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Identification of methods of extraction and conservation of seeds of traditional genotypes of aubergine (*Solanum melongena* L.) in El Retiro de los Indios, Córdoba, Colombia

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Abstract

Eggplant is a traditional crop in the department of Córdoba. One of the main producing regions is the population of El Retiro de los Indios, which supplies local genotype fruits both to local markets and to the Colombian Atlantic coast. In order to find out which are the main genotypes sown by farmers and how they obtain and preserve their seeds, a sample of 65 traditional farmers was taken from said population, who were given a descriptive personal survey with open response. It was established that 76% of the farmers sow the "Morada" genotype, 11% sow the "Lila" genotype, 8% sow the “Verde” genotype, 3% sow the “Picha de perro” genotype, and 2% sow the "Blanca de huevo" genotype. Regarding the obtaining, extraction and storage of seeds, all of the surveyed producers obtain the seeds of their own crops, extract them by the method of softening by rubbing the fruits on the ground, and keep them in glass bottles at which they add a tablespoon of ash.

Keywords: Creole genotypes of aubergine; Rubbing the fruits on the ground; Extraction of seeds; Drying of seeds in the sun; Preservation of seeds in open storage; Eggplant

1. Introduction

One of the most cultivated vegetables in the world is the eggplant. Its world production until 2019 was 55.15 million tons, of which 66.6% were produced in China [1].

On the Colombian Atlantic coast, the cultivation of this vegetable is quite popular, and it is produced mainly by small farmers, who manage it agronomically in a traditional way, using local genotypes known generically as criollos. Its fruits are marketed locally and nationally as an important food for the preparation of salads, stews, soups and traditional culinary recipes of Arab cuisine [2].

The sowing of traditional genotypes of aubergine has contributed greatly to the sustainability of production systems, since the selection of seeds in farmers' own crops has been one of the aspects that allows the transmission of germplasm through different generations family, which promotes the conservation of varietal diversity, based on the criteria of preference of the farmer and the markets [3].

In view of the importance of knowledge of seed extraction methods for the traditional establishment of eggplant crops, both at an ethnobotanical and food anthropology level, this research was carried out with the objective of investigating transfers are the main genotypes that are sown in the area of the middle Sinú valley and how the seeds are extracted and preserved for future use.

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2. Material and methods

The investigation was carried out during the month of October 2019 in the Buenavista village, belonging to the El Retiro de los Indios village, located in the municipality of Cereté, department of Córdoba, Colombia. There, individual interviews were conducted with 65 traditional farmers dedicated to the cultivation of aubergine, using a questionnaire as a participatory evaluation method, where aspects related to age, gender, level of education, time of experience as a farmer, were specifically investigated. genotypes sown, origin of the aubergine seeds used and methods of extraction and conservation of the aubergine seeds used. The information obtained was organized and processed in an Excel™ spreadsheet and supplemented with photographs taken in the field.

3. Results and discussion

The gender distribution of the farmers interviewed showed that 77% are male and 23% female. It was also found that the total number of farmers reported ages between 50 and 65 years and have been planting the eggplant crop for between 15 and 20 years (Table 1). In accordance with the above, there is agreement with the proposals of [4] in the sense that the peasant population of the study area, despite the social, economic and technological limitations that the activity of the cultivation of eggplant implies, has been progressing in their aging optimally, since they have remained active as long as possible in traditional agriculture, preserving their genotypes, customs and types of food preparations with eggplant in the same way as previous generations have been doing and transmitting.

Table 1 Distribution by gender, age, educational level and experience in eggplant cultivation of 65 traditional aubergine farmers from El Retiro de los Indios, Córdoba, Colombia

Evaluated aspect / **Gender**		**Male**	**Feminine**	**Total**
Education level	None	50	15	65
	Primary	-	-	-
	High school	-	-	-
Age (years)	Les tan 30	-	-	-
	30-45	-	-	-
	50-65	50	15	65
Experience in aubergine cultivation (years)	5-10	-	-	-
	10-15	-	-	-
	15-20	50	15	65

Figure 1 Aubergine varieties “Morada”, “Lila” and “Verde”

With regard to the genotypes of aubergine planted, it was found that the varieties are planted: "Morada", "Lila", "Verde" (Fig1), "Picha de Perro" (Fig2) and "Blanca de huevo" (Fig3).

Figure 2 Variety of aubergine "Picha de perro"

Figure 3 Variety of aubergine "Blanca de huevo"

Regarding the preference of farmers for planting the varieties of eggplant (Fig4), it was found that 49 farmers plant the variety "Morada", 7 farmers plant the variety "Lila", 5 farmers plant the variety "Verde", 2 farmers sow the variety "Picha de perro" and 1 farmer sows the variety "White egg". The main criterion used for choosing the varieties to be planted is their taste, for which, in accordance with [5], the aubergine varieties are classified into two types: aubergine with a bitter taste and those with sweet-tasting fruits. In this sense, the "Morada", "Lila" and "Picha de perro" varieties have a bitter taste, and the "Verde" and "White egg" varieties have a sweet taste.

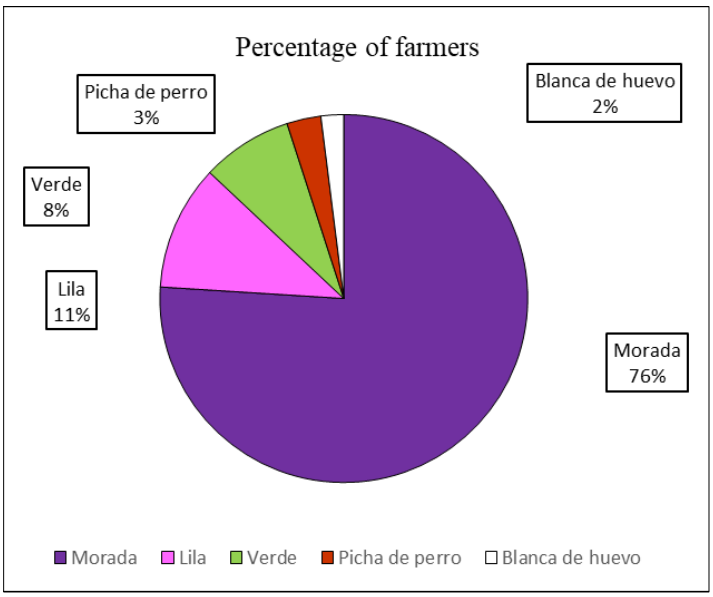

Figure 4 Percentage of farmers who plant each genotype of aubergine

The varieties of eggplant sown by farmers, as reported [5] in their entirety are local and have open pollination, and are propagated by seeds from their own crops, for which they proceed to harvest ripe fruits that have been selected by its desirable characteristics in each of the genotypes such as size, shape and color, which are left in the crops. In this sense, it is important to consider that farmers are very careful that at the time of extracting and saving the seeds for future sowings, no mixtures of seeds obtained from the different varieties occur, since when this occurs, in accordance with [6] it can affect negatively the production process, since they hinder relevant aspects such as the registration, study and development of varieties, quality and yield.

With respect to the extraction methods of the aubergine seeds, all the farmers reported that they are familiar with the natural fermentation of the fruits and the immediate extraction by washing with water of the pulp of the fruits containing the seeds. However, this last method indicated is the only one used by farmers to extract their aubergine seeds, since the extraction by natural fermentation of the fruits carries problems of loss of seeds, since according to [7] there are risks during fermentation, among those found are the germination of the seeds during this process, the deterioration and darkening of the seeds and a reduction in the percentage of germination if the fermentation time is too long.

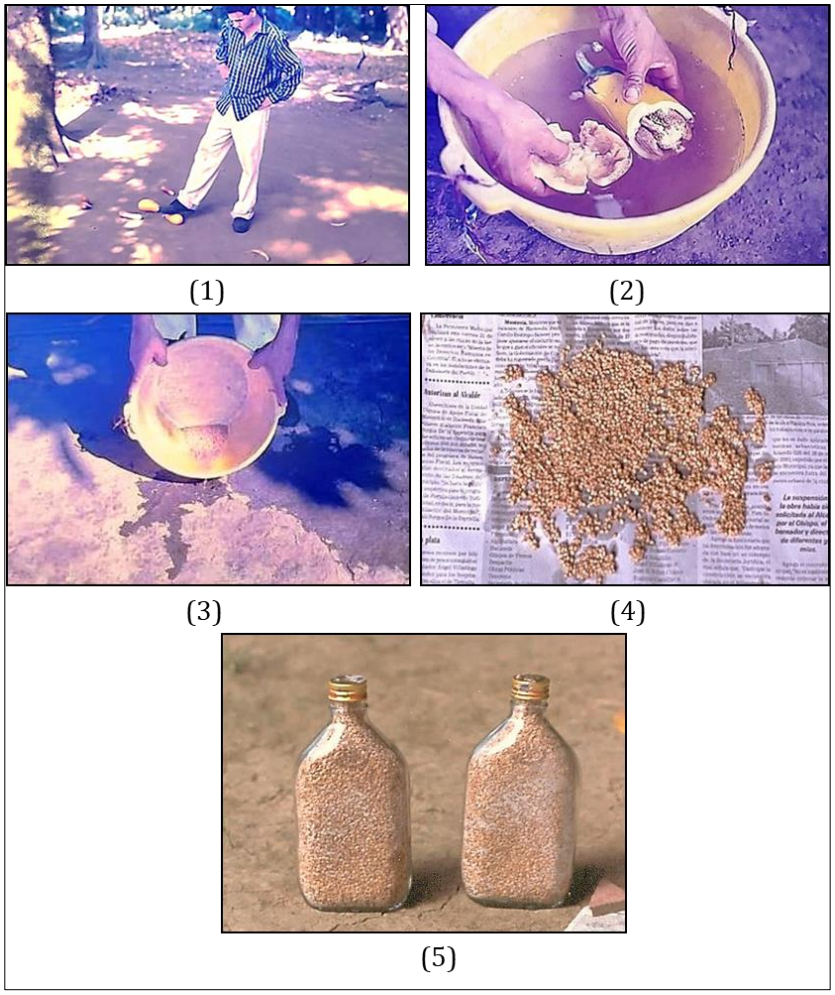

Figure 5 Extraction (1,2,3), drying (4) and packaging (5) of eggplant seeds by farmers

To extract the seeds from the ripe aubergine fruits by immediate washing of the pulp, the fruits are first rubbed on the ground with the help of the foot, with the aim of softening the pulp and concentrating the seeds in the central part of the fruits. Then the fruits are taken to a plastic bucket with water and the pulp remains are separated from the seeds and the mucilage that surrounds the seeds is washed. It is important to note that some seeds will remain floating in the water, which is an indication that they are not physiologically suitable for propagation, so they should be discarded. Finally, the seeds that remain at the bottom of the plastic bucket are recovered after careful removal of the water. The seeds are immediately conveniently separated, on a sheet of newspaper and exposed directly to the sun's rays to dry for two hours. The seeds can be turned over for uniform drying. After drying, the seeds are placed in a glass bottle and a tablespoon of ash is added to them to further facilitate their conservation (Fig5). Seed jars are kept in cabinets to protect them from light.

In accordance with the above, it is important to highlight that the classification system for eggplant seeds, which is given by visual and manual inspection of the farmer himself, as well as the open storage of the seeds without controlling the temperature and relative humidity, are inefficient practices that according to [6,8], are methods based on subjectivity, which also do not consider the determination of the physiological maturity of the seeds because there is no local

knowledge of the optimal moment of physiological maturity of the fruits to harvest them and obtain the best quality of the seeds.

4. Conclusion

An important genetic base was found in the aubergine genotypes planted by farmers in a traditional way, whose conservation has been carried out after family generations, and constitutes their main source of income and food sustenance, which deserves to continue to be conserved through organic production schemes of vegetables and carrying out more and more carefully the processes of extraction and storage of seeds for future plantings.

In particular, the sowing and consumption of the "Verde" and “Blanca de huevo” genotypes should be encouraged, since they are sown to a lesser extent, but have a select and specific market of consumers who want their sweet taste and can pay a better price for its fruits.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The author declares no conflict of interest regarding publication of this article.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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