

ETHNOBOTANY OF THE PEANUT IN RECÔNCAVO DA BAHIA, BRAZIL

ETNOBOTÂNICA DO AMENDOIM NO RECÔNCAVO DA BAHIA, BRASIL

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ABSTRACT: The aim of this study was to perform an ethnobotanical survey in some regions of Recôncavo da Bahia, Brazil, to investigate the profile of farmers and the local knowledge about *Arachis hypogaea* L. (peanut). We sampled 60 local peanut farmers from rural areas in the municipalities Conceição do Almeida, Cruz das Almas, Maragogipe, São Felipe, São Félix, Sapeaçu and Lage. One producer per residence was interviewed and a semi-structured interview model was used. During the interviews, seeds stored by the producers were collected for future analysis. The frequency of the answers was calculated using SAS (Statistical analysis system) software. Using an ethnobotanical approach, we were able to show that peanut cultivation is part of the Recôncavo da Bahia culture and that farmers in the area have their own knowledge about the use and management of this crop. This knowledge arose from information passed down over the years from previous generations. Similar farming techniques were used in all of the studied municipalities.

KEYWORDS: Crops. Family farming. Interview. Local knowledge. *Arachis hypogaea* L.

INTRODUCTION

Ethnobotany is defined as the study of interrelationships between humans and plants (FORD, 1978). It is a method used to discover the different usage patterns of a plant species and assists in understanding the dynamics of knowledge of human groups, which are fundamental aspects when trying to conserve plant resources and local knowledge about them (MIRANDA; HANAZAKI, 2008).

Ethnobotanical studies evaluate how residents gather and use information from their places of origin compared to information obtained where they currently live. This approach also considers how residents incorporate new knowledge from different parts of Brazil, including new plants to cover their needs that will have to adapt to new environments (CUNHA; BORTOLOTO, 2011). Therefore, Carniello et al. (2010) asserts that ethnobotany includes the study of the relationships established by human communities with plants.

Knowledge about the wide range of uses of plant species (either crops or plants with other purposes that are remarkable to human history) is important when obtaining information about the past that can contribute to the progress of a community or region. One way to acquire this information is by using an ethnobotanical study that analyzes the

common knowledge about the use of plants, something that is often restricted to particular communities or regions (MARTINS et al., 2005). Furthermore, this tool can analyze gender relationships in agriculture (VIU et al., 2010).

In Brazil, ethnobotanical studies are conducted in a scenario of cultural and biological diversity that constitutes a valuable potential heritage, including plants of economic interest, which could stimulate the creation of new jobs and income, potentially in an environmentally sustainable way (OLIVEIRA et al., 2009).

Botanists became interested in the peanut (*Arachis hypogaea* L., *mandu'wi* in Tupi, which means "buried"), a dicotyledon in the Fabaceae, in the 18th century when they began studying its morphological variation. These studies identified and classified wild species of *Arachis* native to Brazil, Paraguay, Argentina and Bolivia, including the discovery of new species (FERNANDEZ ; KRAPOVICKAS, 1994).

Arachis L. comprises 81 species distributed in nine taxonomic sections (KRAPOVICKAS; GREGORY, 1994), and includes several economically important species (grown for their fruits, for forage or as an ornamental). In addition, desirable characteristics can be transferred from wild to domesticated species (VALLS, 2005).

Recôncavo is one of 27 territories in the state of Bahia, comprises 20 municipalities (SEI 2013), covers an area of 5,221,201 km², and has a population of 576,672 inhabitants. Within the region, there are mostly small fields of crops managed by family farmers. The peanut, *Arachis hypogaea* L., is the most commonly cultivated plant in the region and generates income for the producers mainly in June when there is a major celebration called Festa Junina (June's Festival). During the festival, many traditional peanut dishes are made, in addition to the high consumption of peanuts alone, which are cooked. In Brazil, 60% of peanut production is intended for the fresh market segment and 30% for the confectionery segment (PEREIRA et al., 2008). The remaining percentage is related to other minor uses, including oil chemical production (FREITAS et al., 2005).

In northeastern Brazil, the technology used by farmers to grow peanuts is simple, which results in low levels of production even when farming large areas (ALMEIDA et al., 2014). These methods usually consist of manual techniques inherited from ancestors. For this reason, ethnobotany is an essential tool to better understand how information about peanuts was passed down throughout the years, which could increase the knowledge of the species.

Considering the significance of peanuts to Recôncavo da Bahia farmers, as well as the importance of acquiring information that will improve the knowledge of crop use and management, the aim of this study was to conduct an ethnobotanical survey in some towns of the region, focusing on the profile of the farmers and the characterization of the local knowledge about the species.

MATERIAL AND METHODS

The survey was conducted in the municipalities of Conceição do Almeida, Cruz das Almas, Maragogipe, São Felipe, São Felix and Sapeaçu, located in Recôncavo da Bahia, Brazil, and the city of Laje located on the border of this territory.

Recôncavo da Bahia is a geographical region located around Todos os Santos Bay, including the coastline and the region surrounding the inner bay (Figure 1), and comprises thirty-four cities, including the capital Salvador. The term Recôncavo is normally used in reference to the cities near Todos os Santos Bay, which are mostly rural.

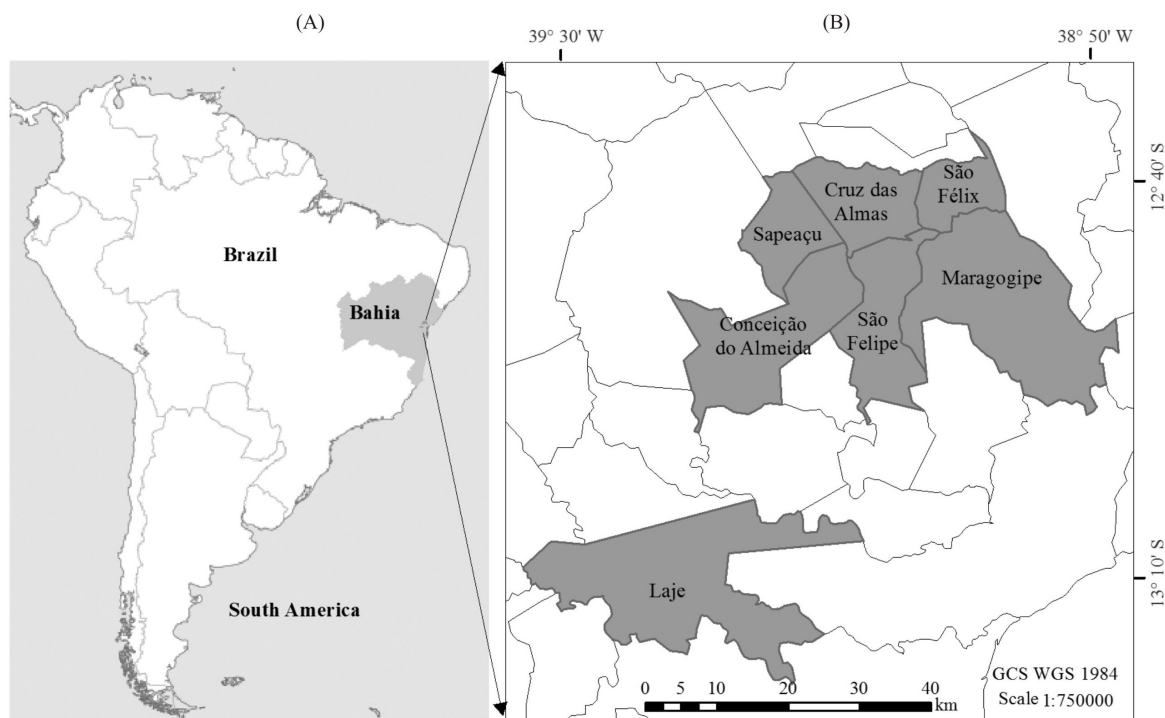


Figure 1. Map of the study area. A: South America, Brazil and Bahia. B: Recôncavo da Bahia counties (gray areas) where the genotypes were collected.

The study area is considered the cradle of Brazilian agriculture because it was the first region where sugarcane was farmed for export. Cotton, coffee, tobacco and citrus are also farmed in the region, in addition to plantations of subsistence crops, such as corn, beans, cassava, yams, peanuts and significant areas of pasture (GONÇALVES et al., 2004). Furthermore, this area is considered an oil-rich region.

Visits to communities of peanut producers living in the rural areas were conducted from January to February 2012. One person per household was interviewed, for a total of 60 individuals. We used a semi-structured interview model with 45 objective and subjective questions.

To select the interviewees, the study area was visited and a resident known by the community and producers was chosen to follow the survey and play the role of mediator between the researcher and the interviewee.

The family profile of each farmer was generated based on gender, age, education level, and the ethnobotanical survey, which included information about usage, popular names, occurrence, planting methods, season, storage methods, marketing, farming practices, interplanting and size of the area of the peanut crop. During the interviews, seeds stored by farmers from previous harvests were collected. All participants signed a disclosure authorization based on provisional measure No. 2186-16 of August 23, 2001, giving them the right to access the results.

The data was tabulated according to the categories related to each question, while the percentage frequency was calculated according to the farmers' answers. Statistical analyses were performed using the program SAS - Statistical Analysis System.

RESULTS AND DISCUSSION

The results revealed that 43 (72%) of the interviewed farmers were born in the town where they live today (Table 1), 16 (26%) are from other locations of Recôncavo da Bahia, and one (2%) is from another region of Bahia. Therefore, the information collected in this study is limited to the study region, and the result of knowledge acquired by local farmers throughout their lives.

Information related to the profiles of the surveyed interviewees revealed that the majority are males, between the ages of 36 and 60, married with children, and have a low degree of illiteracy, which shows a certain consistency between respondents, regardless of the municipality and community where the study was performed (Table 1).

The predominance of males interviewed in this study may be related to the fact that most of the interviewees are married and that field work requires a lot of physical effort. Furthermore, women are more responsible for housework and childcare. According to Viu et al. (2010), women have been responsible for housework and child care in many societies throughout history, renouncing field work.

Table 1. Questionnaire, category and frequency of responses of the ethnobotanical survey about the peanut crops produced by farmers from Recôncavo da Bahia.

Questions	Category	Frequency (%)
What is your gender?	Male	86.67
	Female	13.33
Do you have children?	Yes	91.67
	No	8.33
What is your marriage status?	Married	83.33
	Single	11.67
	Widow/widower	5
	Illiterate	13.33
What is the highest degree you have completed?	Elementary education not completed	46.67
	Elementary education completed	15
	1 st year secondary- incomplete	13.33
	1 st year secondary- complete	3.33
	2 nd year secondary- incomplete	1.67
	2 nd year secondary -complete	5
	Higher education- incomplete	1.67
What is your occupation?	Farmer	98.33
	Other	1.67
Where did you grow up?	Rural	96.67

	Urban	3.33
Place of origin	Same place where they work	72
	Another town in Recôncavo da Bahia	26
	Another region of Bahia	2
How long have you lived in your current town?	More than 10 years	95
	Less than 10 years	5
What is the number of people living in your residence?	More than 5 people	20
	Less than 5 people	70
	5 people	10
Do they work on the farm?	Yes	68.33
	No	31.67
Is anyone retired?	Yes	38.33
	No	61.67
Is anyone subsidized by the government?	Yes	58.33
	No	46.67
Have you worked in a different place before?	Yes	20
	No	80
What is the origin of the seeds collected?	Crops	100
	Spontaneous growth	0
What is the popular name of the variety?	'Vagemlisa'	91.67
	Other	8.33
Do you own or rent the land?	Own land	90
	Rent	10
What is the size of cultivated area?	Over 4356 m ²	18.33
	Below 4356 m ²	51.67
	4356 m ²	30
How many crops per year?	Once per year	58.33
	More than once per year	41.67
Do you use a weed control?	Once per crop cycle	65
	Twice per crop cycle	35
Do you use intercropping?	Yes	51.67
	No	48.33
What part of the plant is used for commercialization?	Legumes	100
	Other	0
Do you select plants?	Yes	6.67
	No	93.33
Do you select seeds?	Yes	71.67
	No	28.33
Do you keep seeds for planting?	Yes	100
	No	0
Do all seeds germinate?	Yes	100
	No	0
Do all seeds germinate at the same time?	Yes	100
	No	0
Do they grow similarly?	Yes	98.33
	No	1.67
Do you exchange seeds with other people?	Yes	3.33
	No	96.67
Do you use fertilizers or manure?	Manure	43.3
	Fertilizer	16.7
	No	40
What is the average productivity?	Over 25,000 L	31.67
	Below 25,000 L	63.33
	25,000 L	5

Is there a demand for peanuts?	Yes	100
	No	0
What is the use of farmed peanuts?	Commercialization	100
	Other	0
How are they commercialized?	Sold to dealers	85
	Sold in town markets	15
How long have you farmed peanuts?	More than 10 years	83.33
	Less than 10 years	3.33
	10 years	13.33
Is it a lucrative job?	Yes	93.33
	No	6.67
Do you receive technical assistance?	Yes	3.33
	No	96.67
Do you grow other crops?	Yes	96.67
	No	3.33
Do you plan to continue farming peanuts?	Yes	98.33
	No	1.67
Do pests or diseases affect your peanut crops?	Yes	83.33
	No	16.67

Contrary to what we found in this study, normally, a greater number of women participate in ethnobotanical studies. Most of these studies have investigated the use of plant species in crafts (SANTOS; COELHO-FERREIRA, 2012), urban backyards (CARNIELLO et al., 2010) and the use of medicinal species (PILLA et al., 2006; SILVA; PROENÇA, 2008; VIU et al., 2010; CUNHA; BORTOLOTO, 2011; MEYER et al., 2012).

Interestingly, our study differs from most other ethnobotanical works. This study found that peanuts are mainly grown for commercialization for both fresh consumption and for food industries, especially the confectionery industry (PEREIRA et al., 2008). The results also show that the sixty farmers interviewed obtain peanuts from crops and not from spontaneous vegetation, as is the case for most herbal medicines.

Even though a low education level is still a reality in rural areas of Brazil, especially among small farmers, a low illiteracy rate was found in this study (Tab. 1). It is interesting to highlight that 86.67% of the interviewed people started elementary school, which explains the low rate, even for people who consider farming as their main occupation.

In a similar study about medicinal species, Meyer et al. (2012) also found a low rate of illiteracy. However, Carniello et al. (2010), in the region of Mirassol D'Oeste (Mato Grosso), and Pinto et al. (2006), in rural communities at Itacaré (Bahia), found illiteracy rates of 31% and 42%, respectively.

In relation to agriculture, about 80% of interviewed people have never performed another

kind of activity. Almost all of the interviewed farmers (96.67%) live in rural areas, and 80% live with up to five people in their residence. According to the survey, 31.67% of the people who live in the same residence as the farmers work in areas not related to agriculture. Usually, younger residents are the ones that seek jobs in nearby cities. In a rural community of Santa Barbara (Santa Catarina), Meyer et al. (2012) observed that the young population sought other sources of income, mostly in the textile industry. This and other factors, such as the presence of retirees in the family and/or assistance from the government, end up being additional income for farmers in the region.

Only 10% of the surveyed respondents do not own property, which has led them to lease land. The method of payment varies depending on the agreement with the landlord. Some farmers share their profit with the owner of the land, others divide it into three parts with a partner, who gets one third of the profit (depending on who is bearing the costs), and in some cases the owner leases the land for years or months for a preestablished amount. The reality of farmers in Rencôncavo da Bahia is different from that found by Baldalf et al. (2007), who recorded a more balanced distribution of the harvest of leather leaf fern in the municipality of Maquiné (Rio Grande do Sul), with 36.7% of respondents harvesting exclusively from their own land, 36.7% from leased land, and 26.6% from both.

At least 96.67% of the surveyed respondents cultivate other crops, such as cassava, yams, and citrus. Planting peanuts in the studied area is considered a good alternative as supplementary

income, especially during June's Festival, when most of the annual crop is harvested in the region.

Over 80% of respondents have farmed peanuts for over ten years and all of them store seeds to use for subsequent planting. These have excellent rates of germination and emergence, which is the result of selecting the best seeds after harvesting, a method adopted by 71.67% of the interviewees.

The farmers harvest most of the production area to sell as fresh legumes, leaving a small production area to be harvested when the peanuts start to ripen, so they can be naturally dried in the sun. Selecting the legumes is done visually. The most uniform fruits, without smooth irregularities and preferably with three to four seeds, are selected. Afterwards, the seeds are stored and subsequently planted.

A small number of interviewees (6.67 %) stated that selection is performed in the field by separating blocks or bands of high performing plants that are collected, dried and stored (the same way described above) when they reach full maturity. However, this type of selection happens in an arbitrary way because a peanut plant that looks healthy is not always productive, considering that the legumes of the species grow below the soil surface, which makes selection harder.

The farmers interviewed reported excellent rates of germination and emergence, with satisfactory development that results in productive crops within the limits of the region. This could be attributed to the farming practices adopted by the producers during cultivation and post-harvest. Thus, we can infer that acquired knowledge is important to the cultivation of peanuts in Recôncavo da Bahia.

According to Lyra et al. (2011), the tradition of storing seeds by Brazilian rural families on their properties, which leads to an increase in seeds over the years, has become a good alternative for preserving agricultural diversity through farm conservation.

In northeastern Brazil, farmers prefer to grow peanuts that belong to the Valência Group (*Arachis hypogaea* var. *fastigiata*), the same group that the cultivar 'Vagem Lisa' is placed in, which is widely used in Recôncavo da Bahia. The species that belong to this group show favorable characteristics for the region, such as an erect habit, short cycle, reddish seeds, good adaptability to dry climate conditions, easy management, easy to manually harvest, in addition to being the most cited for raw consumption (SANTOS et al. 1997; ALVAREZ et al., 2005; PEIXOTO et al., 2008). A total of 91.67% of the producers that participated in

this research grow 'Vagem Lisa' because of these characteristics. They argued that this cultivar produces more uniform seeds that leads to higher yields, higher quality and, consequently, higher profits.

Due to the fact that the technological level used in this region is low, most of the farmers prefer to cultivate 'Vagem Lisa' because the erect habit makes it easier to manually harvest the plants. Moreover, this cultivar dominates the region because it can be harvested before completely maturing, a peculiar feature of the Valencia Group. Thus, the legumes can be sold for fresh consumption.

A few farmers (3.33%) exchange seeds with other producers. One of them explained that the reason for exchanging seeds was that the yield improved significantly when he used seeds of 'Maranhão.' Another interviewee, emphasized that 'Vagem Lisa' presents larger and more uniform legumes, which results in higher yields.

'Maranhão' belongs to the Valencia Group, which according to the farmers is used in the region because it resembles 'Vagem Lisa.' However, it has smaller seeds and the legume is longer. Thus, some producers that want to sell peanuts for fresh consumption are using this cultivar. There is also the so-called 'Miúdo' peanut, named by farmers in the region and usually cultivated by those that can not afford to buy 'Vagem Lisa' seeds.

All the interviewed farmers weed manually at least once during the crop cycle. Most of the farmers apply fertilizer (non-organic or organic) and prepare the soil before sowing, primarily by clearing or plowing and then harrowing the land. Some, after cleaning, directly sow the seeds in pits of approximately 20 x 20 cm.

Fertilizer is usually added before planting using manure from livestock and poultry (43.3%) or other fertilizers (16.7%). This is performed without any criteria of application, leading to some kind of uniformity in the distribution of the materials.

The peanut yield in Recôncavo da Bahia greatly varies depending on the farming practices and techniques used, in addition to soil and climatic factors that directly affect crops. Taking into consideration that the fruiting of the species is hypogeal (i.e., the legumes grow underground), protecting the soil is even more important to obtain a higher yield and better quality legumes (FREIRE et al. 2007).

Peanuts in Recôncavo da Bahia are commercialized using a vessel that holds 25–30 liters of legumes. Most farmers (85%) sell the

peanuts to dealers (people who buy and sell) on their properties.

According to the study, 68.33% of the surveyed respondents harvest a volume of legumes equal to or below 2500–3000 L per harvest (Fig. 2A), with 81.67% using an area equal to or smaller than a 4356 m² (Figure 2B). The total area of land

for the farmers that participated in the study was 24.64 hectares, where approximately 141,300 L of legumes were collected in the last harvest. Considering these data, the farmers produce 5734–6880 liters per hectare, from a population of 250,000 plants per hectare in spaced pits, as previously mentioned.

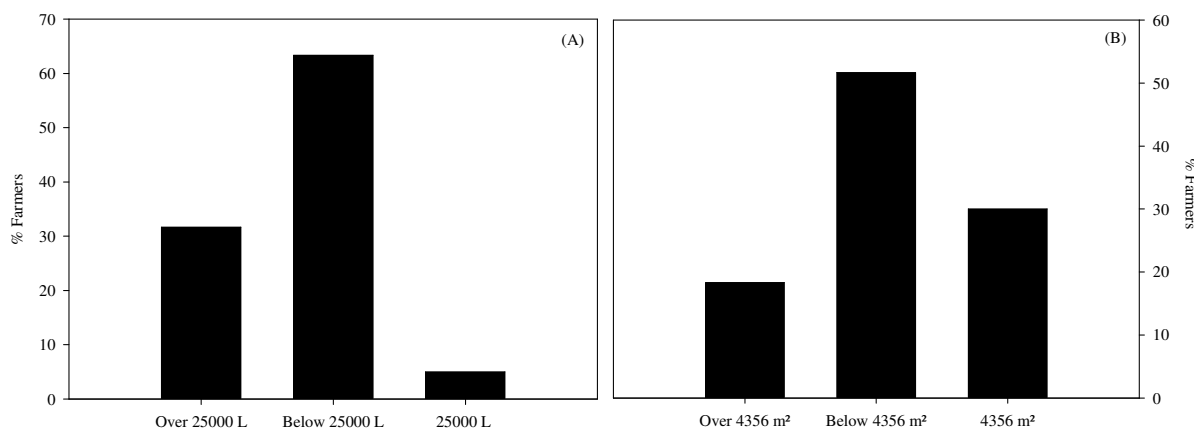


Figure 2. Average productivity (A) and size of cultivated area (B) used by farmers in an ethnobotanical survey of the peanut crop in Recôncavo da Bahia.

Gonçalves et al. (2004) studied different spatial arrangements where productivity reached 7,900 liters per hectare of fresh legumes using 232,500 plants per hectare, in the same conditions as those in Recôncavo da Bahia, which is superior to the productivity achieved by farmers in the present study. The unevenness of farm practices used can cause differences in productivity. According to Peixoto et al. (2008), farmers from Recôncavo da Bahia use production systems that are far from modern exploitation methods, working predominantly in small areas, using irregularly spaced pits made with hoes, and planting during the rainiest months. Due to these and other factors, Bahia has very low productivity compared to other states that grow this crop.

Intercropping might also generate low peanut productivity for farmers in Recôncavo da Bahia; however, only 51.67% practice this. In most cases, intercropping is done with citrus, until the citrus plants become large and start to take advantage of the peanut plants. This practice is also used with corn and yams, resulting in a considerable reduction of area exploited by peanut plants. On the other hand, the practice characterizes the farming system in Recôncavo da Bahia.

Pests and diseases also influence the low productivity of the plants, since 83.33% of the farmers confirmed frequent attacks by various

caterpillars, ants and *Lulus sabulosus cilindroiulus*, in addition to some late season diseases (gray leaf spot and *Fusarium*). Thus, it is necessary to invest in technical assistance in these areas, in order to raise awareness among the farmers about the importance of good management practices for their crops. In addition to the cultural importance in the region, the peanut, a species that is somehow part of the history of family farmers, is a source of supplementary income. However, in addition to the knowledge accumulated by the farmers, there is a need of employing new technologies in crop management, in order to reach higher yields.

CONCLUSIONS

The peanut is part of the culture of Recôncavo da Bahia farmers. This species is one of the most important in the region, especially in June when consumption increases significantly due to demand during festivals. In addition, farmers hold personal knowledge about crop management, as a result of information passed down over generations.

Cultivation techniques are similar in all municipalities where the research was conducted. Sowing in irregularly spaced pits is considered an old technique that is still used today. The methods of weeding and harvesting used during and at the end of the crop cycle, respectively, are also

performed manually, which are tedious tasks that often do not translate into compensatory profits.

In the region of Recôncavo da Bahia, the most common peanut type grown is 'Vagem Lisa' (of the Valencia Group) because its characteristics meet the preference of people who prefer to consume the peanuts raw.

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RESUMO: Objetivou-se realizar um levantamento etnobotânico em alguns municípios do Recôncavo da Bahia visando uma investigação sobre o perfil dos agricultores, além da caracterização do conhecimento local sobre a espécie. Foram feitas visitas a 60 produtores residentes em comunidades da zona rural dos municípios de Conceição do Almeida, Cruz das Almas, Maragogipe, São Felipe, São Félix, Sapeaçu e Lage, que têm contato direto com a cultura do amendoim, sendo entrevistada uma pessoa por domicílio, e que cultivava o amendoim. Utilizou-se um modelo de entrevista semi-estruturada. No momento das entrevistas, foram realizadas as coletas de sementes armazenadas pelos produtores para serem testadas em trabalhos futuros. Foi calculada a frequência percentual de acordo com as respostas dos agricultores com auxílio do programa estatístico SAS - Statistical Analysis System. Por meio do levantamento etnobotânico, fica claro que o amendoim faz parte da cultura do Recôncavo da Bahia e que os agricultores detêm conhecimentos próprios sobre as formas de uso e manejo da cultura, oriundos de informações repassadas ao longo dos anos, vindas de gerações anteriores, levando-os a utilizarem técnicas de cultivo parecidas em todos os municípios que contribuíram com a pesquisa.

PALAVRAS-CHAVE: Cultivos. Agricultura familiar. Entrevista. Conhecimento local. *Arachis hypogaea* L.

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