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A Field Trial on the Efficacy of Ivermectin, Albendazole and Coumaphos Against Parasites of Buffaloes

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ABSTRACT

Results from identification work yeilded six nematodes, one cestode and one trematode, as the helminths accounting for the severe, mixed worm infection in the ranch. The Egg Per Gram (E.P.G.) resulted to confirm the ovicidal effect of Albendazole and Ivermectin against nematodes, however, the latter have more prolonged action than the former. Gross fecal examination showed that the mentioned drugs had a vermifugal and vermicidal effect on the nematodes. However, Ivermectin lacks this properties against cestodes. Insecticidal activity of Ivermectin was also compared with Coumaphos against lice (*Haematopinus* spp.). Both displayed the same activity with regards to the ability to get rid of the external parasites. Economic analysis showed that Ivermectin had more expensive than Albendazole and Coumaphos which combined regardless of labor and equipment needed. However, Ivermectin-treated animals showed a higher weight gain than those treated with Albendazole and Coumaphos and control.

INTRODUCTION

Because of the increasing demand for quality protein, an increases in animal production is a must. Our animal population has increased through the year compared with the human population. In the Philippines the buffaloe population in 1989 was approximately 2,825,836. Even with this number, the large ruminant population has not yet enough to meet the effective demands for meat, work and for other purposes. Poor planning and lack of attention seemed to be small problems, and technical know-how concerning with herd health can make serious inroads to profits (Fraser, *et al.*, 1986). In the economic production of livestock, every female should produce living offspring and raise them to market weight. It is imparative therefore to investigate some nematodes of controlling the common diseases specially the parasitic ones (Drummond, 1987). Veterinarians and animal husbandmen should be knowledgeable of the most effective antiparasitic agents currently available in the market. This will help them in their extention service to farmers with regards to the choice of appropriate preparation in the prevention and control diseases. This study was investigated for enable the animal scientists to formulate an effective parasitic control program in the animal farm. This research objective were identified both external and internal parasites in order to determine the efficacy of injectable Ivermectin and anthelmintic Albendazole, and eva-

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luated the insecticidal efficacy of Ivermectin and Coumaphos to determine the degree of parasitic infection and infestation before and after treatment.

METERIALS AND METHODS

A study on the antiparasitic efficacy of Ivermectin, Albendazole and coumaphos in buffaloes was conducted at the Philippines Carabao Research Development Center (PCRDC). Thirty two water buffaloes (superated into two groups-more than three years and less than three years) were used in this study. Treatment were administration of tested drugs as follows : non-treated one which served as control (T_1), sprayed with Coumaphos (T_2), orally dose with Albendazole (1 ml/10 kg body weight) (T_3) and subcuteneously injected with 200 mcg/kg body weight of Ivermectin (T_4). Each treatment consisted of eight animals. Pre-treatment Examination ; Three consecutive days of fecal samples were collected per rectum and used for treatment 1, 3 and 4 respectively. The fecal samples were analyzed in laboratory. The modified Sheather's Flotation Technique, the Centrifugation Method, The Mc Master Method and Trematode Egg Identification described by Sloss and Kemp (1978), Coles (1980) and Soulsby (1982). The parasite infecting the buffaloes were identified using flotation technique and centrifugal's method. The average egg per gram count for three consecutive days were determined using Mc Master method. The egg per day and the estimated worm load were computed to assess the degree of helminth infection in the animals. The external parasite infesting animals in T_1, T_2 and T_4 were identified and counted the level of ectoparasitic infestation. Post-treatment Examination ; Gross fecal examinations were done for 24 hours administration to detect the vermicidal and vermifugal activities of Albendazole and Ivermectin. Egg per day count for T_1, T_3 and T_4 were daily done for seven days to determine the ovicidal activities of Albendazole and Ivermectin. The number of external parasites were daily noted for 7 days and for the 14th, 21st and 28th day post-treatment for T_1, T_2 and T_4 to determine the insecticidal activities of the tested drugs.

RESULTS AND DISCUSSION

The results revealed that the tested animals were injected with the roundworms : *Strongyloids* spp., *Capillaria* spp., *Haemonchus* spp., *Oesophagostomum* spp., *Neoascaris vitulorum* and *Trichostrongylus* spp. The buffaloes were also found to be injected the rumenfluk with *Paramphistomum* spp., and *Monieza* spp., tapeworm. An evaluation of the estimated worm load of the animals showed the degree of helminth infection as seen in the Table 1 and 2, and that the level of parasitism in the ranch had enough caused for economically losses. *Trichostrongylus* spp. was the major worm infecting the animals, with an everage estimated worm load of 12,250 and 22,750 in young and old animals, and 16,325 and 18,375 in males and females respectively. Meanwhile *Neoascaris vitulorum* was the lowest infecting specie, and evidenced by an average worm load of 0.10 and 0.15 in young and old animals, and 0.14 and 0.13 in males and females, respectively. It was shown that severe parasitism could be certainly hampered the steady growth factors of animals, such as nutrition, and genetic make up of the animals which should also be taken into consideration.

Degree of external parasitic infestation had shown that external parasite counts revealed that the animals were infested by the louse and *Haematopinus* spp. The number of lice ranged from 26 to 86 in males and 20 to 100 in females with an average of 56.06 in males and 59.25 in females. Young buffaloes had a range of 20 to 100, and an average of 58.63 while old buffaloes had a range of 26 to 100 with an average of 59.69 (Table 3). For the Pre-treatment parasite, louse infestation of the tested animals counted for this basis study had not enough to categorise a mild, moderate and severe degrees of infestation. Percent efficacy of the drugs ; The level of parasitism in the control group had compared with the tested group before treatment. The administration of the anthelmintic generally caused a drop in the egg

Table 1 Pre-treatment egg per gram (EPG), egg per day and estimated adult worm load of different helminths of male and female buffaloes.

Parasites	Average Egg per Gram		Average Egg per Day (million)		Average Worm Load (adult)	
	Male	Female	Male	Female	Male	Female
Oesophagostomum spp.	795.81	750.00	2.40	2.20	840.00	770.00
Haemonchus spp.	521.88	479.13	1.60	1.44	280.00	252.00
Neoascaris vitulorum	382.25	353.13	1.15	1.06	0.14	0.13
Strongyloides spp.	434.38	468.75	1.30	1.40	6,500.00	7,000.00
Trichostrongylus spp.	637.50	687.50	1.90	2.10	16,325.00	18,375.00
Capillaria spp.	728.00	683.13	2.20	2.05	-	-
Monieza spp.	1100.19	1064.38	3.30	3.20	-	-
Paramphistomum spp.	10.94	7.38	0.03	0.02	-	-
TOTAL	4610.95	4495.40	13.88	13.47	-	-

N = 32 male = 16, female = 16

Table 2 Pre-treatment egg per gram (EPG), egg per day and estimated adult worm load of different helminths of buffaloes ages less than 3 and more than 3 years old.

Parasites	Average Egg per Gram		Average Egg per Day		Average Worm Load	
	< 3	>3	< 3	>3	< 3	>3
Oesophagostomum spp.	959.38	568.44	1.92	2.30	675.00	805.00
Haemonchus spp.	463.50	537.50	0.91	2.10	159.25	367.50
Neoascaris vitulorum	444.75	290.63	0.89	1.20	0.10	0.15
Strongyloides spp.	515.63	387.50	1.00	1.60	5,000.00	8,000.00
Trichostrongylus spp.	687.50	637.50	1.40	2.60	12,250.00	22,750.00
Capillaria spp.	807.13	604.00	1.60	2.40	-	-
Monieza spp.	1048.75	1115.81	2.10	4.50	-	-
Paramphistomum spp.	11.81	6.50	0.02	0.02	-	-
TOTAL	4938.45	4165.88	9.84	16.73	-	-

N = 32 < 3 = 16, >3 = 16

per gram count, but the decreased was quite temporary, and the egg counts subsequently rose due to apparent ineffectivity immature forms. It was noted that Albendazole-treated animals had showed a peak, of efficacy against the roundworms on the fourth day of post-treatment, and decreased in efficiency on the subsequent days. Ivermectin-treated animals were got rid of parasite for a week after post-treatments and egg reappeared only on the fourteenth day of posmedication. The effect of Albendazole and Ivermectin against cestodes and trematodes (Table 4) indicated that Albendazole had higher anthelmintic efficacy which were 67.81 and 74.05 percent, respectively. Ivermectin had an effectivity to cestode and trematodes as 59.32 and 67.50 percent respectively. However

Table 3 Comparison among means of the degree of external parasitic infestation (Haematopinus spp.) at PCRDC-CLSU Ranch.

Sex/age	NO. of Exptl. Animal	Parasite Count	
		Range	Average
Male	16	28-86	56.06
Female	16	20-100	59.25
Less than 3 years	16	20-100	58.63
More than 3 years	16	26-100	59.69

Table 4 Number of adult worms recovered at gross examination of feces 24 hours post-treatment.

Treatment	Nematode		Destodes	
	Avg. no. of dead worms	Avg. no. of live worms	Avg. no. of dead worms	Avg. no. of live worms
Albendazole	1.87	9.87	1.87	8.50
Ivermectin	2.25	26.75	0.00	0.00

Ivermectin had more effective than Albendazole to control the nematodes. It was earlier noted that there were six nematodes which caused severe parasitism in the tested animals. Accordingly, the highest percentage of efficacy was 88.48 for Ivermectin treatment against nematodes, Albendazole had anthelmintic efficacy percentage of only 65.85 against the nematodes parasites. In comparing the action of Coumaphos and Ivermectin against lice (*Haematopinus* spp.) revealed that Ivermectin had higher percentage of efficacy of 84.26 percent than the 71.47 percent of Coumaphos. It means that Ivermectin had more effective than Coumaphos against lice (*Haematopinus* spp.) (Table 4). Gross examination of feces showed that Ivermectin and Albendazole had both vermicidal and vermifugal effects on roundworm parasites (Table 5). However their effects had more vermfugal activities than vermicidal activities. Fraser *et al.* (1986) stated that Ivermectin no vermicidal and vermifugal effects on cestodes because it did not utilized gamma-aminobutyric acid (GABA) as a neurotransmitter.

CONCLUSION

The gastrointesternal parasites were identified as follows ; *Oesophagostomum* spp., *Haemonchus* spp., *Neoascaris vitolorum, Strongyloidesa* spp., *Trichostrongylus* spp., *Capillaria* spp. *Monieza* spp. and *Paramphistomum* spp. The major ectoparasite present in the ranch was sucking lice (*Haematopinus* spp.). The EPG results for nematodes showed that Albendazole and Ivermectin had significantly reduced the EPG count, thus revealed the ovicidal activity of the two drugs. EPG results for trematodes and cestodea showed that Albendazole had more effective

Table 5 Percent efficacy of Ivermectin, Albendazole and coumaphous of the treated and control animal.

Treatment	% Efficacy			
	Ext. Parasite	Internal Parasites		
		Cestode	Trematode	Nematode
Control	-	-	-	-
Coumaphos	71.47	-	-	-
Albendazole	-	67.81	74.05	65.85
Ivermectin	84.26	59.32	67.50	88.48

than Ivermectin. Parasite count results showed more significant reduction of ectoparasite in Coumaphos and Ivermectin groups than the control. Ivermectin had more prolonged effect than Coumaphos. Gross examination 24 hour after treatment indicated that Albendazole and Ivermectin possess both vermicidal and vermifugal effect on nematodes. Albendazole showed vermifugal and vermicidal properties against cestedes while Ivermectin seemed to lack of these properties. Post administration observation showed no visible undesirable effect for the test drugs. Finally, gain in weight of the animals treated with the test drugs had higher than the untreated group.

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