should be to contribute to increase tuber diameter up to 4 cm and the length up to 7 cm. Another priority should be to increase the period of storage up to 6 months at room temperature.

Discussions

Previous research identified 3 varieties in Burkina Faso based on the tuber skin color (white, red and black) (Nanema, 2010). However, this survey revealed that the black skin frafra potato is the most common variety because of its good taste and the acceptable tuber size. The tubers are sold during a short period compared to other tubers. The rapid deterioration of Frafra potato tubers can explain this situation. The high price variation represents an economic opportunity for many actors (farmers and traders) according to Sugri *et al.* (2013). Frafra potato could be promoted as a tuber food and a source of income. Some research underlined the nutritional potential of Frafra potato (Jayakody *et al.,* 2005; Anbuselvi and Hema, 2013).

The rapid tuber deterioration in storage mentioned by the traders were also mentioned by the farmers as one of the main constraints for frafra potato cultivation in Burkina Faso (Nanema *et al.,* 2010) and in Ghana (Sugri *et al.,* 2013). The bad conditions of storage for tubers after harvest by farmers could contribute to fast deterioration of the tubers. The development of efficient methods for tubers storage could include appropriate techniques to be applied on farm. Another alternative could be the processing of the tubers (Wickramasinghe *et al.,* 2009).

Previous research showed that there was a low variability for the frafra potato tuber size and the small tubers represented 75% of produced tubers (Nanema *et al.,* 2009). The small tuber size was mentioned to be an important constraint for frafra potato promotion (Nkansah, 2004 and Prematilake, 2005). A breeding program and the improvement of cropping conditions (irrigation, fertilization) should contribute to increase the tuber size.

Conclusions

Frafra potato has an important economic potential but many constraints including the rapid tuber deterioration, the small sized tuber and the short period of their availability constituted the main marketing constraints. Developing proper methods for tubers preservation or tubers transformation could be a short term alternative. Breeding program and the development of cropping techniques should contribute to increase in tuber size.

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