American Journal of Biology and Life Sciences
2019; 7(1): 22-26
http://www.openscienceonline.com/journal/ajbls
ISSN: 2381-3784 (Print); ISSN: 2381-3792 (Online)

Open Science

Unwise Use of Pesticides to Control Vegetables Pests in Shikan Locality in North Kordofan State, Sudan

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To cite this article

Omer Rahama Mohamed Rahama, Abdelmanan Elzein Hassan Elamin, Amna Osman Mohamed Fadul. Unwise Use of Pesticides to Control Vegetables Pests in Shikan Locality in North Kordofan State, Sudan. *American Journal of Biology and Life Sciences.* Vol. 7, No. 1, 2019, pp. 22-26.

Received: February 27, 2019; **Accepted**: March 31, 2019; **Published**: April 26, 2019

Abstract

It is no doubt there are many advantages of using pesticides in agriculture and general medical health but unwise use is a problem to non-targeted organism. In addition to this it leads to insect pest resurgence and resistance, and we are daily consuming some amount of poison through fruits and vegetables so, pesticides has polluted and it is being polluted our calm and sweet atmosphere. This study was done at Sheikan locality, North Kordofan state, Sudan in season 2016/2017. The main objective of the study was to throw light on negative effect of misuse of pesticides application on small scale farms of vegetables where tomatoes and eggplant grown. Individual questionnaire was designed to collect information by interviewing 50 farmers from 4 villages in Sheikan locality for their experience in the incident ad control of vegetables pests. The data obtained through the questionnaire revealed that the main problem is white fly beside other pests and 90% of the farmers used chemical to the control and 46% of them said the sources of chemicals is Plant Protection Department; 38% said local market while 8% said local trade men in the villages and 45% of the interviewers do not know the correct recommended dose and use local measurement for determination the application rate. Regarding chemical types 70% of the farmers apply sevin, 20% used malathion and 52% used sprayers and spray more than three times, 34% apply pesticides in the morning, 20% apply chemical at evening before sun set and the rest of them don't know certain time and concerning protective cloths all do not care about and wear ordinary ones. In conclusion we should prevent indiscriminate use of pesticides and farmers should train to acquire knowledge about economic threshold level and natural enemies'. Further and above our agricultural scientist should find out some alternate tools to control vegetables pests and disease for development and catch our goals for the benefit to the farmers and environment too.

Keywords

Pesticides, Kordofan, Vegetables, Misuse, Alternate Tools

1. Introduction

The vegetables grown for human consumption in scattered areas in Kordofan state, they are often attacked by a large number of pests. Tomatoes is very popular vegetable, although this crop is still grown by small farmers it represent one of cash crops in Shiekan locality of Kordofan in the Sudan also the same is eggplant beside other vegetables crops. There are many species of pests caused enormous damage like whitefly *Bemicia tabaci* which feed on the sap of the plants reproducing and leaving honey dew and weakens the leaves making them dry and stunting the growth. Also, there are Aphids *Aphis spp*. and American bollworm *Heliothis armigera*, cut worm *Agrotis spp*., nematode *Meloidogine spp*. eggplant fruit fly *Daraba laisalis*, tomato fruit fly, tomato leaf miner *Tuta absluta* and diseases like powdery mildew *leveillula taurica* and the growers used chemical control against these pests without any precautions. Increased use of agrochemicals however has caused considerable concern about their effect on health and natural environment as well as the agricultural products

quality [1]. Although the use of pesticides gives important benefit both in agriculture and in the field of public health but it is no doubt pesticides has polluted and it is being polluted our calm and sweet atmosphere. We can't get a single gram of food stuffs without residual toxicity and we are daily consuming some amount of poison through fruits and vegetables and the problem extend to non-targeted organism like natural enemies, honey bees, livestock, soil microorganism, and aquatic organism [2]. The level of pesticide residues in vegetables in the Almaty Region of Kazakhstan the results indicated that more than half of samples (59%) contained 29 pesticides, in which 10 are not registered in Kazakhstan, ranging from 0.01 to 0.88 mg kg−1, and 28% contained pesticide residues above maximum residue levels (MRLs) [3]. Pesticide residues in tomatoes from greenhouses and considerable levels of residues were found. In addition to the preceding hazards pesticides lead to insect resurgence and create resistance to pest and diseases. More than that frequent use of pesticides increase the farmers cost of cultivation and environment pollution [4]. Under such circumstances, alternative material like plant products that could be easily used by farmers is valuable [5]. The modern strategy of pests control is the use of repellants, plants powders, plants oil and inert materials. Each of these materials may be used alone or mixed with other for integrated pest management towards safeguard the environment [6]. The unwise use of chemicals leads to natural imbalance as well as destruction of the environment components. The overall purpose is to through light on pesticides handling and advice farmers to combine all control practices whether they may be chemical, physical, and cultural biological or genetic together with existing component of environment. The specific objective is to examine the knowledge of the farmers about control the pest of vegetables and the pesticides used to avoid the hazards of chemical pesticides to the man and the environment.

2. Materials and Methods

Field survey: Farmers Interview by Questionnaire was carried out in Sheikan locality which lay between longitude 29° - 30° and latitude 12°-25° during the cropping season 2016/017 (October- November 2016). Data were collected from 50 interviewees (10 from Almolbas village, 15 Bangdid village, 10 Helat Hassan village and 15 from Alkhor alabyad village) to document the knowledge of the respondents (farmers) about the problem of pests and pesticides used on vegetables especially tomato and eggplant. Information collection was done about distribution; incidence, damage caused and its rate, chemical type; damage; chemical control and recommended dose, method of application, protective wear and natural enemies.

Data collection: Two methods used to collect the data:

Primary data: The measurement instrument used for primary data is questionnaire.

Secondary data: Books, Journals, Official records, Internet.

Data analysis: Data were organized in tables showing frequencies and percentages representing the results obtained from the analysis and SPSS program was used.

3. Results

The results obtained from the statistical analysis of the field survey Questionnaire of Fifty interviewees or respondents about the problems of the pesticide use to control vegetables pests are summarized as follows:

Table 1 shows number of interviewees according to their sex is presented in table.

Table 1. *Distribution of the respondents according to their sex.*

Sex	Frequency	%
Male	30	60
Female	20	40
Total	50	100

Table 2 shows educational levels of interviewees.

Table 2. *Distribution of the respondents according to their education level.*

Level of education	Frequency	%
Illiterate	15	30
Khalwa	18	36
Intermediate	12	24
Secondary	5	10
Total	50	100

Occupation of interviewees in the study area shows in table 3.

Table 3. *Distribution of the respondents according to their occupation.*

Occupation	Frequency	%
Farmers	10	20
Pastoralist	10	20
Farmers and pastoralist	30	60
Total	50	100

Table 4 shows the knowledge of the respondents about tomato and eggplant pests, most pests on tomato and eggplant in the study area.

Table 4. *Distribution of the respondents according to their knowledge about tomato and eggplant pest.*

Species known	Frequency	%
White fly	23	46
American worm	10	20
Tuta absoluta	5	10
Cut worm	5	10
Fusarium	2	4
Nematode	3	6
Virus	2	4
Total	50	100

Table 5 shows the part of the plant affected by pests of tomato and eggplant.

Table 5. *Distribution of the respondents according to their knowledge about the damage of pests in tomato and eggplant.*

Damage on	Frequency	%
Leaves	8	16
Roots	10	20
Fruit	28	56
Stem	4	8
Total	50	100

Table 6 Shows the extent of damage caused to the tomato and the eggplant in study area.

Table 6. *Distribution of the respondents according to their knowledge about the rate of the damage caused by vegetable pests.*

Rate of damage	Frequency	%
Sever	35	44
Moderate	26	33
Light	19	23
Total	80	100

Percentage of respondents according to pesticide use is shows in figure 1.

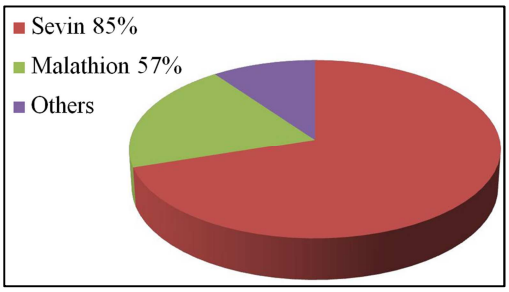

Figure 1. *Percentage of respondents according to pesticide type used.*

Table 7 Shows 52% of respondents uses sprayers while 48% use other thing.

Table 7. *Distribution of the respondents according to their knowledge instruments used.*

Decrease of production	Frequency	%
Sprayers	26	52
Bundle of straw	24	48
Total	50	100

Time of application pesticides by the respondent's shows in table 8.

Table 8. *Distribution of the respondent according to their knowledge about time of application.*

Time of damage	Frequency
Early in the morning	17
At evening	10
Other time	23
Total	50

The knowledge of the respondents about agent from which they obtain pesticide table 9.

Table 9. *Distribution of the respondents according to their knowledge of control agents.*

Agent	Frequency	%
Local market	19	38
Plant Protection Directorate (PPD)	23	46
Local trade men	8	16
Total	50	100

Figure 2 shows the knowledge of respondents about method of chemical application.

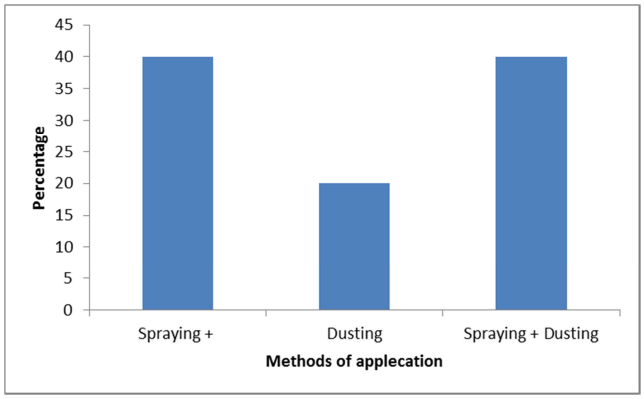

Figure 2. *Distribution of the respondents according to their knowledge about method of chemical application.*

The knowledge of the respondents about the number of spraying pesticides.

Table 10. *Distribution of the respondents according to their knowledge about chemical spraying number.*

Spraying number	Frequency	%
Only one	2	4
Twice	8	16
three times	14	28
More	26	52
Total	50	100

Table 11 shows half of the respondents waiting only one day after spraying and bring their crop to the market

Table 11. *Distribution of the respondents according to their knowledge about waiting period after spraying.*

Period	Frequency	%
One day	25	50
Two days	15	30
Recommended	10	20
Total	50	100

As shown in table 12, 40% store pesticides in the field under straw and 20% store pesticides in their houses

Table 12. *Distribution of the respondents according to their knowledge on storage.*

Place of storage	Frequency	%
House	10	20
Store	15	30
Under straw	20	40
Others	5	10
Total	50	100

4. Discussion

We can provide a useful data for pest monitoring and forecasts by questionnaires because farmers interviewing information could be gathered by means of questionnaires and sent to the officials to be answered from their own views and by interrogating the farmers in their sector, who are generally knowledgeable about major pests in their crops.

The results obtained by this questionnaire revealed that, the majority of the interviewed happened to be males, 30% of them were illiterate; 36% of them attained khalwa lessons, and 24% attained primary schools while only 10% of them are secondary schools (table 1). However, this is a normal result as far as rural communities in Sudan are concerned. The majority (60%) of the rural population in the study area are farmers and pastoralist (table 3), and 46% believed that white fly is harmful while 20% said American bollworm. 56% said the damage on tomato fruits and 16% mentioned the leaves of vegetables (table 5). Concerning the knowledge upon severity 44% said the damage is severing, 16% said moderate. Regarding pesticide use 70% mentioned sevin 85%, 20% mentioned malathion 57% EC while 10% mentioned others (Figure 1). Forty percent of the respondents know recommended dose while 45% don't know and 52% use sprayers while 48% use straw for spraying chemical solutions. There is variation in time of application 34% of the respondents said early in the morning; 20% at evening and 36% at any time of the day. All the respondents don't care about protective wear when applying pesticides. Concerning the knowledge of control agents 38% said local market, 46% PPD and 16% mentioned local trades. Regarding method of application spraying 40%, dusting 20%, spraying and dusting 40% (Figure 2) and regarding chemical spraying numbers, 52% spray more than three times and when asked about waiting period after spraying 50% of them said one day while 30% said two days and 20% follow recommendations. Pesticide residues on vegetables constitute a possible risk to consumers and have been a human health concern [7, 8] and [9] further they recorded that when a chemical is used as recommended on the label of the product, any residues that occur should not exceed the maximum residue levels (MRLs).

Residues detected in excess of the MRL rarely constitute a toxicological concern. A good knowledge of the pesticide concentration is necessary to properly assess human exposure. Health risk assessment of pesticide residues in contaminated vegetables is performed in developed countries [10, 11] and [9] however; these residues are minimally explored in developing countries. Storage of pesticide must be store in correct manner and in separate well build store, in the current study 20% of respondents said they store pesticides in their houses, while 30% sored them in stores and 40% stored under straw in the field. The respondents in the study don't know natural enemies for vegetables pests. In fact, the role of plants extracts as control methods are not use in the area, all respondents don't know it's important, while many authors [12, 13] and [14] documented some plants species have got an anti-insect action and could be used against insect pests. In this regard earlier [15] studying the effect of crude methanolic extracts of neem seeds kernels on the Mediterranean fruit fly, *Ceratitis capitata* [16] applied Neem seeds extract against whitefly *Bemicia tabaci* and found the extract prolonged nymphal development, reduced insect fecundity and induced mortality. We must emphasize that insecticide use is not the only answer to insect pest problems. If we fail to utilize the many elements of pest management and rely entirely upon chemicals we will encounter disasters of unlimited magnitude in future. We hope that commonsense will prevail and that IPM will be used to increase the yields from our crops and to maintain and improve our environment.

5. Conclusion

The majority of the interviewed happened to be males, 30% of them were illiterate; greatest of them were literate. The majorities of the rural population in the study area were farmers and pastoralist and believed that white fly is harmful. Regarding the knowledge upon severity most of them said the damage is severing. About pesticide use more of them mentioned sevin 85%. Most of the respondents know recommended dose and use sprayers. There is variation in time of application; all the respondents don't care about pesticides application precautious. Concerning method of application spraying and dusting are in the same level. Recommendations that pesticide residues on vegetables constitute a possible risk to consumers and have been a human health concern further they recorded that when a chemical is used as recommended on the label of the product, any residues that occur should not exceed the maximum residue levels.

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