



Main Obstacles in the Production of Citrus Seedlings in Santa Luzia do Induá, Capitão Poço/Pa-Brazil

**Letícia do Socorro Cunha^{1*}, Luane Laíse Oliveira Ribeiro¹,
Lucila Elizabeth Fragoso Monfort², Wanderson Cunha Pereira²,
Francisca das Chagas Bezerra de Araújo² and Mayra Taniely Ribeiro Abade¹**

¹Post-Graduation Program in Agronomy of the Western University of Parana –1777 Pernambuco St,
Zip: 85960000 Marechal Candido Rondon, PR, Brazil.

²Universidade Federal Rural da Amazonia-S/n Yellow TV Pau, Zip: 68650000 Capitão Poço, PA,
Brazil.

Authors' contributions

This work contains unpublished information collected by the Authors LSC and LLOR, in a community in the municipality of Capitão Poço / Pa, emphasizing Normative Instruction No. 48 on the main difficulties encountered by producers of citrus seedlings in the locality that is one of the main means of income farmers, and that similar research is still needed to improve them. These authors, besides contributing with the data collection, also helped in the tabulation of the data, assembly of the graphs and tables, in the writing, assembly and estrutura of the work. Authors LEFM, WCP, FCBA and MTRA contributed in writing, structuring and correcting the work.

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ABSTRACT

The objective of the study was to identify the main obstacles faced by nurserymen in the production of citrus seedlings in Santa Luzia do Induá, municipality of Capitão Poço / PA. The research was developed based on the application of semistructured questionnaires, where 50 active seedling producers were interviewed on a random basis, out of a total of 100 nurseries. Finally, the information obtained was analyzed. The producers had difficulty in accepting the importance of

*Corresponding author: E-mail: leticiaacunhaufra2013@hotmail.com;

applying one of the items of normative instruction No 48, which deals with the need of protected environment for the production of the Basic Plant, Matrix, Certified Bubble and Certified Mute, considered essential for obtaining material seedlings and certified seedlings. Stated that the way of acquiring the seeds for the production of the rootstock acquired from his property and bought in the trade. According to nurserymen, 90% of the seeds come from plants that are not registered with an inspection body and are used for the production of the rootstock (known as a horse). The local producers have little knowledge and understanding of current regulations, thus being one of the main difficulties. In addition, the producers stated that the main obstacles they face in the production and marketing of seedlings are: Lack of technical assistance and public policies; phytosanitary attack and compliance with Normative Instruction No. 48. These factors together cause major limitations in the production system. Thus, among the aforementioned the main problem experienced by the producers, it is worth noting the adequacy to IN 48 that entails in great changes in the way of production of seedlings of the nurserymen.

Keywords: Adequacy; producers; nursery.

1. INTRODUCTION

Citriculture is an important activity of Brazilian and American agribusiness, being a commodity responsible for the generation of jobs in a direct and indirect way. There are several fruits belonging to this group, of the genus Citrus, being the main species: orange, tangerine and lemon.

According to Neves et al. [1], Brazil achieved a good efficiency in the citrus chain. From seedlings and certified nurseries, orange planting and growing, orange juice production to international distribution in integrated bulk systems. Citrus is susceptible to climate change and diseases that affect fruits. Soon, problems like this interfere in the production, market price and, consequently, in all the progress of the activity.

Capitão Poço is considered the land of orange, with citriculture being the main source of income of the producers in the municipality. Among the sectors of citrus production, the production of seedlings, which is heavily cultivated and marketed in the community of Santa Luzia do Induá, rural area of the city, stands out. The community is a reference in this activity, since this sector is considered as a strong element for the generation of jobs, capital formation, value added and also in regional development, which strengthens the production of seedlings in the municipality. According to Alves et al. [2], this development is due to edaphoclimatic conditions such as climate and a favorable soil for citrus production growth in Capitão Poço and surrounding municipalities.

However, this expressive production has been suffering from problems associated with the way of cultivation and commercialization of the

farmers, thus becoming a great bottleneck faced by the nurserymen. Even though this situation is affected due to the obstacles encountered, however, producers continue to develop seedling production activity, since this is the main means of income of community nurseries, being considered a factor of socioeconomic importance, strengthening the economy of the municipality.

The study carried out in the community seeks to draw attention to the organs of interest, public and private institutions that work in the scope of research and extension, so that measures and actions can be developed that can minimize the impacts caused and thus improve the system of cultivation of seedlings and income of rural producers.

In this sense, the objective of this work is to identify the main obstacles faced by nurserymen in the production of citrus seedlings in Santa Luzia do Induá, municipality of Capitão Poço / PA.

2. MATERIALS AND METHODS

Field research was carried out from December 2, 2017 to January 12, 2018, in the community of Santa Luzia do Induá, belonging to the rural area of the municipality of Capitão Poço / PA. In this community, the production of citrus seedlings, developed by small, medium and large producers, is the main agricultural activity that generates income, where small producers stand out in this production.

The municipality of Capitão Poço is located at a latitude of 01°44'47 "S and longitude of 47°03'34" W), belongs to the Guamá Microregion, a northeastern region of Pará and is located

Table 1. Classification of producers of seedlings of Santa Luzia of Induá, Capitão Poço/PA

Classes	No seedlings	No interviewees
Small Producer	5 to10 thousand seedlings	27
Medium Producer	>10 to 50 thousand seedlings	16
Large Producer	Over 50 thousand seedlings	07
Total		50

Source: Authors, 2018

226km from the capital Belém, with an amplitude of 25. With an annual average of 26.2°C, only 1.2°C of variation, and according to the Köppen classification the Ami type climate [3], with an annual rainfall of around 2,500 mm and a short dry season between September and November (monthly precipitation around 60mm), as well as a relative humidity of 75% to 89% in the months with lower and higher rainfall, respectively [4].

Initially, a survey was made of the total number of producers obtained based on the information collected with the nursery owners themselves. With this, it was possible to define representative sampling of the community.

The research was developed based on the application of semistructured questionnaires, in order to identify the main difficulties faced by the producers in the form of seedlings production, where 50 seedlings were interviewed on a random basis, out of a total of approximately 100 nurseries, which guarantees a representative sample unit. The interviewees were divided into classes according to the number of seedlings produced and identified by small, medium and large producers, according to Table 1. The framework of seedlings producers was defined with the intention of organizing them based on similar characteristics, thus facilitating the manipulation of the data.

Photographic records, audio recording, notes in field notebooks and direct and indirect observations, which also supported the research's foundations.

Then the data was tabulated in Microsoft Excel 2010® and 2013® spreadsheet, where they were manipulated to elaborate the graph to represent them. Finally, the information obtained was analyzed.

3. RESULTS AND DISCUSSION

3.1 Identification of the Nursery

According to the information obtained in the questionnaire, regarding the characterization of the nurseries, some producers said they were

members of associations, but all nurserymen reported owning their own nurseries for the production of rootstocks and seedlings. Currently none of the producers have certification and active enrollment in Ministry of Agriculture Livestock and Food Supply (MAPA). It is interesting to note that some nurseries have registration under Law 10.711, but with the new regulations in force these will have to according to Normative Instruction No. 48 (NI 48) so that National Seed and Seed Registry (RENASEM) is released for all.

According to MAPA [5], producers had difficulty accepting the importance of the application of Article 17, which deals with the need for protected environment for the production of the Basic Plant, Matrix, Certified Bubble and Certified Saplings. essential for obtaining propagating material and certified seedlings; and article 28, which deals with the use of substrate that does not contain soil for seedling production and certified seedlings. However, it is important to clarify that Articles 17 and 28 do not apply to any production system. Thus, for the installation of uncertified Seed Orchard, unconfirmed Bubbulheira and seedling, also uncertified, the protected environment is not required. And for the installation of the Seed Orchard, the Basic Plant, the Matrix Plant, the Certified Bubble and the Bubble, it is not mandatory to use a substrate that does not contain soil.

3.2 Citrus Seed Production

According to the topic citrus seed production, the interviewees (small, medium and large producers), when asked about the way of acquiring the seeds for the production of the rootstock, the majority of small (28%) and large (6%) producers claimed to own the seeds of their property. The middle ones (16%) buy these seeds in the trade, as highlighted in Fig. 2.

In a study on the Citrus seedling production system [6], it was also verified that 76% of the nurserymen declared to obtain seed from the plants present in their property and another 32% collected seeds of spontaneous plants from their locality, corroborating the results of the research.



Fig. 1. Protected cultivation system of the community of Santa Luzia do Induá, Captain Poço/PA

Source: Authors, 2018

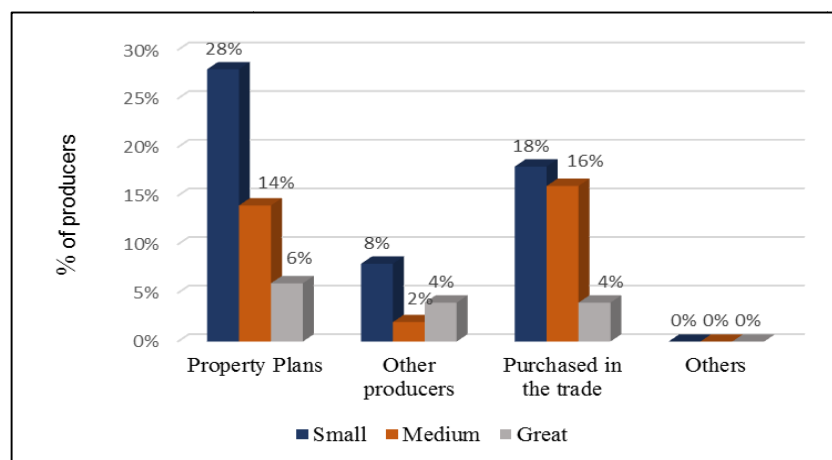


Fig. 2. Methods of acquiring citrus seeds for the production of rootstocks of the producers in the community of Santa Luzia do Induá, Capitão Poço / PA

Source: Authors, 2018

Table 2. Degree of knowledge of IN 48 of the seedlings producers of Santa Luzia do Induá, Captain Poço / PA

Classes	IN 48SES knowledge class			
	None	Little	Reasonable	Very
Small	14%	24%	14%	2%
Medium	8%	20%	4%	0%
Great	2%	4%	8%	0%
Total	24%	48%	26%	2%

Source: Authors, 2018

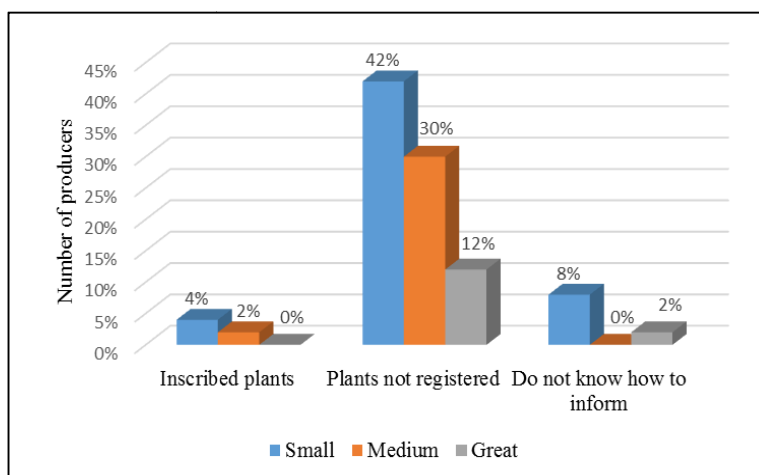


Fig. 3. Status of the registration of citrus plants producing propagating material of the producers of the Santa Luzia do Induá community, Capitão Poço / PA

Source: Authors, 2018

Table 3. Degree of understanding of the IN 48 of the seedlings producers of Santa Luzia do Induá, Captain Poço / PA

CLASSES	Degree of understanding of in 48			
	None	Little	Reasonable	Very
Small	14%	24%	16%	0%
Medium	16%	12%	4%	0%
Great	2%	4%	4%	4%
Total	32	40	24	4

Source: Authors, 2018

According to nurserymen, 90% of the seeds come from plants that are not registered with an inspection body and are used for the production of the rootstock (known as a horse). Only 6% stated that they did not know about the registration of these plants and 4% said they purchased seeds from registered plants. According to article 3 of IN 48, plants producing citrus seeds: Basic Plant, Parent Plant, Clonal Garden, Propagating Material Plant with no Proven Genetic Origin and Field of Plants Suppliers of Propagation Material with No Proven Genetic Origin should be registered with the Authority, that is, producers will have to comply with regulations and purchase seeds of plants registered and / or registered in some supervisory body. These bodies will have greater control of the field of seed production, which guarantees greater sanity and quality of propagation material for seedling production and commercialization.

Prior to IN 48 the entire production system of propagating material was based on materials with no proven genetic origin [5]. After the validity

of IN 48, it is only allowed to the seed orchards to be registered without proven genetic origin, the bubbles are no longer included in this device, that is, they need a proven genetic origin. Thus, seedlings producers in the community will have to be in communion with the current law, adhering to and following the proposed cultivation. However, this framework creates dissatisfaction with producers, thus causing difficulties in the way of production.

In order to verify the degree of knowledge of IN48-related citrus seedlings producers, it was demonstrated (Table 2) that most of the small (24%) and medium (20%) producers have little knowledge of the regulations. However, most of the large (8%) nurseries in the locality have a reasonable knowledge, meaning that they could do a more precise analysis of the possible ways of adapting the regulations.

As for the degree of understanding, it was possible to verify that small producers (24%) have little understanding of IN 48. Most of the interviewed producers (16%) do not have any

understanding, whereas only 2% of respondents said they had no understanding of the regulations (Table 3).

According to MAPA (2017) [5], the greatest difficulty in understanding the IN 48 was regarding the segregation of the contents present in the different stages of production: Seed Production; Production of Bubbles and Production of seedlings, contents found in different chapters of said IN. For the correct understanding of these different stages of production, the content of a chapter can not be associated in its entirety with the next chapter and so on (eg chapter II, which deals with the production of bubbles in its single paragraph of article 16 is prohibited the renewal of the registration of Borbulheira originating from Plant Suppliers of Propagation Material without Proven Genetic Origin and Field of Plants Suppliers of Propagation Material without Proven Genetic Origin, but this veto does not occur in chapter I that deals with the production of seeds).

In this context, it can be seen that for a large part of the producers there is little knowledge and understanding of the current regulations, there is an erroneous interpretation that stems from the complexity of the IN 48, so there is an increase and permanence of the clandestine producers, in fear of a decrease in the supply of seedlings of citrus in the region, which makes it even more difficult for these producers to comply with current regulations. However, the intensification of meetings and technical clarifications about IN for seedling producers is an alternative to rescue their interest in meeting the changes of this legislation. For this, it is important the participation of the organs of interest, to present possible solutions that favor productive gains in both the production and the commercialization of the seedlings, besides reaffirming the existing commitment to the producers of the community.

Thus, the main problem faced by producers is the adequacy to IN No. 48, since the normative requires a deep understanding and analysis so that there is an improvement in the form of production, since they are not accustomed to develop activity according to some established criteria in this legislation, that is, they have their own form of production and commercialization, being a challenge for the rural producer to fit in this new model of production. In connection to this, the adaptation to this legislation requires a high investment that the small nurserymen still do not have, which makes it increasingly difficult

to frame this IN, thus causing, great impacts on the production dynamics of the same.

3.3 Production of Citrus Bubbles

In relation to the production of citrus bubbles in the community of Santa Luzia, during the interview, the nurserymen reported that 70% purchase the propagating material from other sites, while 22% buy the bubbles they own and only 8% buy the two locations. On the other hand, Girardi et al. [6], found data inverse to the research, where 58% of the sampled nurseries collected bubbles used in the grafting on the plants owned on the property and 39% the bubbles were collected in the surrounding fields and in neighboring properties.

According to Fig. 3, these plants producing the propagating material do not have the majority of the registration in inspection bodies, and the fact that the producers remove the grafting materials from these plants could lead to the spread of phytosanitary diseases. And these fields of bubble production generally do not have technical control to prevent the development of diseases and maintain the quality of the material.

According to Koller [7], branches or forks with bubbles should be removed from parent plants free of viruses and other diseases transmitted by the blisters. Therefore, the matrices must originate from basic plants produced and maintained by experimental stations or other institutions accredited by official monitoring or certifying bodies of seedlings. Several authors are unanimous in stating that the use of propagating material must come from matrices of genetic origin and proven sanity [8,9,10,11, 12,13].

According to Art. 13 of IN 48: Plants supplying citrus buds, whether they are Basic Plant, Matrix, Bubble, Certified seedlings, Propagating Material Plant without Proven Genetic Origin and Field of Plants Material Suppliers of Propagation without Proven Genetic Origin, must be registered by the producer of seedlings before the supervisory body, where this registration will be valid for 5 years, being obligatory the acquisition of new source material for registration of a new bubble after this validity.

This requirement of genetic origin for the bubble is one of the main difficulties faced by the producers of bubbles, since they need to look for basic or certified materials for the production of

bubbles so as not to depend on intermediates [5]. Therefore, without producing its own pomegranate, the seedling producer will need to buy it from third parties, which can increase its cost of production and even increase the phytosanitary risk of its propagation material by the propagation of pests.

In addition, the producers stated that the main obstacles they face in the production and marketing of seedlings are: lack of technical assistance and public policies; phytosanitary attack and compliance with IN 48. These factors together cause major limitations in the production system.

The lack of Technical Assistance and Rural Extension (TARE) is still a reality experienced mainly by small producers who need information for the improvement of techniques in the production activity, that is, this ends up reflecting in factors that are essential for the development of the seedlings, such as cultural dealings and improper handling, which tend to favor the appearance of pests and diseases, which in turn will be a problem, interfering directly in the storage, water and nutrient uptake, in the photosynthesis and translocation of photoassimilates, compromising the production from the initial stage and throughout the development of seedlings.

The technical assistance and rural extension services have a relevant role for the local and regional development of the country. However, much of the family farmers do not have access to such services and guidance [14]. In this context, technical assistance and rural extension services are important allies in consolidating sustainable development. It is important that this development model brings social benefits to the local population, respecting their diversity and production potential, both in terms of local culture and natural resources [15].

The lack of access to public policies is also another factor that interferes with the technical-productive system of seedlings, since it provides the necessary investments for the development of actions that favor the system as a whole.

Faced with this, the producers mentioned alternatives such as: partnerships and provision of services by public and private institutions and / or agencies; acquisition of public policies; among other options, that could be used as a way to minimize the impacts caused by the factors mentioned above.

In this context, partnerships and services such as ATER could provide more information regarding current regulations due to their complexity, as well as in research, creating new cultivation techniques to increase production, such as: made with materials available and easily accessible in the region; use of biological and natural control in order to minimize the use of pesticides or the development of new varieties resistant to phytosanitary attack, reducing the excessive costs related to production, as well as other aspects such as access and adherence to public policies for financing the production system.

4. CONCLUSION

In view of the above, it was verified that the combination of all factors results in the main problems experienced by the producers, however among these, it is worth noting the adequacy to IN 48 that entails in great changes in the production form of nursery seedlings.

Despite the many difficulties faced by the community producers, it was also observed that they do not discourage, and continue to produce according to the knowledge acquired over the years since this activity is the main means of income. It is worth mentioning that the producers are open to partnerships that add to their knowledge and that favors the development of the productive and commercial system of the seedlings.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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