Journal of Animal & Plant Sciences, 2009. Vol. 4, Issue 1: 276 - 280.
Publication date: 15 August 2009, http://www.biosciences.elewa.org/JAPS; **ISSN 2071 - 7024**

Survey of pesticides used in the control of ectoparasites on farm animals in Kaduna State, Northern Nigeria

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Key words
Survey, pesticides, ectoparasites, farm animals, Nigeria.

1 SUMMARY

This study was conducted with the aim of getting an inventory of pesticides used to control ectoparasites of farm animals in Zaria and Kaduna towns and their environs in Kaduna State, Northern Nigeria. Information was gathered through questionnaires and verbal interviews. A total of 22 veterinary drug stores, 14 farms and 8 veterinary clinics were visited. A total of 28 different pesticides were encountered in veterinary drug stores, with synthetic pyrethroids (50%) being predominant. On the farms and veterinary clinics, 19 different pesticides were encountered, with organophoshates (42.1%) being the most widely used. The most popular method of application of pesticides was dipping. The result of this survey suggests there is need to subject the most widely used pesticides to systematic in vivo and in vitro assays, in order to avoid possible development of resistance by ectoparasites to these pesticides.

2 INTRODUCTION

The use of pesticides to control ectoparasites started with the application of arsenicals from the early years of the last century and the use of pesticides is still the main method for the control of these parasites (Youdeowei & Service, 1983). Use of pesticide is accompanied by a number of problems such as resistance of ectoparasites to pesticides (Beugnet & Chardonnet, 1995), destruction of beneficial insects, and the risk of some of the chemicals accumulating in body fat and milk for long periods, e.g. organochlorines that are lipid soluble (Lapage, 1968), thus becoming health hazards for both animals and man. The menace of ectoparasites of domestic animals has been discussed (Lapage, 1968; Natala, 1997; Natala *et al*., 2009), clearly showing the necessity to control them.

Although efforts have been made to develop anti-tick vaccines against *Boophilus microplus* (Willadson *et al.,* 1989) and *Rhipicephalus appendiculatus* (Dipeolu *et al.,* 1990), these species are not found in Nigeria, while the use of sialidase enzyme for the control of *Amblyomma variegatum* in Nigeria is still at the experimental stage (Natala, 2006). Until more suitable methods are developed for the control of ectoparasites, reliance on pesticides will continue. Although pesticides have been used in the livestock industry in Nigeria for quite sometime, there appears to be no information on the types used and their effects on man and animals. This survey was therefore conducted to provide information on the pesticides used in Kaduna State.

3 MATERIALS AND METHODS

A survey of the different types of pesticides sold in veterinary drug stores and used on farms and veterinary clinics was conducted in Zaria and Kaduna and their environs. The survey was carried out from May to September, 2005. The area covered by this study comprises of savannah vegetation, which makes it suitable for the presence of ectoparasites including lice, ticks, mites, fleas and myiatic larvae (Natala, *et al.*, 2009). The economic activities of the people are trading and farming. Major veterinary drug stores, farms and clinics within these areas were contacted and information obtained through questionnaires and verbal interviews. The drug stores were asked about the pesticides on sale, their levels of patronage to the various brands and the recommended methods of application.

On the farms and veterinary clinics visited, information was sought on the type of animals kept, the type of pesticides used, methods of application, frequency of application and records of toxicity. A total of twenty two veterinary drug stores, fourteen farms and eight veterinary clinics were contacted during the survey.

4 RESULTS

A total of 28 different pesticides were encountered in veterinary drug stores, out of which 14 (50%) were synthetic pyrethroids, 6 (21.43%) were organophosphates, 3 (10.71%) were avermectins, 2 (7.14%) were carbamates, 2 (7.14%) were formamidines and 1 (3.57%) was imidazothiazole (Table 1). The different pesticides used by farmers and veterinary clinics were 19 in total, of which 8 (42.10%) were organophosphates, 6 (31.57%) were synthetic pyrethroids, 2 (10.53%) were organochlorines, 2 (10.53%) were avermectins and 1 (5.26%) was formamidine (Table 2). On the farms, 50% of the farmers applied the pesticides by dipping, 35.71% by spraying, 7.14% used pour-on, while 7.14% used injectables. The farms were mainly organized and owned by government and some by individuals. The spraying was done by individuals wearing protective clothing.

At the veterinary clinics, the methods of application of pesticides were pour-on (36.40%), spraying (27.35%), bathing (18.32%) and use of injectables (17.92%). All the methods of applications were practiced by all the clinics visited. Dusting was predominantly applied to poultry, rabbits and puppies.

During the rainy season, 57.14% of the farmers use pesticides on a weekly basis, 21.43% use it twice a week and 21.43% fortnightly. During the dry season, 14.29% control ectoparasites weekly, 21.43% fortnightly, 21.43% monthly and 42.86% do so only when the infestation was such that the health and performance of the animals were threatened. Fifteen percent of the farmers interviewed reported toxicity due to pesticides, mostly among young animals. There was no report of apparent resistance by ectoparasites to any of the pesticides used.

5 DISCUSSION

The results of the survey indicates there is heavy reliance on pesticides for the control of ectoparasites. This situation may persist for some time, until the alternative control methods yield acceptable levels of successes. Most of the alternative control methods such as vaccination and pasture spellings are specific for few ectoparasites, leaving other parasites uncontrolled. Although synthetic pyrethroids appeared to be the most available on the market, organophosphates were the most used. This is probably because of the high prices of the pyrethroids being prohibitive to the farmers, especially those with large herds. Organophosphates on the other hand were preferred because of their relatively low prices, availability and high effectiveness (Kenneth, 1982).

The absence of lindane (organochorine) in the market while being available on farms and in clinics indicates supplies retained from earlier old stocks. The production of lindane as pesticides for use on livestock has been banned (Tahori & Galum, 1976) because of its long persistence in the environment (Carson, 1963). The availability of lindane in the Ghanaian market in an earlier report (Awumbila & Bokuma, 1994) and absence from Nigeria markets currently suggest its gradual disappearance, since the supplies were from the same sources.

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Table 1: Pesticides sold by veterinary drug stores for managing ectoparasites on farm animals in Kaduna, Northern Nigeria.

S/N	Pesticide (Brand Name)	Common Chemical Name	Chemical Group	Mode of application recommended by manufacturer	No. of Shops selling pesticides
1	Diazintol	Diazintol	Organophosphate	Dipping, spraying	11
2	DDV	Dichlorvos	Organophosphate	Dipping, spraying	2
3	Steladone	Chlorfenvinphos	Organophosphate	Dipping, spraying	8
4	Nuvan	Dichlorvos	Organophosphate	Dipping, spraying	4
5	Tagafon	Trichorofen	Organophosphate	Dipping, spraying	1
6	Gold Fleece	Diazintol	Organophosphate	Dipping, spraying	7
7	Tse-tse, tick, pour on	Deltamethrin	Synthetic Pyrethroid	Pour on	8
8	Pouracide	Alpha Cypermethrin	Synthetic Pyrethroid	Pour on	9
9	Ectopor	Flumethrin	Synthetic Pyrethroid	Pour on	7
10	Clout	Deltamethrin	Synthetic Pyrethroid	Pour on	4
11	Tick, Fleas pour on	Flumethrin	Synthetic Pyrethroid	Pour on	3
12	Tick & Fleas dog powder	Pyrethrin	Synthetic Pyrethroid	Pour on	3
13	Stomoxyn-P	Pyrethrin	Synthetic Pyrethroid	Pour on	1
14	Tick & Fleas Shampoo	Pyrethrin + VitE	Synthetic Pyrethroid	Pour on	3
15	Primose shampoo powder	Pyrethrin	Synthetic Pyrethroid	Pour on	4
16	Bayticol pour on	Flumethrin	Synthetic Pyrethroid	Pour on	1
17	Spot on	Deltamethrin	Synthetic Pyrethroid	Pour on	4
18	Tick, Fleas Pet soap	Pyrethrin	Synthetic Pyrethroid	Pour on	2
19	Spot or Pour on	Deltamethrin	Synthetic Pyrethroid	Pour on	1
20	Roadans grooming oil	Pyrethrin	Synthetic Pyrethroid	Pour on	1
21	Ivomec	Ivermectin	Avermectins	Injectable	8
22	Kepromac	Ivermectin	Avermectins	Injectable	1
23	Dectomax	Ivermectin	Avermectins	Injectable	1
24	Marapour	Levamisole	Imidazothiazole	Pour on	1
25	Furadine	Carbofuran	Carbamate	Dipping, spraying	1
26	Opigal	Methylcarbamate	Carbamate	Dipping, spraying	2
27	Triatrix	Amitraz	Formamidine	Dipping, spraying	5
28	Milbitraz	Amitraz	Formamidine	Dipping, spraying	1

The fact that no farmer or clinic complained of resistance could be as a result of dipping and spraying which are the most favoured methods of applying pesticides, since required dosages are used in most cases dipping and spraying (Hall, 1977). The variation in the frequency of use of the pesticides could have been influenced by many factors such as residual effect, the type of management of the animals which affects their parasitic burden and the availability of the pesticides. The application of pesticides only when the infestation is high may reduce the effectiveness of the chemicals and might eventually lead to the development of resistant strains of the ectoparasites. It could even permit the transmission of some pathogens to the livestock (Lapage, 1968). In addition, enormous amounts of blood could be sucked, especially by ticks, leading to anemia (Natala, 1997).

The cases of toxicity that were reported may be attributed to the non-compliance to the manufacturers' instructions as regards the right concentrations of the pesticides to be used. Dipping of young animals could also result in toxicity as their naivety might lead them to accidental swallowing or licking of the pesticides.

This survey enabled the compilation of the inventory of available pesticides used in the control of ectoparasites of livestock in Kaduna State and how they are handled by the end users. However, it is imperative to carry out further in vitro and in vivo assays in order to ascertain their true levels of efficacies and to check the likelihood of development of resistance.

Table 2: Pesticides used by farms and veterinary clinics to control ectoparasites in Kaduna, Northern Nigeria.

S/N	Pesticide (Brand Name)	Common Chemical Name	Chemical Group	No. of Shops
1	Rhodiacide	Ethion	Organophosphate	3
2	Steladone	Chlorfenvinphos	Organophosphate	3
3	Asuntol	Coumaphos	Organophosphate	7
4	Pfizona	Chlofenvinphos	Organophosphate	2
5	Diazintol	Diazinol	Organophosphate	3
6	Gold fleece	Diazinol	Organophosphate	1
7	Sniper DDVP	DDVP	Organophosphate	1
8	Nuvan	Dichlorvos	Organophosphate	1
9	Ectopor	Flumethrin	Synthetic pyrethroid	4
10	Pour on	Flumethrin	Synthetic pyrethroid	3
11	Tse-tse, tick pour on	Deltamethrin	Synthetic pyrethroid	1
12	Bayticol	Flumethrin	Synthetic pyrethroid	2
13	Spot on	Cypermethrin	Synthetic pyrethroid	3
14	Primose, tick, fleas pour on	Pymethrin	Synthetic pyrethroid	1
15	Gamatox	Lindane	Organochlorine	1
16	Chanatic	Benzenehexachloride	Organochlorine	1
17	Ivomec	Ivermectin	Avermectin	4
18	Duramectin	Ivermectin	Avermectin	2
19	Triatrix	Amitraz	Formamidine	1

6 REFERENCES

Awumbila B. and Bokuma B: 1994. Survey of pesticides used in the control of ectoparasites of farm animals in Ghana. Tropical Animal Health and Production 26: 7-12.

Beugnet F. and Chardonnet L: 1994. Tick resistance to pyrethroids in New Caledonia. Veterinary Parasitology 56: 325-338.

Carson R: 1963. Silent spring. Namish Hamilton, London. Pp 16-25.

Dipeolu O. O, Mongi A.O, Nyindo M.A, Essumah S.T, Kamangosollo E.L.P and Odhiambo T.

R: 1990. Progress in the production of an anti-tick vaccine. Seventeenth Annual Report (1989). The International Centre of Insect Physiology and Ecology (ICIPE), Nairobi, Kenya, PP 30-32.

Hall H.B.T: 1977. Diseases and parasites of livestock in the tropics. Longman Group, London. Pp 55-59.

Kenneth A. H: 1982. The chemistry of pesticides: Their metabolism, mode of action and uses in crop protection. The Macmillan Press Ltd. London and Basingstoke, pp 28-58.

Lapage G: 1968. Veterinary Parasitology. 2nd ed. Oliver and Boyd, Edinburgh and London. Pp. 1082-1120.

Natala A.J, Okubanjo O.O, Ulayi B.M, Owolabi Y.N, Jatau I.D. and Yusuf K.H :2009. Ectoparasites of domestic animals in Nothern Nigeria. Journal of Animal and Plant Sciences. 3: 238-242.

Natala A. J: 2006. The distribution of sialidase and other glycosidases in the developmental stages of *Amblyomma variegatum* and the characterization of the tick stage specific sialidase and galactosidase. Ph.D Thesis, Ahmadu Bello University Zaria, Nigeria. 133 pp.

Natala A. J: 1997. Studies on the biology and chemical control of *Amblyomma variegatum* (Fabricius, 1794) ticks on the Accra Plains of Ghana. M. Phil. Thesis, University of Ghana, Legon. 155pp.

Tahori A.S and Galum R: 1976. The rise and fall of DDT. Israeli Journal of Entomology. 11: 35-51.

Willadsen P, Riding G.A, Mckenna R.V, Kemp D.H, Tellam R.I, Nelsen J.N, Lahnstein J, Coborn G.S and Gough J.M:1989. Immunological control parasitic arthropod. Identification of a protective antigen from *Boophilus microplus*. The Journal of Immunology. 143: 1346-1351.

Youdeowei A. and Service M.W: 1983. Pest and vector management in the tropics. Longman Group Limited pp54.