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El etnoconocimiento de los agricultores familiares asociado al control de *Plutella xylostella* L. 1758 (Lepidoptera: Plutellidae) en la producción de col

Ethno-knowledge of family farmers associated with the control of *Plutella xylostella* L. 1758 (Lepidoptera: Plutellidae) in kale production

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Abstract

The species *Brassica oleracea* L. covers the varieties of kale, broccoli, and cabbage, being these crops mainly commercially exploited and cultivated by family farming in Brazil. Over the years, farmers adapt and better understand the problems related to pests and their life cycles, they gain knowledge from their daily work, which becomes important in the decision-making process regarding crops. *Plutella xylostella* L. is the main pest that attacks crucifers; when poorly controlled, it can compromise the entire production. The objective of this work was to evaluate the ethno-knowledge associated with the control of *P. xylostella* among family farmers who grow kale. 42 producers were selected by the snowball sampling technique, in the municipalities of Lucas do Rio Verde, Sorriso, and Sinop, Brazil, who answered a semi-structured questionnaire about their social profile, production and ethno-knowledge associated with the control of *P. xylostella*. It was found that there are several difficulties concerning the production of kale and pest recognition, the production techniques used, and access to information; in many of these factors, technical assistance has contributed to minimizing them through the dissemination of modern and effective techniques. Thus, knowing the role of ethno-knowledge of cabbage producers can contribute to the correct identification of damages in the crop and the pests that causes them, and can prevent the improper use of pesticides by farmers, leading to an efficient control. Furthermore, it can contribute to the valorization of dialogue, the exchange of knowledge and the resolution of problems.

Keywords: brassicaceae, family farming, Mato Grosso, pest control, rural extension.

Resumen

La especie *Brassica oleracea* L. abarca las variedades de col rizada, brócoli y repollo, siendo estos cultivos explotados comercialmente y cultivados principalmente por la agricultura familiar en Brasil. Con los años, los agricultores se adaptan y comprenden mejor los problemas relacionados con las plagas y su ciclo de vida, ganan conocimiento con su trabajo diario que se vuelve importante en la toma de decisiones sobre los cultivos. *Plutella xylostella* L. es la principal plaga que ataca a las crucíferas; mal controlada, puede comprometer toda la producción. El objetivo de este trabajo fue evaluar el etnoconocimiento de agricultores familiares que cultivan col. Se seleccionaron 42 productores mediante la técnica de muestreo de bola de nieve, en los municipios de Lucas do Rio Verde, Sorriso y Sinop, Brasil, que respondieron un cuestionario semiestructurado sobre su perfil social, producción y etnoconocimiento asociado al control de *P. xylostella*. Se encontró que existen varias dificultades en cuanto a la producción de repollo, el reconocimiento de plagas, las técnicas de producción utilizadas y el acceso a la información; en muchos de estos factores, la asistencia técnica ha contribuido a minimizarlos, mediante la difusión de técnicas modernas y eficaces. Así, conocer el papel del etnoconocimiento de los productores de col puede contribuir a la correcta identificación de daños en el cultivo y de las plagas que los causan, y puede evitar el uso inadecuado de pesticidas por parte de los agricultores, llevando a un control eficiente. Además, contribuye a la valorización del diálogo, el intercambio de conocimientos y la resolución de problemas.

Palabras clave: agricultura familiar, Brassicaceae, control de plagas, extensión rural, Mato Grosso.

Introduction

Crucifers or brassicas (Brassicaceae) contain about 3700 species, from which *Brassica oleracea* L. covers the varieties of kale, cauliflower, broccoli, and cabbage (Ribeiro, 2021). *Plutella xylostella* L. 1758 (Lepidoptera: Plutellidae), better known as the diamond moth, is one of the main pests of Brassicaceae crops and is one of the limiting factors in brassica production worldwide (Massaroli *et al*., 2020), it can cause losses in large and small crops such as canola, cabbage, broccoli, cauliflower, and kale (Correa *et al*., 2014).

Although it is difficult to state the real contribution rate of family farming in food production, its invaluable importance in the agricultural sector is known. In the Brazilian state of Mato Grosso, family farming is responsible for a large part of the food production for daily consumption, mainly fruits and vegetables, in addition to significantly participating in the generation of jobs and income in rural areas (Abreu *et al*., 2021).

Over the years, farmers adapt and better understand the problems related to pests and their life cycle and make decisions about their productive activity. In other words, it is knowledge that arises from countless daily experiments associated with scientific work.

For Marconi and Lakatos (2005), and Santana (2019), truthful ethno-knowledge can be equivalent to scientific knowledge, it is just the application of scientific knowledge in a different way. Traditional knowledge can be understood as accumulated experiences and knowledge about natural resources, transmitted in a mutable and transgenerational way, favoring the maintenance of cultural traditions and their updating through a social dynamic of constant transformation.

Therefore, the objective of this work was to evaluate the ethno-knowledge associated with the control of *P. xylostella* among family farmers who cultivate kale. It is worth noting that the knowledge referred to here is of a particular nature to the individual, since wisdom is considered through reason, as well as experiences in daily practices that define their attitudes.

Materials and methods

The work was carried out in the municipalities of Lucas do Rio Verde, Sorriso, and Sinop, state of Mato Grosso, Brazil. These municipalities were selected due to their important agricultural vocation in the state. In 2017, it was reported that they produced together 143 t of kale (IBGE, 2017).

Kale producers answered a semi-structured questionnaire about their social profile, cabbage production and commercialization, and questions that involved their knowledge, empirical or not, about the pest. The questionnaire was approved by the Research Ethics Committee of the Federal University of Mato Grosso (Opinion 2,902,137) and was applied between November 2018 and April 2019. A free and informed consent form was signed by each participating farmer.

The 42 interviewees were selected using the snowball sampling. In most cases, it was indicated that there were neighbors and/or relatives living in the same community. Only non-seasonal kale producers with production exceeding 100 bunches (8 leaves/bunch) per day could participate in this work, which represents a minimum planted area of 2000 m². This pre-classification served to prevent farmers with small productions from participating in the study, especially those who produce only for their consumption, thus excluding people who might have little experience in cultivation.

Results and discussion

Social profile of the participants

42 farmers were interviewed, 27 of them in the city of Lucas do Rio Verde, 4 in Sorriso and 11 in Sinop. The interviewees had a varied level of education, with the majority having dropped out of elementary school (Table 1).

According to Wedekin (2022), education for rural people should not serve to distance them from the agricultural activities. On the contrary, it should qualify and provide human development similar to

Table 1. Social profile of kale producers interviewed in the municipalities of Lucas do Rio Verde, Sorriso, and Sinop, in Mato Grosso, Brazil, from November 2018 to April 2019

Marital status	Percentage	Level of schooling	Percentage
Single	4.8	Fundamental (incomplete)	47.6
Married	71.4	Fundamental (complete)	14.3
Divorced	2.4	High school (incomplete)	11.9
Cohabitation	21.4	High school (complete)	11.9
Age (years)		Technical school (complete)	4.8
≤30	9.5	Superior (complete)	9.5
31 - 40	14.3		
41 - 50	45.2		
51 - 60	19.0		
>61	12.0		

that of the urban areas. The transformations of the contemporary world would require farmers to be accompanied in their adaptation to this new reality, regardless of their level of education (Zangrande *et al.*, 2022).

The male gender represented 95 % of the respondents (Table 1). Prochnow *et al.* (2021) reported that masculinization and aging in the countryside together with greater opportunities for education, increased integration between urbal and rural areas, and dissatisfaction with the gains obtained in agriculture are factors linked to the rural exodus process among younger people, especially women, who seek opportunities in cities. For Rodrigues *et al.* (2020), the causes of the decline in rural population, especially young people, are linked to the search for better living conditions, that is, they seek education, health care, and jobs with competitive salaries.

For many young people who grew up facing challenges in the socioeconomic reproduction of productive units and experienced greater access to education with an urban bias, the city is still seen as a promising future. Rural migrations certainly occur, and understanding their dynamics can support new directions that consider popular knowledge and the ways people utilize natural resources. It is necessary to demystify the idea that, when rural population migrates to the city, it is culturally colonized, leaving their original basic knowledge.

Regarding women, although there were fewer interviewees, their leading role in work and in helping to maintain their families stands out, as highlighted by Silva and Hespanhol (2019), who report that it is normal for women in family farming to actively participate in the production, harvesting and product marketing, allowing them to increase their income and economic autonomy, in addition to being the guardians of knowledge.

With respect to the age of the interviewees, 76 % of them are older than 41 years (Table 1), which may indicate that the rural man is aging. The low renewal of rural men can bring irreversible consequences, since much of the work on these properties is manual. However, this data also reveals the arsenal of experiences and knowledge acquired in different generations, adapting, and creating opportunities to develop agricultural activities and guarantee the exchange of knowledge between generations.

Kale cultivation

For 34 of the interviewees, kale crop is produced on a large scale, but it is not the main crop on the property, with lettuce and parsley being the main ones. For those whose main activity is kale, it is cultivated mainly because there are difficulties in the production of other crops, and, in some cases, low preference by customers: C. I. (male, 63 years old), "People find it very difficult to plant kale because the moth destroys everything, but we manage to control the moth and we sell kale all year round"; F. W. (male, 30 years old), "Kale sells well here on the farm, but what people are really looking for is lettuce, parsley and cassava".

In the dry season, there is less caterpillar occurrence in the study region because, despite having a tropical climate, it has some cold days (12 to 15 ºC) in mid-June and July that help reduce the population o the plague.

Kale is grown only in the open field by 71 % of those interviewed, 21 % grow part of it in open and protected fields, and 8 % grow it exclusively in protected environments. These producers claim to have difficulty in controlling the moth when there is a high infestation period, which coincides with the period of high precipitation (October to April, approximately). Trani *et al.* (2015) reported that kale grown in protected environments can suffer severe damage caused by *P. xylostella*.

Protected cultivation is a production technique with relatively high investments. But it has the advantage of protecting the crop from environmental weather conditions such as heavy rains, increasing productivity, pest and disease control, etc. V. B. (male, 48 years old), "Here on the property I have low tunnels, I have kale, lettuce, arugula, etc. When it looks like it's going to rain, my son or I run to close the tunnel canvas, so I can protect the plants from the rain, and when it's sunny, I open it again".

Almost all farmers grow kale all year round (86 %), regardless of the type of cultivation (protected or not). The remaining 14 % cultivate kale only during the dry season of the year (from April to October). The preference of these farmers for cultivating during this period is due to the lower infestation of *P. xylostella* and whiteflies (*Bemisia tabaci* Gennadius, 1889 – Hemiptera: Aleyrodidae), which occurs in mid-December and January in this region. According to O. J. V. (male, 42 years old), "During the rainy season, nothing grows here, the moth attacks very hard and then the whitefly comes and destroys everything". Also, according to S. F. (male, 55 years old), "During the dry season, we manage to control moths better. The cold days make them disappear, but, on the other hand, in the rain they reproduce very quickly and there is no way to control it".

Most respondents (95 %) perform crop rotation and 5 % of them said they perform a fallow period of 30 days after removing the crop, being this another conservation strategy used by farmers guided by traditional knowledge. For C. K. (male, 58 years old), "After pulling up the kale plants, we turn the bed over and leave it still for the soil to absorb and decompose those leaf residues left over from the cultivation".

Lettuce, chives, arugula, coriander, and corn are the main crops used by the respondents to rotate with kale (Table 2). For Trani *et al.* (2015), corn, lettuce, parsley, chives, coriander, green beans, cucumber, peppers, and tomatoes are the best crop rotation options for kale because they reduce soil pathogens, recycle nutrients, and introduce new insects into the environment.

Table 2. Crops used in the crop rotation with kale and frequency with which farmers use them in the study region

Family	Culture/species*	Frequency (%)
Amaryllidaceae	Onion (*Allium cepa* L.)	3.5
Apiaceae	Coriander (*Coriandrum sativum* L.)	7.8
	Parsley (*Petroselinum crispum* [Mill.]) Fuss.)	2.6
Asteraceae	Lettuce (*Lactuca sativa* L.)	24.3
	Chicory (*Cichorium intybus* L.)	4.3
Brassicaceae	Arugula (*Eruca vesicaria* [L.] Cav.)	13.0
	Cabbage (*Brassica oleracea* L.)	1.7
	Cauliflower (*Brassica oleracea* L.)	0.9
	Radish (*Raphanus sativus* L.)	0.9
Curcubitaceae	Melon (*Cucumis melo* L.)	0.9
	Cucumber (*Cucumis sativus* L.)	0.9
Euphorbiaceae	Cassava (*Manihot esculenta* Crantz.)	3.5
Fabaceae	Beans (*Phaseolus vulgaris* L.)	3.5
	Crotalaria (*Crotalaria spp.*)	0.9
	Velvet-bean (*Mucuna pruriens* [L.] DC.)	0.9
Lilliaceae	Scallions (*Allium fistulosum* L.)	13.0
Malvaceae	Okra (*Abelmoschus esculentus* [L.] Moench)	0.9
Poaceae	Corn (*Zea mays* L.)	5.2
	Millet (*Pennisetum glaucum* [L.] R.Br.)	2.6
	Brachiaria (*Urochloa ruziziensis* [R.Germ.& vrard] Crins)	0.9
Solanaceae	Scarlet Eggplant (*Solanum aethiopicum* L.)	2.6
	Greenpepper (*Capsicum annuum* L.)	1.7
	Tomato (*Solanum lycopersicum* L.)	1.7

*The scientific names were checked and verified with the platforms List of Species of the Flora of Brazil (Flora do Brasil 2020) and The Plant List and/or Tropics (W3T, Missouri Botanical Garden).

Cauliflower, radish, cabbage, and arugula should not be used in the crop rotation because they belong to the same botanical family of kale and, therefore, are natural hosts for the pests that affect the kale crop, such as *P. xylostella* (Table 2). This use violates one of the basic concepts of crop rotation, which is to interrupt the pest reproductive cycle, since the moth continues its development in the new crops implanted (Capinera, 2012).

It is evident that, although the producers have used the term 'crop rotation', the cultivation of cauliflower, radish, cabbage, and arugula is due to the planting time (periodicity of production) considering the consumer market, as a source of income. For A. V. (male, 64 years old), "I remember someone told me that you can't plant arugula and radish after kale, but it's the space we have, I need to use it as much as possible".

Considering good practices, the reduction of herbivorous insect pest populations can be achieved by using conservative biological control, preserving, and increasing the populations of natural enemies already existing in the environment (Fontes *et al.*, 2020). Studies indicate an increase in beneficial insect communities as a result of habitat manipulation, with the inclusion of appropriate plant species and the maintenance of spontaneous vegetation (Boetzl *et al.*, 2021; Schulz-Kesting *et al.*, 2021).

Some crops that could be rotated with kale and would break the pest cycle may not be as easily utilized. Cucumbers, peppers, and tomatoes are great crops for this rotation (Trani *et al.*, 2015). Yet, the use of these cultivars can be prevented mainly by the fact that 60 % of farmers use sprinkler-type irrigation systems, which can favor the development and installation of severe foliar diseases, making their use unfeasible in rotation with kale. For V. B. (male, 49 years old), "We use santeno hoses in certain areas of the field, which soaks the plants; cucumber, in particular, gets a lot of powdery mildew, and not to mention tomatoes, the bottom of the leaves is very damaged by the alternaria (black spot)".

Another fundamental aspect is the period of irrigation, the interviewed farmers prefer to use irrigation during the day. Only 7 % of the interviewees answered that they turn on the irrigation only at night, but this is not because of preference, but because of the availability of water: J. D. F. (male, 46 years old), "Here in the settlement, everyone turns on water during the day and the pressure is very low, at night nobody uses it so the pressure increases and I manage to irrigate my kales".

Even without realizing it, this irrigation management used at night helps to reduce the infestation of *P. xylostella*. Nighttime irrigation can disrupt the moth's flight and mating, reducing the

chances of copulation and oviposition on the plant (Capinera, 2012). Also, the leaves become wet and there is a reduction in temperature, which makes it difficult for the pest to develop at night. Therefore, knowing and identifying the presence of the moth is important, since in this case, the option to irrigate at night helps in its control.

Small farmers, whether belonging to traditional populations or not, are the greatest promoters and holders of the world's agricultural diversity and have a strong connection with their ways of life. Their cultures are based on production for subsistence, with the possibility of selling surpluses, developing family labor, using simple technology, and mainly cultivating several different species in the same area. These practices guarantee food and nutritional security, while ensuring planting despite abiotic and biotic stresses, such as climate change and pest and disease attacks (Boscolo and Rocha, 2018).

Access to information

As most of the interviewees completed basic education, we sought to find out if they had already participated in some course, in person or not, on vegetable production, related or not to the cultivation of kale. 45 % responded that they never use the internet to search for this type of information, while 31 % always use the internet to search for information about cabbage.

In particular, they use websites such as Google (74 %) and YouTube (56 %), where they are directed to other sites about the subject they are looking for. For D.B. (male. 50 years old), "I write on YouTube "how to kill the diamondback moth" and soon something appears to help me". Few respondents use other sources of research and three respondents said they use WhatsApp to ask acquaintances questions. Although it was not the subject of research in this work, we observed that the main sources for searching for information on the internet (Google and YouTube) are not specialized. This fact may result in obtaining information that is not always correct.

Although producers have access to the internet, they reported little use of it for acquiring knowledge regarding kale cultivation. This can demonstrate that the digital exclusion of the interviewees occurs not due to the lack or absence of technological access means, but due to the lack of social, cultural, and historical conditions for access to information and communication technologies (Carvalho, 2022). However, there is a need to show the benefits of digital tools because, in addition to access to information, they can create an information channel between the producer, the trader and the consumer that generates a series of benefits, such as improved productivity, use of resources, reduction in the use and cost of inputs, and management time.

With regard to technical assistance, the results obtained show the need for and importance of farmers to receive assistance, whether from public companies such as the city hall and State (70 %) or private companies like resale stores (30 %) for the development of their properties. For A. V. (64 years old), "People from the city government and Empaer often notice details during their quick walks that go unnoticed by us, such as some insects and diseases that we do not see, leading us to think that everything is normal".

The importance of bringing scientific knowledge closer to traditional knowledge is visible, as in addition to enabling the valorization of local knowledge; it seeks to find strategies that allow scientific knowledge to be put into dialogue with culturally maintained local knowledge. Technical assistance greatly contributes to the development of sustainable alternatives for the use and management of natural resources in the generation and dissemination of technologies, adapted to small producers, that are economically viable, becoming essential for increasing production and improving food quality, with the role of technical assistance being essential for the conservation of local biodiversity.

Another important feature of technical assistance is its contribution to the selection of varieties through innovation processes led by farmers, as well as the exchange of agricultural knowledge and seeds, which are practices as old as agriculture itself (Boscolo and Rocha, 2018).

The respondents were asked how often they look for a technician and almost half (47 %) of them said that they do not seek information from technicians, they only go after it when something happens that they cannot solve: R. R. (male, 42 years old), "I don't usually get in touch with them. The dealers go from here and I only go after them when there is a product missing or when some pest that I don't know attacks and I can't control it". For F. W. (male, 30 years old), "As soon as something different comes up, I send a message to the people from the city government and to Mato Grosso Research, Assistance and Rural Extension Company (Empaer), or, when they delay, I see if I find something on the internet". Spanholi and Barreto (2018) reported that older people tend to use their knowledge first, and then look for someone who can better clarify the fact.

Reis *et al*. (2018) reported that technical assistance is essential for the development of farmers in the field once it assists in purchasing seeds, managing them effectively, ensuring proper fertilization, and selecting the appropriate harvest period.

The frequency with which each technician returns to the property is of paramount importance for the development of the properties. In the speech of producer R. R., "Pest control could be improved if the

producer routinely received or sought out extension agents". Trial and error to control a pest that the producer is not aware of can cause harm to him as well as to the consumer, as it can lead to the selection of insecticide-resistant insects, or using wrong products, since, in an attempt to control the plague, the producer may use unregistered and/or inefficient products. The misuse of pesticides can generate environmental contamination, and the exposure of people to pesticides can lead to poisoning and other harm to human health (Lopes and Albuquerque, 2018; Ródio *et al*., 2021). Specifically, kale is considered one of the foods with the highest risk of pesticide contamination (Ribeiro *et al*., 2021). Although several pesticides are used to control the diversity of pests and diseases in cabbage (Noblat *et al*., 2021), their use requires good agricultural practices as well as technical assistance that contributes to their dissemination and the reduction of pesticide use.

Ethno-knowledge

Farmers' daily work on the crop, combined with their desires and perceptions, gives them vast knowledge regarding kale cultivation. And from this knowledge and perceptions, we sought to find out how much knowledge or recognition farmers had of some daily activities that could help control the moth.

The most carried out activities in producers' daily work were leaving the crop free of weeds (22 reports), collecting old leaves (16 reports), pest monitoring (8 reports), preventive control (7 reports), and not leaving old plants (5 reports). For D. C. S. (male, 43 years old), "Some time ago, we noticed that when we touched the weeds in the beds, many moths got up and flew, which indicated that these plants would serve as a shelter for moths and, as not always the poison reaches them, they end up taking refuge over there".

The reports above (clean farming, collecting old leaves, developing preventive control and pest monitoring, eliminating crop residues) belong to cultural control, an important component of integrated pest management (IPM). But they also reflect conservation and control strategies used by farmers guided by traditional knowledge. Weed control is the main activity carried out on a daily basis in order not to leave a refuge area for the moth, although these are not hosts for the pest.

On the other hand, allowing weed growth favors insect diversity, which can provide greater balance in the insect-crop relationship, contributing to the reduction of insect pests in cabbage, as well as increasing the diversity of predatory insects in the area. The cultivation environment can be adjusted to deter pests, striving for control through the implementation of measures to diminish the likelihood of pests locating and colonizing hosts plants, causing the dispersion of insect pests, hindering their ability to reproduce and survive in the area.

Concerning traditional knowledge, the collection of old and/or discarded leaves due to their poor quality and number of holes prevents new moths from attacking the crop and may repel moth larvae and pupae, thus, avoiding the restart of a new cycle of the infestation. According to D. J. S. (male, 50 years old), "It is in the old leaves where I see a certain amount of moth pupae, whitefly eggs, etc.; even if I don't sell the leaves due to the number of holes or the bad color, I take them out and give them to the animals, preventing new moths from appearing in the field".

In correlation with the management of the kale crop, the interviewees acquire knowledge as a result of their hands-on experience in growing it. For example, it is customary for people to use knowledge about the phases of the moon in their actions in the field. According to V. P. (male, 59 years old), "I usually sow cabbage during the week of waxing moon or full moon, but I really prefer the crescent moon, more vigorous plants seem to come out, I don't know if it has something to do with it, does it?"

Along with the years invested in the cultivation of kale, the tendency is for farmers to become better acquainted with the crop and the pests involved there. Therefore, regarding the practices employed over time to control the moth, passed from father to son or learned from relatives, neighbors, etc., the following were reported: use of tobacco extract (2), sequential harvesting (2), cooking oil with detergent (1), not planting in the rain (1), using chive extract with alcohol (1), applying quicklime over the entire area (1), tanning cassava peel for three days (1), not always harvesting from the same plot (1), using silicon to stiffen the leaves (1), using insecticide only at night (1).

Some practices used are already known among producers, but the way how each producer genereates or uses them is what makes ethno-knowledge, as is the case with neem extract, a natural homemade insecticide that can be used to control pests in organic and conventional crop production. The extract can be prepared at home, and the two reports of its use are similar in how it is obtained: C. J. T. (male, 67 years old) and F. W. (male, 30 years old), "I take a bunch of leaves from the plants I have here, I put them in a 20 liter bucket, add water and crush them, let the preparation rest for 12 hours and apply it directly, without adding more water".

The construction of knowledge about natural resources is the result of production based on biocultural memory and its dissemination through

direct personal experience. Its use is validated by its everyday relevance in social reproduction systems and this knowledge is noted, in this work, in the accounts presented above (D. C. S., 43 years; V. P., 59 years; C. J. T., 67 years, and F. W., 30 years). This accumulation of knowledge between human beings and natural resources results in the process of adaptation and the transmission of this knowledge between generations.

According to Souza (2020), understanding the organization of work in family agricultural production units implies analyzing both the familial and work domains in a complementary way. Even accepting its dynamism, it is necessary to consider that locally constructed knowledge associated with natural resources has suffered threats of extreme modifications, far beyond its resilience potential. The loss of this knowledge is associated with the abandonment of resource management projects and changes in the population's way of life, which has limited their flexibility and adaptive capacity.

Conclusions

Based on their daily labors, the farmers identified various routine activities that help them control the moth; during this time, they have developed various practices and management techniques that help to minimize the deleterious effects of the moth.

There are several difficulties reported in this work concerning the production of kale, recognition of pests, the production techniques used, and access to information. In many of these factors, technical assistance has contributed to minimizing them through the implementation of modern and effective techniques.

From the junction between popular and scientific knowledge, involving the various authors in this process and their lived experiences, the aim is to reinforce the importance of disseminating this information, ensuring its perpetuation as well as improving the quality of life of small producers.

Thus, knowing the role of ethno-knowledge among cabbage producers can contribute to the correct identification of damages and the pests that causes them, and prevent the improper use of pesticides by farmers, leading to an efficient control. Furthermore, it can contribute to the valorization of dialogue, the exchange of knowledge and the resolution of problems.

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