Tobacco cultivation in the Reconcavo Baiano: sociodemographic profile and workers' health conditions

Cultivo do tabaco no Recôncavo Baiano: perfil sociodemográfico e condições de saúde dos trabalhadores

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Abstract

Despite the economic importance of tobacco farming in Brazil, pesticides and wet tobacco leaf handling affect workers´ health. Thus, the aim of this study was to assess the socio-demographic profile, health and behavioral aspects of tobacco growers in a Reconcavo da Bahia county. It was a descriptive and experimental research within a quantitative approach. Its target population were members of the Quixabeiras´ Tobacco Growers Association located in the county of Cabaceiras do Paraguaçú, Bahia. Data were collected by means of questionnaires from April to September of 2014. Most tobacco growers were women, 46 years old in average, with incomplete basic education, who had been working as tobacco growers for over 20 years. With regard to pesticides, 54.54% used pyrethroids (Decis 25) in combination with herbicides (Sempra). Of the interviewed workers, 18.18% reported absence of health symptoms, while 57.57% complained of body aches, 33.36% suffered from headaches and 27.27% from tiredness. Personal protection equipment (PPE) was not used by 60.60% of the farmers due to its high cost, and correct pesticide packaging disposal was performed by 12.12% of them. The results of this study indicate that tobacco farmers are exposed to health risks and that the use of PPE and the correct packaging disposal is of the utmost importance to prevent nicotine and pesticide intoxication.

Keywords: Poisoning. Nicotine. Occupational Health.

Resumo

Embora a fumicultura desempenhe grande relevância na economia do país, a qualidade da saúde dos trabalhadores vem sendo questionada frente à utilização de agrotóxicos e a manipulação da folha úmida do tabaco. Dessa maneira, o presente estudo teve como objetivo conhecer o perfil sócio-demográfico de saúde e aspectos comportamentais no ambiente laboral dos fumicultores no município do Recôncavo Baiano. O estudo teve um enfoque exploratório, descritivo do tipo experimental com abordagem de cunho quantitativo, tendo como população alvo os produtores rurais afiliados na Associação de Fumicultores de Quixabeira, localizada no Município de Cabaceiras do Paraguaçu, Bahia. A aplicação do formulário para a coleta de dados da população foi realizada no período de abril a setembro de 2014. No estudo verificou-se a predominância do sexo feminino, média de idade de 46 anos, ensino fundamental incompleto e que trabalham na cultura há mais de 20 anos. Com relação à utilização de agrotóxicos 54,54% utilizam piretróide (Decis25) associado a herbicida (Sempra). Apenas 18,18% dos entrevistados afirmaram não sentir sintomas, e os demais fumicultores relataram sentir dores no corpo (57,57%), dor de cabeça (33,36%) e cansaço (27,27%). Quanto à utilização de equipamentos de proteção individual 60,60% não faz uso em função do seu alto custo; e a destinação correta das embalagens de agrotóxicos é realizada por apenas 12,12% dos fumicultores. Constata-se no presente estudo que as condições de trabalho e as práticas realizadas diariamente pelos fumicultores os expõem a riscos ocupacionais. Portanto, é imprescindível que esses agricultores compreendam que a adesão aos equipamentos de proteção individual e destinação correta das embalagens podem prevenir problemas de saúde decorrentes da intoxicação ocupacional proveniente da nicotina e dos agrotóxicos.

Palavras-chave: Envenenamento. Nicotina. Saúde do Trabalhador.

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INTRODUCTION

According to the Brazilian Tobacco Farmers Association[1] the biggest tobacco producers in Brazil are the states of Rio Grande do Sul, Paraná, Santa Catarina and Bahia. In the latter production is concentrated in the area known as Recôncavo Baiano, specifically in the counties of Governador Mangabeira and Cabaceiras do Paraguaçu. Tobacco culture is of great economic and social importance in those municipalities, for it secures a livelihood for farmers as well as for workers in the small tobacco industries[2].

Despite the importance of tobacco for the Brazilian economy, Boeira and Guivant[3] report that tobacco farming poses a health risk for workers due to the use of pesticides and direct contact with the nicotine released by wet plants. However, the chemical and toxicological characteristics of the plant, as well as exposure and working conditions can cause intoxication in all the stages of tobacco production, from seeding to plantation[4].

Health complications resulting from intoxication are generally due to mishandling or excessive use of pesticides[5]. The use of these substances have a great impact on human health and can cause serious problems. Thus, tobacco growing is considered a hazardous activity for farmers and their families[6].

Organophosphates, carbamates and pyrethroids are pesticides that belong to toxicity class I and II, i.e. extremely toxic, and are widely used in tobacco culture[7]. Pyrethroids are the most commonly used, they present a broad activity spectrum, rapid action, are efficient in low dosage, have a low residual power in the environment and low toxicity for mammals, when compared to other insecticides. Despite these advantages, their use requires great care, for they can cause neurotoxic and cardio toxic effects on vertebrates[8].

On the other hand, tobacco leaf handling can also be toxic for farmers, because the leaves release nicotine that can be absorbed through the skin causing Green Tobacco Sickness (GTS). GTS is an occupational pathology and its symptoms include nausea, vomiting, weakness, headaches, diarrhea, dizziness, abdominal cramps and breathing difficulty[9].

The use of personal protection equipment (PPE) is mandatory to protect farmers´ health along the process of tobacco producing, from seeding to drying and final storage.

According to the Labor Department Regulatory Standard no. 06, PPEs are "devices or products used by workers to protect themselves from risks that threaten their safety or health"[10]. The minimal set of PPEs that should be used when handling pesticides classified as extremely or highly hazardous (Type I and II) are: masks, glasses, waterproof gloves, water resistant wide brim hats, waterproof boots, long-sleeve overalls and waterproof aprons.

The use of pesticides classified as moderately or slightly hazardous (Type III and IV) require the above mentioned PPEs, except gloves and waterproof aprons.

Considering the relevance of studying the health of family agriculture workers, the aim of this research was to assess the socio-demographic profile, health and behavioral aspects of tobacco growers in their working locations in order to identify the main health and safety risks.

METHODOLOGY

This was a descriptive and experimental research within a quantitative approach of the working process in a rural community located in the municipality of Cabaceiras do Paraguaçu - BA. This municipality, which occupies 226 km² and has 15,547 inhabitants, is located in the economical region known as Recôncavo Sul, in the Santo Antônio de Jesus micro region. Its economy is based on cassava, beef cattle, orange production and tobacco farming, which covers an area of 819 hectares and is the second largest tobacco producer in the state of Bahia.

The study was performed with workers affiliated to the Quixabeiras´ Tobacco Growers Association and the inclusion criteria were being ≥18 years old, a tobacco farmer, a member of the Association, and agreeing to participate in the study by signing the Informed Consent Form (ICF).

To collect information about

sociodemographic characteristics (genre, age, schooling, work relations and occupation), agrarian structure of the tobacco farms (area in hectares, pesticides used and crops), and working practices related to pesticide use (exposure time, type of contact) a questionnaire was applied from April to September of 2014.

The research was approved by the Ethics Committee of the Universidade Federal do Recôncavo da Bahia (CEP-UFRB nº 567.051/2014) in accordance with the guidelines and standards regulating research involving human beings (resolution 466/12 of the National Health Council).

RESULTS AND DISCUSSION

Population profile

After applying the inclusion criteria, 33 tobacco farmers were selected. Their average age was 48.87 years, varying from 18 to 60. Men average age was 55, while women were in average 46.36 years old. Most of the tobacco farmers in this study were women (60.61%) (Table 1).

Female predominance could be related to the manual production of tobacco during which women are responsible not only for the seeding, the weeding and the harvesting, but also for weaving the leaves into bundles, for curing the leaves and for their final classification and sorting. As reported by male growers, men are responsible for the crops grown in combination with tobacco which have higher productivity per hectare and require more physical strength.

Similar findings were reported by Marin et al.[11], who observed a strong genre labor division in tobacco farms.

Women and youngsters (under 15 years) performed lighter tasks like harvest, bundling, curing and sorting. Men over 16 engaged in activities that required more physical strength which include tobacco leaves harvesting and carrying, weeding the kitchen garden and reaping beans and cassava.

A similar average age (41.49 years varying from 18 to 88) was also reported by Inácio[12], who studied the tobacco growers in Araparica, Alagoas. Men average age was 44.08 and women 38.59. Heemann[13] studied 104 tobacco growers in Rio Grande do Sul and found an average age of 43.22 years. In his study most of the farmers (59.62%) were men. According to Vasconcelos et al.[14] farmers' age is an important risk factor, since young and elderly people are more susceptible to health problems when exposed to pesticides.

With regard to the marital status, our results show that 19 farmers (57.58%) were married, 09 (27.27%) were single, and 05 (15.15%) widowed. The workforce can be defined as familiar, since most of the family members are engaged in the process of tobacco growing (Table 1).

Ferreira[15] and Fialho[16] classified tobacco culture as family agriculture. The latter explains that to perform all the tasks involved in tobacco production the participation of all the family members is required. During harvest, when work is more intense, temporary workers are frequently hired.

When analyzing the degree of schooling, 18 (54.54%) participants did not finish elementary school, 07 (21.22%) completed elementary school, 07 (21.22%) stated they were illiterate, and only 1 (03.03%) completed high school (Table 1).

Our results are consistent with those of Inácio[12], who reported low educational level among tobacco farmers. From a total of 72 individuals, 44 (61.11%) did not complete elementary school and 16 (22.22%) were illiterate. According to the study performed by Agostinetto et al.[6] 97.8% of the tobacco growers did not finish elementary school, and from those 66.3% completed fourth grade. The author concludes that the low educational level may represent a barrier to enter the labor market forcing those workers to remain in the fields.

Low educational level was also observed by Heemann[13], who reported that 61.54% (64) of the interviewed farmers did not complete elementary school, 35.58% (57) completed it, and 2.88 % (03) went to high school, but did not necessarily finish it. Interestingly, Cargnin[17] identified a significant relation between low educational level and low use of PPE.

Table 1– Characteristics of the population interviewed obtained between April and September of 2014 in the county of Cabaçeiras do Paraguaçu, Bahia, Brazil.

POPULATION DATA	NUMBER (%)
Gender	
Male	13 (39.40%)
Female	20 (60.60%)
Marital status	
Single	09 (27.27%)
Married	19 (57.58%)
Widower	05 (15.15%)
Age (years)	
18 – 20	01 (03.03%)
21 – 30	05 (15.15%)
31 – 40	03 (09.09%)
41 – 50	10 (30.30%)
51 – 60	06 (18.18%)
+ de 60	08 (24.24%)
Educational Level	
Illiterate	07 (21.21%)
Elementary school not completed	18 (54.55%)
Elementary school completed	07 (21.21%)
High school completed	01 (03.03%)

In our sample 63.64% of the individuals had been working as tobacco growers for over 20 years, and 54.55% stated they worked six days a week. In 72.73% of the cases, 1/3 of the farm (01 to 05 hectares) was used to grow tobacco (Table 2). All the interviewed farmers grew tobacco in combination with other crops, mainly corn, cassava, and beans.

Spending over a decade working with the same culture has been observed by several authors: Silva et al.[18] reported that all individuals in their sample had been working as tobacco growers for over 14 years; Cargnin[17] found an average working time of 20 years, while Vargas and Oliveira[19] reported 24.7 years.

Heemann[13] believes that the exposure time to chemical products may contribute to worsen the pains and aches reported by the growers as well as increase the probability of triggering pathologies such as skin diseases (allergies, burnings), breathing difficulties and even cancer.

According to Schoenhals et al.[20], spending decades growing tobacco increases the workers´ exposure to chemicals hazardous to their health. The authors explain that it is not only the daily exposure to pesticides that affects the farmer´s health, but also the direct contact with the tobacco leaves that release nicotine as well as their smell during drying procedures.

Table 2 – Work related activities and culture area in the county, obtained between April and September of 2014 in the county of Cabaçeiras do Paraguaçu, Bahia, Brazil.

WORK ACTIVITIES	NUMBER (%)
Working time as tobacco growers (years)	
Less than 01	02 (06.06%)
06 to 10	04 (12.12%)
11 to 15	04 (12.12%)
16 to 20	02 (06.06%)
More than 20	21 (66.64%)
Working frequency (days per week)	
01 to 04	09 (27.27%)
06	18 (54.55%)
07	06 (18.18%)
Cultivated area (hectares)	
Less than 01	02 (06.06%)
Between 01 and 05	24 (72.74%)
More than 05	07 (21.21%)

Use of pesticides

With regard to pesticides, from the 33 farmers interviewed 19 (57.57%) used the pyrethroid Decis 25 EC associated with the herbicide Sempra; 27.27% used only fertilizers, and 14 (42.43%) said they did not use any products. Decis 25 EC contains deltametrine and is registered with the Ministry of Agriculture, Livestock and Supply (MAPA no. 00758498) to be used in tobacco cultures.

In his research, Inácio[12] found that 8.33 % of the tobacco growers used the pyrethroid Decis for pest control, mainly tobacco flea beetle (*Epitrix fasciata*), Brazilian leaf beetle (*Diabrotica speciosa)*, potato moth (*Phthorimaea operculella*), hawk moth (*Manduca sexta paphus*), and black cutworm (*Agrotis ipsilon*).

According to Gallo et al.[21], Decis is classified as moderately or slightly hazardous for human beings. Some pyrethroids like allethrin and permethrin increase the free calcium level in the nerve endings, which inhibits the intracellular calcium binding proteins and increases the release of neurotransmitters. Other compounds like cypermethrin and decamethrine promote a persistent membrane depolarization due to the constant influx from the sodium channels[22]. As stated by Figueiredo[23], Decis has low toxicity in mammals, because they are able to metabolize it through ester cleavage and excrete it in the urine, thus avoiding its accumulation in the tissues and organs.

Domingues[24] explains that pyrethroids can have different toxicities in mammals. Type I pyrethroids, like Decis 25, do not have alfa-ciano groups and the opening time of the calcium channels is moderate.

According to the author, these chemical products may cause tremors that propagate all over the body due to an increase in sensitivity to external stimuli.

Group II pyrethroids contain alpha-ciano groups which keep the calcium channels opened for a longer period of time and can cause ataxia, seizures, choreoathetoses, and salivation.

Sempra is a type III sulfonylurea herbicide used in tobacco and other cultures to control weeds like purple nutsedge (*Cyperus rotundus*)[25]. Garcia and Alves Filho[26] reported that acute oral exposure or dermal exposure to the herbicide do not have aggressive effects on health. On the other hand, Silva et al.[27] stated that herbicides can cause memory reduction, concentration difficulties and sleep disturbance. Despite these negative effects on health, Troian et al.[28] observed that tobacco growers are not aware that the intensive use of herbicides is hazardous to their health and to the health of animals causing allergies, impoverishing soils and killing organic matter.

Pesticide packaging disposal

With regard to the final disposal of pesticide packagings, the majority of the interviewed farmers (81.81%) said they burn or burry them, 06.06% keep them, and only 12.12% return them to the store or to specialized collection sites. According to Law no. 9.974/00, farmers must return the pesticide packagings and the like within a year after the purchasing date directly to the manufacturer or through specialized collection sites or centers as long as they are authorized and supervised by a competent body. Correct disposal requires triple-washing of the packagings [29].

Our results are consistent with those obtained by Peres and Moreira[30], who reported that only 10 to 20% of the pesticide packagings are adequately disposed of. In Racena and Caldas[31] research only 8.40% of the interviewed tobacco growers took the empty packaging to collection sites, while 54.4% stored them. Chaves[32] observed that only 15.79% of the packagings were taken to collection centers, and 84.21% of them were left in the field, buried, burned or reused.

The correct final disposal of packagings is extremely important. According to Barreira and Philippi Júnior[33], empty pesticide packagings belong to the category of hazardous waste, for they contain chemicals that can contaminate the soil, the water and the air and thus, affect public health. Abreu and Alonzo[34] also claim that the reutilization or inadequate final disposal of pesticide packaging cause environmental contamination and are hazardous to the health of human beings and of wild as well as domestic animals. Londres[35] warns that despite the existing standards, empty pesticide packagings are frequently found near crops, along riversides and roads, and that they are sometimes reused to pack all sorts of items, even food.

Symptomatology

The questionnaire analysis revealed that 27.82% of the tobacco growers suffered from two simultaneous symptoms, 21.21% presented three symptoms and 18.18% stated they did not suffer from any symptoms (Figure 1). The most frequent ones reported by the farmers

were body aches, headaches, irritability and abdominal cramps (Figure 2). With regard to the symptoms during and after working activities, 42.42% felt unwell during and 48.48% after performing their daily labor. The intoxication caused by pesticides can be acute or chronic. In the former, symptoms appear some hours after excessive exposure to highly toxic products; in the latter, symptom appearance can take months or years after a slightly or moderate exposure to toxic products, and can result in irreversible damage such as paralysis and neoplasia[13].

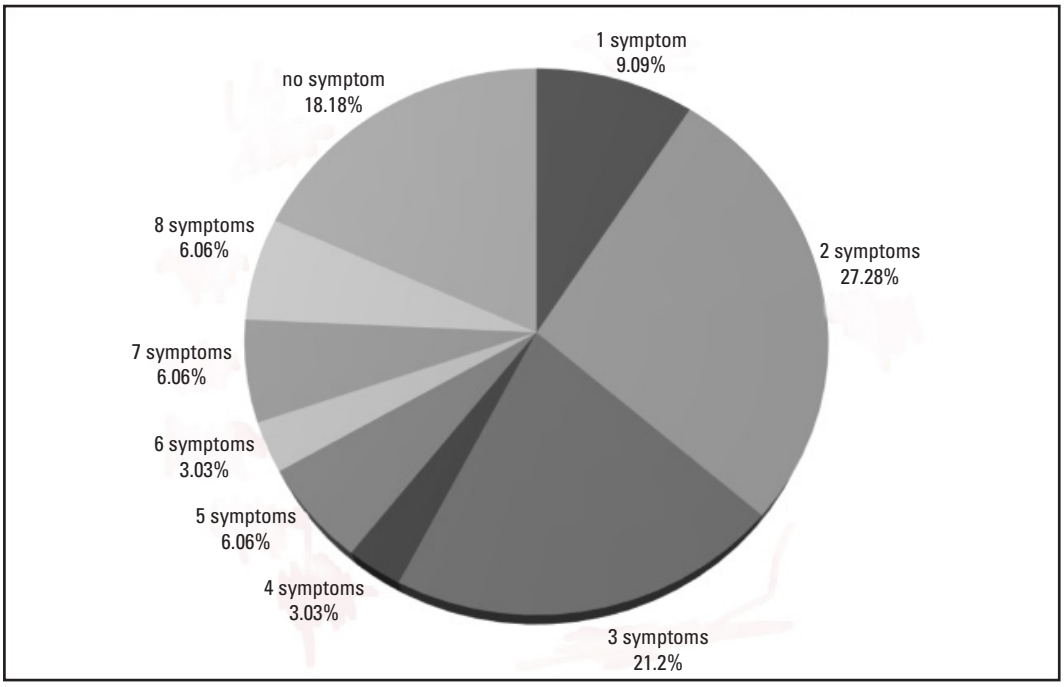

Figure 1 – Percentage distribution of symptoms as reported by tobacco growers obtained between April and September of 2014 in the county of Cabaçeiras do Paraguaçu, Bahia, Brazil.

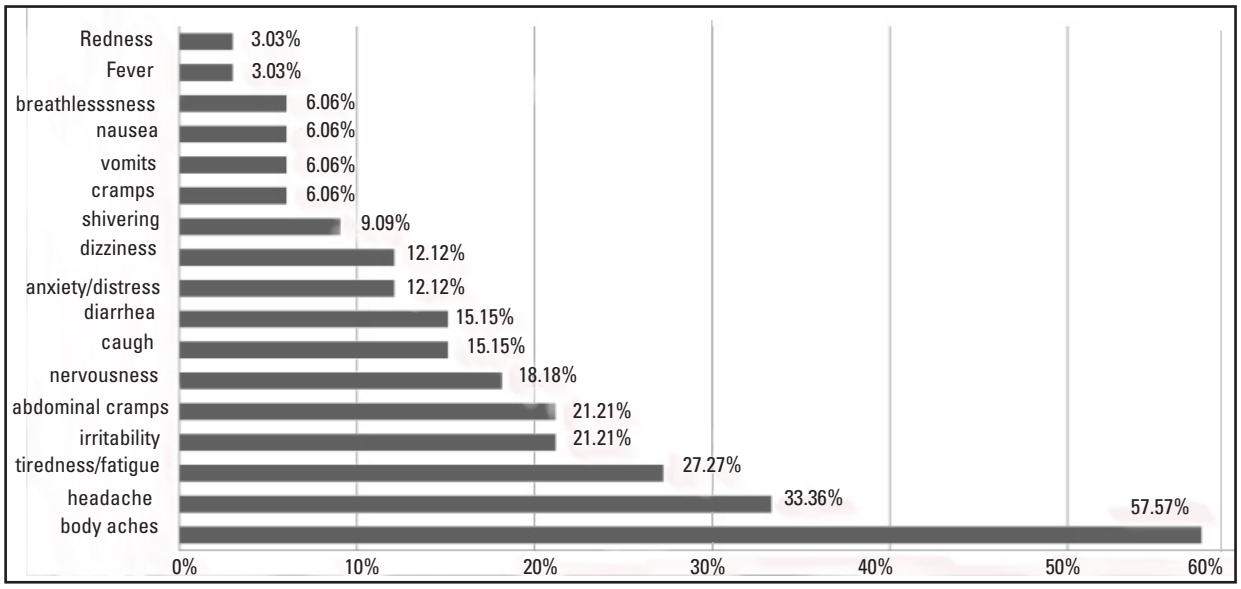

Figure 2 – Percentage distribution of symptoms as reported by tobacco growers obtained between April and September of 2014 in the county of Cabaçeiras do Paraguaçu, Bahia, Brazil.

It was not possible to determine the contamination source of the interviewed farmers. Notwithstanding, Moreira et al.[36] state that human health can not only be affected by pesticides through direct contact (mainly during transport and application), but also through indirect contact with their components. Human contamination can occur: a) at work while handling or applying pesticides; b) in the environment due to dispersion of pesticides which can also affect rivers, water-tables, and the atmosphere; and c) through the ingestion of contaminated food. Veiga[37] states that intoxication can also occur through dermal absorption, inhaled into the lungs or ingested, and that the negative effect on health depends on the chemical characteristics, the amount absorbed or ingested, the exposition time, and the general health of the victim.

Moreover, according to Peres[38] and Peres et al.[39], the symptoms of pesticide intoxication are not just the result of the relation between the product and the exposed person. They depend on the chemical and toxicological characteristics of the product (packaging, stability, solubility, and type of solvent); individual factors (such as age, genre, weight, nutritional state, education level, knowledge of the effects and safety measures); exposure or working conditions (frequency, dosage and type of exposition, among others). Londres[35] explains that in chronic intoxications the symptoms might take some time to appear and, as they are subjectively described, the diagnoses is often difficult to establish.

Araújo et al.[40] studied the effect of exposure to a mix of pesticides generally containing organophosphates or pyrethroids and reported that 74 (72.50%) of the farmers complained of sweating, salivation, lacrimation, rhinorrhea, convulsions, abdominal cramps, nausea and /or vomits probably caused by recent pesticide application. After application the most frequently reported symptoms were facial blushing, burning or irritated eyes, nasal pruritus and dermatitis. According to the authors, the 23 (31.94%) farmers who did not apply pesticides were also vulnerable to environmental exposure due to their atmospheric dispersion, contact with contaminated water or soil or residence proximity to culture areas.

Notwithstanding, Arcury et al.[9] believe that the most frequent symptoms reported by tobacco farmers such as headaches, dizziness, discomfort, muscular contraction, vomits, salivation and appetite loss might be caused by GTS. Inácio[12] supports this hypothesis and explains that tobacco growers are simultaneously exposed to pesticides and to high amounts of nicotine which hampers the determination of which symptoms are caused by one or the other compound. For Bonato[4] and Schoenhals et al.[20] the main symptoms to confirm GTS are depression, anxiety, neurological dysfunctions, muscular aches and tremors besides vomits, headaches and insomnia.

According to the National Toxic and Pharmacological Information System (SININTOX) managed by Fiocruz, from the 99,035 cases registered in 2012, 16,052 occurred in the Northeast region with a lethality of 0.62%[41]. However, Ascari et al.[42] state that the numbers provided by official agencies are generally underestimated due to the under-reporting of cases that are not considered acute or severe. Vasconcelos et al.[14] explain that the under-reporting might be a consequence of the tobacco growers' difficulty in relating the symptoms to pesticide intoxication.

Besides the harm caused to workers' health, the overuse of pesticides in agriculture negatively affects the environment due to their accumulation in the ecosystems' biotic and abiotic segments[43]. Griza et al.[7] state that as a result of natural processes of water movement, the organophosphate and carbamate residues might be transported and accumulated in the environment contaminating surface and underground water resources. Pesticide particles can also be transported through the air affecting surface waters and vegetation.

According to Arias et al.[44], the dispersion of pesticide particles might affect the populations that eat contaminated vegetables and food, as well as communities and ecosystems close to the farming areas where these products are being used. Pesticide dispersion may also affect a specific plant or animal population causing ecological imbalance in the relation of two or more species. The reuse or inappropriate final disposal of pesticide packagings increases environmental contamination and has an adverse effect on human as well as wild and

domestic animals health[34].

According to Canadas et al.[45], alcoholism may interfere in chronic pesticide intoxication diagnosis. Notwithstanding, this possibility was not considered in our study, since the interviewed workers did not drink alcohol for religious reasons.

Personal protection equipment

When asked about the use of PPE, 13 (39.39%) tobacco growers answered they wore hats combined with masks, gloves, boots, glasses or aprons, while 20 (60.60%) said they did not wear any PPEs (Table 3).

Similar results were obtained by Inácio[12], who found that from the 72 interviewed tobacco growers, 41 (56.94 %) did not wear any PPE, and 23 (31.94%) wore only gloves. The remaining farmers did not answer the question or did not handle tobacco leaves.

Heemann[13], on the other hand, reported that 100% of the interviewed farmers stated they wore some of the PPE items such as hats (98.08%), boots (94.23%), gloves (54.81%), and masks (29.81%).

The author emphasizes the importance of wearing masks to avoid inhaling chemical products that might cause health problems or speed up the development of pre-existent diseases.

According to Agostinetto et al.[6], the contact with chemicals during pesticide applications or during leaf handling are hazardous to the workers' health. However, the use of PPE might avoid chronic and acute intoxication by reducing dermal or inhalation exposure.

With regard to clothes, 20 (60.60%) workers wore long sleeve t-shirts and trousers to avoid contact with chemicals; 03 (09.09%) wore short sleeve t-shirts and trousers; and 10 (30.30%) wore short sleeve t-shirts and trunks. Although it is required by law, we observed that none of the interviewed workers wore the complete set of PPE items (Table 3).

For 21 (63.63%) tobacco workers the main reason for not wearing PPE was its high cost; 10 (30.30%) mentioned discomfort, and 02 (06.06%) did not answer this question.

In previous studies focusing on the use of PPE researchers report that tobacco growers avoid its use due to high cost, loss of mobility and thermal discomfort such as heat and breathing difficulties[37,45, 28].

Racena and Caldas[31] studied agricultural workers in Culturama, MS, and observed that they wore hats, but most of them avoided gloves, masks or waterproof clothing.

According to Ascari et al.[42], the highest number of intoxications (127 registered cases) occurred among tobacco farmers due to the lack of PPE during pesticide application.

One explanation for this fact is that the workers are not aware of the risks they are exposed to and thus, neglect the basic rules of health and safety at work.

Table 3 – Personal Protection Equipment (PPE) used by tobacco farmers in the county obtained between April and September of 2014 in the county of Cabaçeiras do Paraguaçu, Bahia, Brazil.

PPE	NUMBER (%)
PPE use	
Only one item	13 (39.40%)
No use	20 (60.60%)
Reasons For Not Using PPE	
High cost	21 (63.63%)
Discomfort	10 (30.30%)
Other	02 (06.06%)
Working clothes	
Long sleeve t-shirt and trousers	20 (60.60%)
Short sleeve t-shirt and trousers	03 (09.09%)
Short sleeve t-shirt and trunks	10 (30.30%)

Faria et al.[47] and Veiga[37] also state that pesticide use is the main source of hazardous chemical exposure, and that PPE is mandatory to avoid contamination. For Peres et al.[43] the farmers' low level of schooling might explain why they refuse to use all the PPE items. On the one hand, they have difficulties understanding their function, and on the other they are unaware of the risks involved in pesticide application and exposure.

The incorrect use of PPE is another issue that should be considered[14], since it can give a false sense of safety and even become a source of contamination. Thus, workers need to be aware of correct PPE use, conservation, storage and disposal.

FINAL CONSIDERATIONS

The results of our research show that tobacco farmers present signs and symptoms associated to green tobacco sickness and pesticide intoxication which is in accordance with the literature on health problems related to tobacco growing.

We also observed that PPE is not well accepted and that most tobacco workers avoid it as a result of discomfort and high cost.

Incorrect final disposal of pesticide packaging prevails among the majority of tobacco growers causing environmental contamination and health risks for human beings and animals.

Moreover, tobacco farmers underestimate the relation between pesticide and nicotine intoxication and its symptoms. Thus, it is of the utmost importance to inform farmers of the risks of occupational exposure and of the advantages of using PPE to improve their health conditions and wellbeing. The vulnerability of the population under study might be the result of the lack of efficient educational and health programs to control, prevent and treat the occupational diseases of tobacco growers.

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