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Full Length Research Paper

Regulatory compliance of small holder livestock farmers and herdsmen in the use of acaricides and gastrointestinal anthelmintics in sub-urban Accra, Ghana

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Labelling information on Acaricides and Anthelmintics were monitored in some small scale livestock farms in suburban Accra to ascertain compliance to the Ghana Standard Authority regulations. 77 livestock farms were visited to record labelling information on Acaricide and Anthelmintics cans, bottles and boxes. Farmer age groups, academic background, numeracy, responsibility in acaricide and anthelmintics application and the types of acaricides and anthelmintics being used by the farmers were monitored. LC values were not conspicuously displayed on all the acaricides monitored whilst only 1 acaricide did not have manufacturing date.17 varied acaricides were used within the study period. Most of the acaricides and anthelmintics complied with the necessary regulations. In most instances, formulation procedures were based on what colleague farmers related to them. We therefore concluded that with the low level of education and the varied usage of acaricides, there was the potential of improper usage of the acaricides that could lead consequently to resistant tick species. And also that various levels of misapplication of both the acaricides and anthelmintics had occurred in the study areas as a result of their low educational background, incomplete labelling information and varied acaricides and anthelmintics.

Key words: Acaricide, anthelmintic, farmers, livestock, herdsmen, regulations, compliance.

INTRODUCTION

Ticks and helminths have a wide host and geographic diversity and hence constitute a major constraint to livestock production in the tropics and the subtropics (Keyyu et al., 2003; Githiori 2004; Swai et al., 2005). They are also of great Veterinary importance as disease agents, Amr et al., 2007, and also as a threat to the tourism Industry (Heerdrink et al., 2006). In Ghana, the control of ticks and helminths are currently by means of acaricides (Koney et al., 2004) and Anthelmintics (Agyei et al., 2005; Addah and Yakubu 2008). Arsenic was first used for tick control, it was globally used effectively to control tick and tick borne disease before resistance to the chemical was detected (George, 2000). 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 (Drummond,1960). 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 (Drummond, 1983). 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 (Spickett, 1998). They are synthetic chemicals that were used as replacement for arsenicals as a result of multiple resis-

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tance development by many tick species (Matthewson and Baker, 1975; Angus, 1996). Their mode of action is by interfering with the tick nervous system (Solomon, 1983). After significant development of resistance against chlorinated hydrocarbons by ticks, organophosphorous acaricides were introduced as replacement. By 1950, they were being used to control tick problems (Shanahan and Hart, 1966). 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 were also detected (Wharton, 1967). The organophosphorus compounds were synthesised 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 (Spickett, 1967). 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 (Zahid et al., 2006). Moler,(1906),Matthewson and Baker(1975) 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 a small amount 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 (Drummond, 1983). The 2 methods mentioned above, dipping and spraying may not expose 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 (Drummond, 1983). In using chemicals to control ticks and their infections, farmers must ensure less negative effect of their activity on the environment, the target ticks, the livestock (animal tissues) as well as those applying the chemicals (Drummond, 1983). The use of chemical Acaricides which gives some partial results but some there are shortcomings like the presence of chemical residues in milk, meat and the development of tick resistant strains (Willadsen and Kemp, 1988; Nolan, 1990). Garcia-Garcia et al., (2000) also identified the development of resistant tick populations, harmful effects of the acaricides on livestock and humans as well as the environment. Major worm species of health importance to the livestock industry in Ghana include; *Haemonchus sp*. (Agyei, 1991), *Oesophagostomum* and *Trichostrongylus* (Agyei, 1997).The objectives of this study is to sample the use of acaricides and Anthelmintics among small holder livestock farmers in 77 farms in suburban Accra, determine whether requirements on labelling information are compliant to the Ghana Standards Authority Act, Standards Decree, 1973 (NRCD 175) and Act 528(1996) on the registration of pesticides, dealers, exporters and distributors etc.

MATERIALS AND METHODS

The study was carried out on all cattle ranches or kraals and livestock farms in the Ga West Municipal Assembly, Ga East Municipal Assembly, Adentan Municipal Assembly, Dangbe West District Assembly and Tema Municipal Assembly that were located, in the Sub- urban Accra of Southern Ghana. Relevant questionnaires were administered to respondents using the Rural Appraisal Method and direct observation of respondents. 77 livestock farmers of cattle, sheep, goat, pigs, guinea fowls and chicken were involved in the study from August 2012 to January, 2013. 11 labelling specifics were monitored; Trade name, Manufacturers address, Formulation, Acaricide/ Anthelmintics type, Volume, LC values, Target species, Expiry date, Manufacturing date, Ghana Standard Authority Stamp/ Approval. Per cent labelling deficiency was calculated as:

Number of absent labelling (s) x 11/100.

Information gathered were analysed using Statiscal Package for Social Sciences (SSPS 13).

RESULTS

A total of 77 livestock farms were monitored during the study. Farmer age groups were found to be 20-30 (18%), 31-40 (39%), 41-50 (23%), 51-60 (12%) and 61-70 (8%) Table 1 and Figure 1, below. Only 1.3% of the farmers had tertiary education, 12% had Senior School education, 10% had Junior High school or Middle school leaving certificate whilst 66% had no education as shown in Table2 and Figure 2 below. Only 45% of the farmers were able to count more than 500, Table 3 and Figure 3. Application of on farm acaricides were done by herdsmen (56%), farm owners (5.2%) and Veterinary Technical Officers, 3.9%, Table4 and Figure 4 below. Also, 40% of the herdsmen were responsible for the de worming of livestock, compared to 13% for farm owners and 10% for veterinary Technical Officers as shown in Table5 and Figure 5 below. 17 different acaricides were identified in

Table 1. Age group of livestock farmers.

Age Group	Total farmers	% of farmers
20-30	14	18
31-40	30	39
41- 50	18	23
51-60	9	12
61-70	6	8

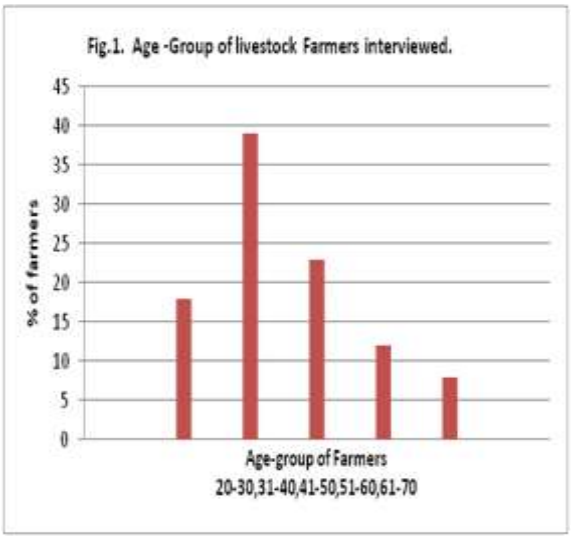

Table 2. Educational background of livestock farmers in the study areas.

Level of Education	No. Of farmers	% of total farmers
Tertiary level	1	1.3
Senior High School	9	12
Junior High School	8	10
Middle School	8	10
No education	51	66

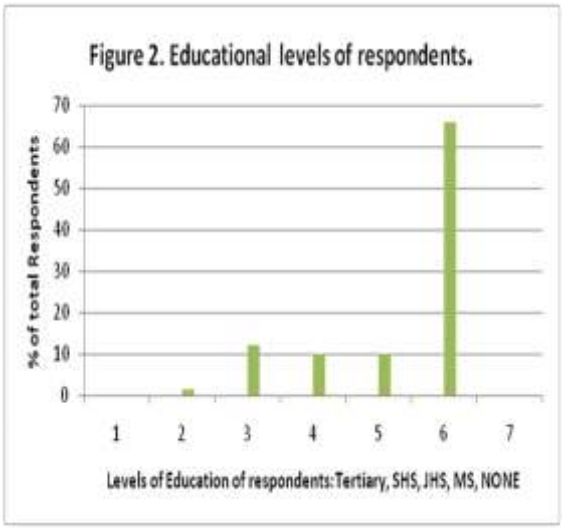

Table 3. Level of numeracy among livestock farmers interviewed.

Range of Numeracy farmers	No. Of farmers	% of total
1 to 50	3	3.9
51 to 100	5	6.5
101 to 200	9	12
201 to 500	16	21
Above 500	35	45
Neither	9	12

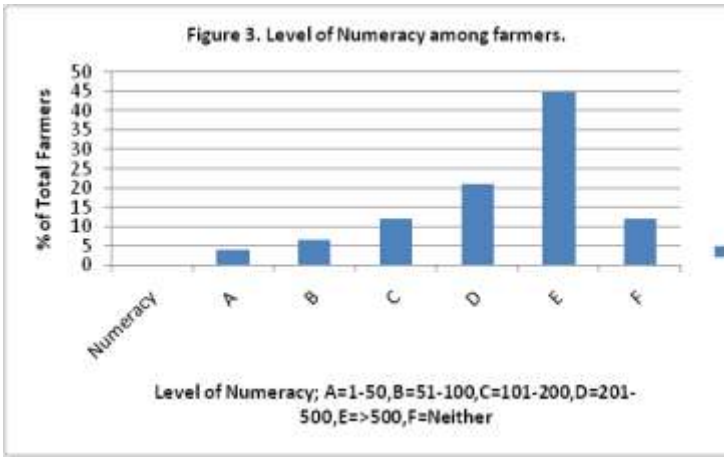

Table 4. Application of Acaricides.

Applicant	No.	%
Herdsman	43	56
Farm- Owner	4	5.2
Veterinary Officer	3	3.9

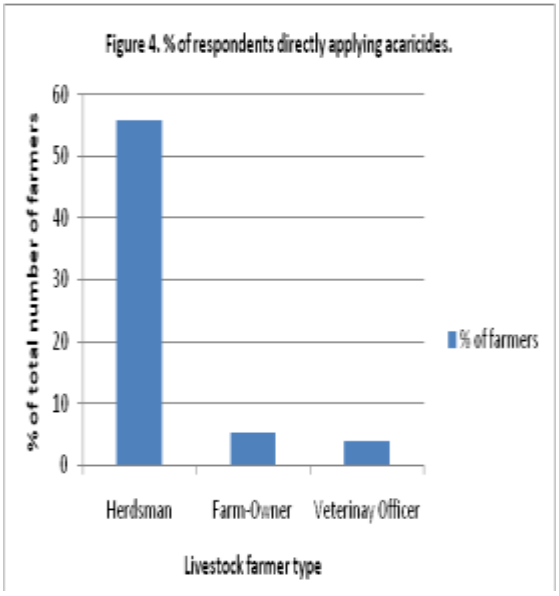

Table 5. Deworming of livestock.

Applicant	No.	%
Farm-Owner	10	13
Herdsman	31	40
Veterinary Officer	8	10

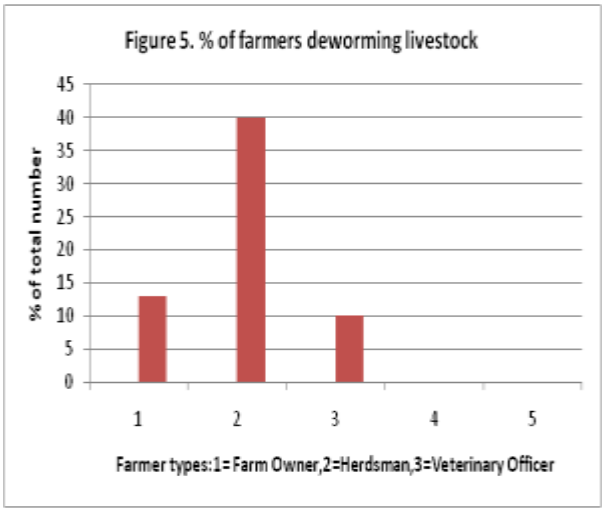

Table 6. Types of acaricides commonly used by the small scale livestock farmers in the study area.

Acaricide Type	Chemical Group	% Usage	% Label Deficiency	Mode of Application
Amiraz 20	Amidines	19.5	9.1	Pour on,Spraying
Drastic Deadline	Pyrethroid	32.5	9.1	Pour on
Amtix	Amidines	11.1	9.1	Dipping,Spraying, Handwashing
Tactic	Amidines	2.6	9.1	Dipping,Spraying, Handwashing
Mbitrac	Amidines	1.3	9.1	Dipping, Spraying, Handwashing
Abotic	Amidines	3.9	9.1	Dipping, Spraying, Handwashing
Vetancid	Organophosphates	2.6	9.1	Dipping, Spraying
Femro Vet-20	*	1.3	9.1	*
Cipertroide	Pyrethroid	1.3	9.1	Pour on
Alfatix	pyrethroid	1.3	9.1	Dipping,Spraying, Handwashing
Ektocip	*	1.3	9.1	*
Imtraz-125EC	*	5.2	9.1	*
Damapor	Pyrethroid	1.3	9.1	Pour on
Cyper Top	Pyrethroid	1.3	18.2	Pour on
Milbitraz	Amidines	7.8	9.1	Dipping,Spraying, Handwashing
Abotic	Amidines	5.2	9.1	Dipping, Spraying, Handwashing
Sutox-Ec	*	5.2	9.1	*

*means illegible mark on container

the 77 livestock farms with varying percentage usages, Tables 6 and 7 respectively. 8 brands of Anthelmintics were identified in the study areas with the Albendazole group being most, Table 8. LC values were the only deficient labelling information lacking on acaricides containers whilst the anthelmintics deficiencies were man-

Table 7. Label information not available on Acaricide containers.

Acaricide Type (Trade Name)	Label Information Absent
Amiraz 20	LC values
Drastic Deadline	LC values
Amtix	LC values
Tactic	LC values
Mbitrac	LC values
Abotic	LC values
Vetancid	LC values
Femro Vet-20	LC values
Cipertroide	LC values
Alfatix	LC values
Ektocip	LC values
Imtraz-125EC	LC values
Damapor	LC values
Cyper Top	LC values, Manufacturing date
Milbitraz	LC values
Abotic	LC values
Sutox-EC	LC values

Table 8. List of Anthelmintics used as dewormers in the study area in sub urban Accra, Ghana.

Anthelmintics type Deficiency	% Usage	% Label
Albendazole 10%	23.4	9.1
Multibendazole 10%	28	9.1
Albenol-100	5	9.1
Levacide	2	9.1
Alba 100	1	9.1
Vet-Lexgen	1	9.1
Wormazole10%	6	27
Ashaiben 2.5%	9	36

facturing date, expiry date etc., Table 8. 8 different anthelmintics were used by the farmers within the study period. These have various levels of usage; Albendazole was most used at 36% and Multibendazole, 27%. The anthelmintics also had deficient labelling.

DISCUSSIONS

Ghana was one of the first countries in Africa to sign the Rotterdam Convention on Prior Informed Consent for importation of pesticides which enables the country to regulate the importation of dangerous and unregistered agro-chemicals (Williamson 2001). The Foods and Drugs Authority (FDA), mandated by PNDC Law 305b, Act 523, to register and license all foods and medicines in Ghana, co enforced by the Environmental Protection Agency (EPA) and the Customs Excise and Preventive Service. Labelling standards must also conform to the Ghana Standards Authority Specifications. A wide range of Acaricides exist for use against ticks of domestic animals and livestock. It is one of the many methods used to control ticks (Spickett and Fivaz, 1992). Documented Acaricides include; arsenics, chlorinated hydrocarbons, organophosphates, carbamates, amidines and synthetic pyrethroids. The quality and quantity of the active ingredients inherent influences the efficacy of the Acaricide. Current list of acaricides observed during the study were mostly, pyrethroids, Amidines and Organophoshates. None of the outlawed chemicals in Ghana was detected. The labelling information on the acaricide and anthelmintics containers needed various forms of interpretation before administration to the livestock. It needed well trained personnel like Veterinary Technicians. From Table 4 and Figure 4, the application was undertaken mostly by the herdsmen (56%), farm owners (5.2%) and the Veterinary Technical Officers (3.9%). It could also be deduced from Table2 and Figure 2 that 66% of the farmers were illiterates. It was therefore clear that the herdsmen who were mostly uneducated because they are usually the least of the farm hands were mostly involved in the application of the acaricides, formulations and application procedures were mostly learnt or heard from other farmers who might at a point in time hired the services of a Veterinary Technician and hence picked this from him probably through observation. The herdsmen also performed (40%) deworming duties more than the farm owners (13%) and Veterinary Technical Officers (10%). In the area of deworming, some of the anthelmintics were as high as 36% and 27% in incorrect labelling information. The high incidence of different acaricide usage and anthelmintic usage in the farms could be as a result of lack of adequate information on acaricide and anthelmintic usages as well as deficiency in information interpretation leading to little effect on target ectoparasites hence the desire to change. These finding agrees with those of (Addah et al., 2009; Swai et al., 2005). Acaricides and anthelmintic specifics

were inspected for label information. Tables 7 and 8 above gave the various specifics in percentages. For the acaricides, the missing labelling was LC values which as were all the cases not very discernible on the acaricide containers and must need some further calculations. This gave label deficiency of 9.2% for the acaricides in this category as shown in Table 7. For the anthelmintics, the least deficiency was 9.1% and the maximum was 36% in the case of Ashaiben where 4 of the 11 labelling information were absent. The only explanations for these were that it was likely the certification of these products might have been inscribed on the bulk containers (cartons) used for packaging rather than individual bottles or containers or they were illegally brought into the country. Most of the acaricides and anthelmintics satisfied requirements under the regulatory systems, as shown in Tables 6,7 and 8 above; The Environmental Protection Agency Act of 1994 (Act 490) and the Pesticides registration Act (1996) which requires registration of Pesticides, dealers in Pesticides, importers and distributors, The Standards Decree of 1973(NRCD 175) which provides promulgation of standards and ensuring high quality goods and related matters and the Foods and Drugs Authority Act (1992).The use of acaricides and anthelmintics in the livestock industry in Ghana is very haphazard as shown by this study. Worst of all, their use is now mainly in the hands of untrained and mostly illiterate livestock farmers. Unless prompt and decisive actions and steps are taken by the regulatory agencies to monitor the use of these drugs and chemicals, our environment, food in terms of animal proteins are in danger of contamination and pollution. Also the users of these chemicals and drugs are in danger of self poisoning. We therefore conclude that even though most of the acaricides and anthelmintics have satisfied the regulatory features, various levels of misapplication had occurred in the study areas as a result of their low educational background, incomplete labelling information in some cases as well as lack of adequate guidance from field Veterinary Officers. We therefore recommend improvement in extension services by the Veterinary Authorities and enforcement by Regulatory agencies.

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