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A survey of acaricide use in the control of ectoparasites by livestock farmers in sub urban Accra, Ghana

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Abstract: A total of 17 acaricides were identified in 77 small holder livestock farms in suburban Accra during farm surveys to identify acaricides being used by livestock farmers. It comprised Pyrethroids, Amidines and Organophoshates. A survey of Veterinary shops in the project area showed the presence of 12 of the listed chemicals. All the acaricides showed no FDA stamp probably because of batch authorisation. LC values were also not explicitly shown on the acaricides. The Pyrethroid, Drastic Deadline, was patronised by the livestock farmers more than any other acaricide as 32.5% of the farms used it. This was followed by the Amidines, Amitraz20, used by 19.5% of farmers. This high level of variety is dangerous as it could lead to acaricide resistance, resulting especially from improperly managed tick control at the farms.

Keywords: Acaricides, Amidines, Chemicals, Pyrethroids, Suburban

1. Introduction

Acaricides are the major chemicals used to control ticks and other ectoparasites. Ticks have a wide host and geographic diversity and therefore present a strong constraint to livestock production in the tropics and the subtropics [8, 9, 16]. They are also of veterinary importance to man than other ectoparasites due to the large volume of blood they consume over the long attachment period they spend on their host [2].

As the ticks take their blood meal, they also transmit disease causing organisms to not only the livestock but also man. The menace of tick infestation and their effect on the livestock industry has been estimated to cause the loss of 0.7 kg/tick per livestock weight to the cattle industry.

Ticks are major threat to the livestock and the hospitality industry but yet do not receive the needed attention especially in the tourism potential countries in Africa. The problems of tick transmitted disease to livestock have not been adequately circulated hence ticks are seen and accepted as one of those that one can easily gloss over. Ticks are major agents of disease to man and his livestock.

The control of tick infestations and the transmission of tick-borne diseases remain a challenge for the cattle industry in many areas[2], as they are also seen as a threat to the emerging tourism industry where exposure to tick bites have been associated with tick borne- relapsing fever, [7].

In Ghana, the control of ticks is currently by means of acaricides. In this study, the types, level of usage, compliance of acaricide container labeling to the Ghana Standard Authority (GSA) and Foods and Drugs Authority (FDA) regulations by livestock farmers in suburban Accra were monitored.

2. Materials and Methods Research Setting

The study area lies in the Savannah zone with two raining seasons with an annual rainfall of about 730mm. The peak season falls primarily during May and ends in mid July. The second season begins in August and cuts off in October. There is little variation in temperature throughout the year. The mean monthly temperature ranges from 24 to 28 ^{o}C. August is the coolest period whilst the hottest period is March. Relative humidity is usually high ranging from 65% in the mid-afternoon to 95% at night.

Because of the massive built environment as a metropolis, the vegetation has been altered in several ways to suit a changing urban landscape as well as directly by changing climatic factors. The hitherto dense tropical forest has been replaced by only a few remnant trees. Currently, the vegetation is basically that of Sudan and Guinea savannah types. There exist different species of antelopes, squirrels, monkeys and reptiles. There are also many

species of snakes, lizards in addition to many domestic animals such as donkey, sheep, goat and chicken.

At the north east of the study area lies the Shai Hills which has a small game park with several species of monkeys and ground foraging animals as well as birds.

The population of Accra is currently in the region of 2,291,352 million people and is one of the most populated and fast growing Metropolis of Africa with an annual growth rate of 3.5%. The Accra Metropolitan Area is the most industrialized in Ghana contributing over 10% of the Gross Domestic Product (GDP). Over 30% of the manufacturing activities, representing over 50% of value added are located in the area and by extension, problems associated with urban sanitation and hygiene exist here. It is manifested in development of slumps, poor solid and liquid waste disposal, pests and vectors breeding sites.

2.1. Study Design

Focus group interviews of Livestock farmers were employed to solicit adequate responses. Information on Acaricide containers, labelling and other materials were carefully noted. All kraals identified in the study area were used for the study. Information gathered were analysed using Statiscal Package for Social Sciences (SPSS 13.0).

3. Results and Discussion

The use of chemicals to control ticks and its infestation is the major control strategy adopted by farmers currently. In this strategy, the objectives are to reduce the negative effect of the chemical on the environment as well as the target, the livestock, whilst inflicting the highest possible damage on the ticks and this should ensure that, livestock and applicators are not harmed, the tissues of the treated animals would not contain chemical residues and the environment would not be affected [4].

The conventional control methods include the use of chemical Acaricides which give some partial results albeit shortcomings like the presence of chemical residues in milk, meat and the development of tick resistant strains [17,11].

[6] also identified the development of resistant tick populations, harmful effect on livestock and humans as well as the environment.

A wide range of Acaricides exist for use against ticks of domestic animals and livestock among one of the many methods used to control ticks [14]. Documented Acaricides include; arsenics, chlorinated hydrocarbons, organophosphates, carbamates and synthetic pyrethroids. The quality and quantity of the active ingredients inherent influences the efficacy of the Acaricide.

Arsenic was first used for tick control in 1893 in South Africa [3]. It was globally used effectively to control tick and tick borne disease before resistance to the chemical was detected [5]. Some qualities of this chemical that made it suitable were that, it was inexpensive, stable and water soluble as well as its easiness to use as an accurate vat-side test.

As a result, it was the first Acaricide to be used. It was widely used in dipping to control ticks of the genus *Rhipicephalus (Boophilus)*. In Southern United States, Arsenic was successfully used to eradicate *Rhipicephalus* ticks. However, Arsenic has a very short residual effect lasting for just about less than one to two days. In most areas of the world, *Rhipicephalus* ticks have developed resistance to it [4]. It is normally formulated as water soluble Sodium arsenite.

Chlorinated hydrocarbons are Acaricides that have been withdrawn from the shelves as a result of their high toxicity and long life span [13]. They are synthetic chemicals that were used as replacement for arsenicals as a result of multiple resistance development by many tick species [10,1]. Their mode of action is through the interfering with the tick nervous system [12].

After significant development of resistance against chlorinated hydrocarbons by ticks, organophosphorus acaricides were introduced as replacement. By 1950, they were being used to control tick problems [15].

However, their residual effects were shorter than the chlorinated hydrocarbons but with high toxicity levels to livestock. By 1963, significant resistance by ticks to these chemicals was also detected [18]. The organophosphorus compounds were synthesized as esters of phosphoric acid.

Carbamates acaricides are rather expensive and closely resemble the organophosphates but are prepared as esters of carbamic acids. They are also more toxic to mammals than the organophosphates [13].

Acaricides are applied through, dipping, spraying, spot treatment or hand dressing

Dipping provides a highly effective method of treating animals with Acaricides for the control of ticks. The disadvantage of this method however is the initial construction cost and the cost of Acaricide which make this method unattractive for small scale ranching operations. The method involves immersion of animals in a dipping tub containing solution of chemicals [19].[10] mentioned the use of dipping vats as far back as 1893 in Australia, Africa and the United States of America as means of controlling tick infested cattle and transmission of tick borne diseases.

The spraying method of tick control is not as efficient as dipping. It involves the use of fluid Acaricides applied to animals by means of a spray. The spraying equipment is portable and needs only small amounts of Acaricides to be mixed for the application. The Acaricides may not be thoroughly applied to all parts of the animal body hence it is less efficient than the dipping method of application [4].

The 2 methods mentioned above, dipping and spraying may not exposed ticks in the inner parts of the ear, under part of the tail, the tail brush and the areas between the teats and the legs in cattle with large udder, to the Acaricides and hence may escape treatment. The process of applying Acaricides to these areas by hand is termed hand dressing or spot treatment. The advantage here is that the method is more effective and economical in terms of cost of Acaricide as spot treatment is restricted to only selected areas instead of the whole animal. The disadvantage however is that the

process is time consuming and laborious [4].

Table 1. *Types of acaricides commonly used by the small scale livestock farmers in the study area.*

Acaricide Type (Trade Name)	% Usage	% Label Deficiency
Amiraz 20	19.5	9.1
Drastic Deadline	32.5	9.1
Amitix	11.7	9.1
Tactic	2.6	9.1
Mbitrac	1.3	9.1
Abotic	3.9	9.1
Vetancid	2.6	9.1
Femro Vet-20	1.3	9.1
Cipertroide	1.3	9.1
Alfatix	1.3	9.1
Ektocip	1.3	9.1
Imtraz-125	5.2	9.1
Damapor	1.3	9.1
Cyper Top	1.3	9.1
Milbitraz	7.8	9.1
Abotic	5.2	9.1
Sutox-EC	5.2	9.1

Table 2. *Chemicals available in shops in the study area.*

Acaricide Type (Brand Name)	Chemical Group	Mode of Application
Armiraz 20	Formamidine	Dipping, Spraying
Drastic Deadline	Pyrethroids	Dipping, Spraying, Hand washing
Amtix	Amidines	Dipping, Spraying, Hand washing
Tactic	Amidines	Dipping, Spraying, Hand washing
Mbitrac	Amidines	Dipping, Spraying, Hand washing
Abotic	Amidines	Dipping, Spraying, Hand washing
Vetancid	Organophosphate	Dipping, Spraying
Cipertroide	Pyrethroids	Pour-on
Alfatix	Pyrethroids	Dipping, Spraying, Hand washing
Damapor	Pyrethroids	Pour-on
Cyper Top	Organophosphates	Pour- on
Milbitraz	Formamidine	Dipping, Spraying, Hand washing
Abotic	Amidines	Dipping, Spraying, Hand washing

Formamidine, Pyrethroids, Amidines and Organophosphates are the main acaricides identified at the study sites as shown in Tables 1 and 2 above. 17 different acaricides been listed in the 77 farms studied (Tables 1 and 2) above. An average of 5 acaricides has been identified to be used in each farm visited. The acaricide, Drastic Deadline (Pyrethroids) was the most commonly used (Table 1). Pyrethroids are known to destroy the nervous system of the arthropod resulting in paralysis and death. 32.5% of acaricides used were pyrethroids. In all the acaricides surveyed (Table 1), all the acaricides depict % labelling Deficiency of 9.1%. Out of the 11 information monitored on their packages, LC values were conspicuously absent. A survey of Veterinary shops in the project area showed the presence of 12 of the listed chemicals (Table 2). 5 were not found in shops in the study areas. All the acaricides showed no FDA stamp as a result of may be batch authorisation.

4. Conclusion

A variety of Pyrethroids, Amidines and Organophoshates are used as acaricides in the survey area with about 70.6% available in Veterinary shops in the project area. All the acaricides showed no FDA stamp probably because of batch authorisation and LC values were not explicitly shown on the acaricides. The pyrethroids, Drastic Deadline was the most patronised acaricide, with 32.5% of the farms using it. This was followed by the Amidines, Amitraz20, used by 19.5% of farms. This high level of variety of acaricide use is dangerous as it could lead to acaricide resistance development, resulting from improperly managed tick control in the farms.

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References

[1] Angus, B.M. The history of the cattle tick *Boophilus microplus* in Australia and achievements in its control. *Australian Soc Parasitology*. 1996. 26:1341-1355.

[2] Amr, E.E,, Yasser, E.S., Amira, M.K.A., Mohamed, E.S. Purification and characterisation of two larval glycoproteins from the cattle tick *Boophilus annulatus J.Vet.Sci* .2007. 8:175-180.

[3] Bekker, P.M. The history of dipping. *Veld*. 1960. 20:1-5.

[4] Drummond, R.O. Tick-borne livestock diseases and their vectors. Chemical control of ticks. *Wld Anim Rev, (FAO*).1983. 36:28-33.

[5] George, J.E. Present and future technologies for tick control. *Annual New York Academy of Science.* 2000.916:583-588.

[6] Garcia-Garcia, J.C., Monteo, C.,Redondo, M.,Vargas, M., Canales, M., Boue, O.,Rodriguez, M., Joglar, M.,Machaodo, H., Gonzalez, I.L. Control of ticks resistant to immunization with Bm86 in cattle vaccinated with the recombinant antigen Bm95 iso lated from the cattle tick, *B.microplus*. *Vaccine*. 2000.18:2275.

[7] Heerdrink, G.,Petit, P.L.C., Hofwegen, H.,Genderen, P.J.J.,Genderen, P.J.J.V. A patientwith Fever following a visit to the tropics: tick-borne relapsing fever discovered in a thick Blood smear preparation. *Net. Tij. Geneeskunde. 2006.*150:2386-2389.

[8] Keyyu, J.D., Kyvsgaard, N.C., Kassuku, A.A. and Willingham, A.L. Worm control practices and anthelmintic usage in traditional and dairy cattle farms in the southern highlands of Tanzania. *Veterinary Parasitology*. *2003*.114:51-61.

[9] Githiori,J.B. 2004. Evaluation of anthelmintic properties of ethno-veterinary plant ppreparations used as as livestock dewormers by pastoralists and smallholder farmers inKenya. Docoral thesis. Swedish University of Agricultural Sciences, Uppsala. 72pp. http://diss-epsilon.slu.se/archive/00000514/01/John_Githiori_Thesis.pdf

[10] Matthewson, M.D., Baker, J.A.F. Arsenic resistance in species of multihost ticks in the Republic Of South Africa and Swaziland. *J .of Sou. Afri Vet Assc*. 1975.46:341-344.

[11] Nolan, J. Acaricide resistance in single and multi-host ticks and strategies for control. *Parasitol*. 1990.32:145-153.

[12] Solomon, K.R. Acaricide resistance in ticks. *Advances in Verterinary Sciences and Compara tive Medicine*. 1983.27:273-296.

[13] Spickett, A.M. Acaricides and resistance. *Verterinary Ectoparasitology and Protozoology*. 1998.1:1-13

[14] Spickett, A.M.,Fivaz, B.H. A survey of cattle tick control practice in the Eastern Cape Province of South Africa. *Onderstepoort Journal of Verterinay Research*. 1992.*59*:203-210.

[15] Shanahan,G.J.,Hart,R.J. Change in response of *Lucilia cuprina* (Weid) to organophosphorus insecticide in Australia. *Nature*. 1966.212: 1466-1467.

[16] Swai, E.S., Mbise, A.N., Kessy, V., Kaaya, E., Sanka, P. and Loomu, P.M. Farm constraints, cattle disease perception and tick management practices in pastoral Maasai community-Ngorongoro, Tanzania. *Livestock Research for Rural Development*.2005. 17.http://www.Irrd.org/Irrd17/2/swai 17017.htm

[17] Wiladsen, P.,Kemp, D.H. Vaccination with concealed antigens for tick control. *Parasitol. Today*. 1988.4:196-198

[18] Wharton, R.H. Acaricide resistance and cattle tick control. *Aust. Vet. Journal*.1967.43:394-398.

[19] Zahid,I.R.,Song-hua,H.,Wan-ju,C., Abdullah,G.A.,and Chen-wen,X. Importance of ticks and their Chemical and immunological control in livestock. *Journal of Zhejiang University Science*.2006;7:912-921.