MONTHLY INCIDENCE OF COCCIDIA INFECTION IN GOATS IN RIYOM DISTRICT, RIYOM LOCAL GOVERNMENT AREA OF PLATEAU STATE, NIGERIA

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Abstract

The research was undertaken from December 2015 to June 2016 (7 months) to determine the monthly incidence of Coccidia infection in goats in Riyom Districts in Riyom Local Area of Plateau State, Nigeria. 658 faecal samples were randomly collected to isolate and assess the level of coccidia Oocysts in goats in the study area. Samples were categorized according to month (December, 2015 to June, 2016), sex (male or female), age (<7 months = young, ≥ 8 months ≥= Adult), Reproductive status (pregnant or not pregnant) weight kilogram (3.0 – 7.9, 8.0 – 12.9, 13.0-17.9 and> 18.0 Animals were weighed using weigh scale, identified by sex and reproductive status through pregnancy diagnosis, faecal samples were collected into a plastic flask and routinely taken to the parasitology Laboratory of National Veterinary Research Institute, Vom and processed using floatation and sedimentation techniques. The result revealed a total incidence rate of 25.1%. The percentage infection rate was high in adults than in young with no significant difference (P>0.05). Floatation techniques yielded more parasites than sedimentation. Infection rate did not differ significantly (P>0.05) according to sex and reproductive status but differed significantly (P<0.05) according to body weight, the animals with higher body weight had less infection rate. The study concluded that goats in the study area suffer some level of coccidia infection and recommend proper feeding with good husbandry practice with timely administration of anti-coccidiostats to sustain goat production in the area.
Keywords: monthly, incidence, coccidia, infection, goats, Riyom District

Introduction

Coccidiosis is economically a disease that is caused by *Eimeria Spp* and large intestines are the target tissues of this protozoan parasites (Reza*, et al;* 2014). According to the works of Epeze, *et al* (2009) and Abubakar*, et al* (2020), who carried out a findings on the status of *Emeria i*nfection and clinical coccidiosis in west African Dwarf goats at Mbakwu, Anambra State and Red Sokoto goats and recorded prevalent rates of 72.8% and 98.8% respectively amongst the animals and attributed the difference in *Eimeria* infection to management systems, age groups and sexes. Useh (2005) conducted a resarch in Ahmadu Bello University

Veterinary Teaching Hospital in Zaria to document diseases of goats that occurred and reported coccidiosis as one of the disease militating against goat's production in the area. A research carried out in Mekelle, Regional State of Northern Ethiopia on prevalence of Coccidiosis in sheep and goats reported that species, sex and age of animals significantly ($p<0.05$) influenced the prevalence of pathogenic *Eimeria species* (Etsay, *et al,* 2020). Afzan *et al., (*2016) reported a high prevalence of Coccidiosis 89.2% in Malaysia mainly in kids, yearling and adult goats which was significantly ($p<0.05$) higher than other gastro-intestinal Nematodiasis (52.3%). Burna *et al (*2020) reported that intestinal tract infection usually occurs as a mild subclinical disease in healthy animals but severe acute disease may be seen in young, malnourished or immuno- compromised animals manifested by diarrhea, reduced weight gain, weakness or edema. Gofwan *et al* (2021) reported that Coccidia parasites are among the gastro-intestinal parasite of sheep or goats that affects not only their health but productive and reproductive performance leading to loss in body weight, reproductive performance, digestive disturbance and emaciation leading to increased susceptibility to other infections and this form the basis for this study which aimed to isolate and asses monthly level of coccidia in goats in the study area.

Materials and Methods

Study Area

Riyom is the headquarters of Riyom Local Government Area of Plateau State, Nigeria. Riyom LGA is located on latitude 9^0 38 00' and longitude 46^0 00'E, it has area of 807 km2 and a population of 131, 557 at 2006 census (National Population Commission, 2006). Riyom LGA has an average daily high temperature above 88^0f and lowest of 62^0f. The month with highest rainfall is August with average rain 8.0 inches and least in December, 0.0 inches (weather, 2016).

Age Determination

This was done based on the method described by Coombs (2002) with further confirmation from owners of the animals.

Pregnancy Diagnosis

The sign of pregnancy in the mature female goats was diagnosed by palpation of the gravid uterus or fetus through the relaxed abdominal wall of the standing doe by placing hand on the either side of the abdomen and squeezing or lifting upward (Lionel, 2002).

Sample Collection

658 faecal samples were randomly collected in December, 2015 to June, 2016 (7 months) from goats in Riyom District of Riyom Local Government Area of Plateau State to isolate and assess Coccidia Oocysts in goats in the area. Samples were categorized according to months (December 2015 to June, 2016), sex (male or female) age (<7 months = young, ≥ 8 months = adult), reproductive status (pregnant or not pregnant), weight in kg (3.0 – 7.9, 8.0 – 12.9, 13.0 – 17.9 and ≥18.0 The faecal samples were systematically collected by first restraining

the individual goats inserting moistened gloved fingers into the rectum and massaging until the external sphincter relaxes for ease of collection and taking the weight using weigh scale. Bio data on age, sex and reproductive status were recorded. The faecal samples collected were immediately and routinely transported in a plastic flask containing ice packs to Parasitology Division of National Veterinary Research Institute, Vom and were screened for presence of Coccidia Oocyst. The faecal samples were collected from each category on repeated measurement basis for 7 months.

Sample Processing

Routine examination of the faecal samples for presence of *Eimeria* species that cause Coccidiosis in goats was done by direct microscopic examination. After the sodium chloride floatation and sedimentation techniques were carried out adopting the method described by I.L.R.A.D., (2015).

RESULTS

Table 1: Monthly Incidence of Coccidia Infection in Goats based on Age.

Year	No. examined	No. positive	Percentage positive	Chi square value	p-value
December 2015					
Adult	45	13	28.9	0.814	0.367
Young	17	3	17.6		
Total	62	16	25.8		
January, 2016					
Adult	44	5	11.4	1.006	0.367
Young	8	0	0.0		
Total	52	5	9.6		
February, 2016					
Adult	41	6	14.6	3.46	0.061
Young	13	5	38.5		
Total	54	11	20.4		
March, 2016					
Adult	97	23	23.7	0.030	0.867
Young	27	6	22.2		
Total	124	29	23.4		
April, 2016					
Adult	88	22	25.0	1.770	0.180
Young	30	4	13.3		
Total	118	26	22.0		
May, 2016					
Adult	108	25	23.1	0.150	0.700
Young	16	3	18.8		
Total	124	28	22.6		
June, 2016					
Adult	105	43	41.0	0.113	0.737
Young	19	7	36.8		

Total	124	50	40.3

$P > 0.05$ is not significant.

Table2: Monthly Incidence of Coccidia Infection in Goats based on Sex.

Year	No. examined	No. positive	Percentage positive	Chi square value	p-value
December 2015					
Female	46	13	28.3	5.610	0.454
Male	16	3	18.8		
Total	62	16	25.8		
January, 2016					
Female	29	3	10.3	0.400	0.841
Male	23	2	8.7		
Total	52	5	9.6		
February, 2016					
Female	32	7	21.9	0.110	0.741
Male	22	4	18.2		
Total	54	11	20.4		
March, 2016					
Female	77	24	31.2	6.870	0.008
Male	47	5	10.6		
Total	124	29	23.4		
April, 2016					
Female	63	20	31.7	14.87	0.03
Male	45	6	13.7		
Total	108	26	24.1		
May, 2016					
Female	90	18	20.0	1.25	0.263
Male	34	10	29.4		
Total	124	28	22.6		
June, 2016					
Female	80	30	37.5	0.746	0.388
Male	44	20	45.5		
Total	124	50	40.3		

$P < 0.05$ is significant.

Table 3: Monthly Incidence of Coccidia Infection in Goats based on Reproductive Status

Year	No. examined	No. positive	Percentage positive	Chi square value	p-value
December 2015					
Pregnant	19	4	21.4	0.830	0.362
Not pregnant	27	9	33.3		
Total	46	13	28.3		
January, 2016					
Pregnant	4	1	25.0	1.07	0.300
Not pregnant	25	2	8.0		
	29	3	10.3		
February, 2016					
Pregnant	4	1	25.0	0.026	0.872
Not pregnant	28	6	21.4		
Total	32	7	21.9		
March, 2016					
Pregnant	15	3	20.0	1.083	0.288
Not pregnant	62	21	33.9		
Total	77	24	31.2		
April, 2016					
Pregnant	3	0	0.0	0.988	0.320
Not pregnant	80	20	25.0		
Total	83	20	24.1		
May, 2016					
Pregnant	3	1	33.3	0.345	0.557
Not pregnant	87	17	19.5		
Total	90	18	20.0		
June, 2016					
Pregnant	7	1	14.3	1.764	0.184
Not pregnant	73	29	39.7		
Total	80	30	37.5		

$P > 0.05$ is no significant.

Table 4: Monthly Incidence of Coccidia Infection in Goats based on Weight

Year	No. examined	No. positive	Percentage positive	Chi square value	p-value
December 2015					
3.0 – 7.9	14	6	42.9	12.04	0.001
8.0 – 12.9	17	0	0.0		
13.0 – 17.9	18	8	44.4		
18.0 – 22.9	13	2	15.4		
Total	62	16	25.8		
January, 2016					
3.0 – 7.9	5	2	40.0	13.70	0.003
8.0 – 12.9	28	0	0.0		
13.0 – 17.9	14	1	7.1		
18.0 – 22.9	5	2	40.0		
Total	52	5	9.6		
February, 2016					
3.0 – 7.9	11	7	63.6	17.76	0.000
8.0 – 12.9	19	0	0.0		
13.0 – 17.9	18	3	16.7		
18.0 – 22.9	6	1	16.7		
Total	54	11	20.4		
March, 2016					
3.0 – 7.9	37	18	48.6	33.53	0.000
8.0 – 12.9	55	0	0.0		
13.0 – 17.9	30	11	36.7		
18.0 – 22.9	2	0	0.0		
Total	124	29	23.4		
April, 2016					
3.0 – 7.9	21	16	76.2	49.55	0.000
8.0 – 12.9	52	0	0.0		
13.0 – 17.9	32	10	31.3		
18.0 – 22.9	3	0	0.0		
Total	108	26	24.1		
May, 2016					
3.0 – 7.9	16	12	75.0	42.43	0.000
8.0 – 12.9	54	0	0.0		
13.0 – 17.9	54	16	29.6		
18.0 – 22.9	0	0	0.0		
Total	124	28	22.6		
June, 2016					
3.0 – 7.9	32	29	90.6	57.60	0.000
8.0 – 12.9	35	0	0.0		
13.0 – 17.9	54	20	37.0		
18.0 – 22.9	3	1	33.3		
Total	124	50	40.35		

$P < 0.05$ is significant.

Table 5: Monthly Incidence of Coccidia Infection in Goats using Floatation and Sedimentation Methods

Months	Number examined	Floatation method (+)	Sedimentation (+)
December, 2015	62	16(25.8)	5(8.1)
January, 2016	52	5(9.6)	0(0.0)
February, 2016	54	11(20.4)	0(0.0)
March, 2016	124	29(23.4)	7(5.6)
April, 2016	118	26(22.0)	0(0.0)
May, 2016	124	28(22.6)	0(0.0)
June, 2016	124	50(40.3)	0(0.0)
total	658	165(25.1)	13(2.0)
Chi square		23.790	32.369
P-value		0.001	0.000

$P < 0.05$ is significant.

658 goats sampled, there was an overall prevalence of 25.1%. The adult goats had the highest percentage incidence rate (28.9%) in December, 2015 compared to the young (17.6%). This can be seen across all the months, however there is no significance difference (P>0.05) in infection rate by age. Prevalence of Coccidia infection in goats based on sex in 2016 revealed infection in goats differs significantly (P<0.05) by sex. The females had 31.2% and the males 10.6%. In March and April, 2016, 31.7% and 13.7% respectively. Table 2 shows that incidence of Coccidia infection in goats based on Reproductive status, revealed that there was no significant difference (P>0.05) in infection rate (Table3):

Table 4, Revealed that there was a significant difference (P<0.05) in infection rates in goats according to weight across all the months under study. Infection rate seems to be higher in animals with low body weight with ranged 0.0 -90.6% while those with high body weight had less infection with ranged 0.0% -40%. The result revealed that the floatation techniques yielded more positive results (25.1%) across the months under study which is significantly different (P<0.05) compared to the sedimentation (2.0%). (Table 5).

Discussion

The 25.1% overall monthly incidence of Coccidiosis in goats reported in the study was lower than the report of Abubakar*, et al* (2020) and Afzan, *et al* (2016) who reported incidence of 72.8% and 89.2% respectively. The non-significant difference (p>0.05) in the monthly incidence of coccidiosis between the age groups observed in this study contradicts the report of Etsay, *etal,* (2020) who reported significant difference (p<0.05) in the incidence of Coccidiosis based on age. In this study Coccidia infection rates did not vary according to sex and reproductive status, this entails that Coccidia infection can occur in these animals irrespective of sex and reproductive status. A similar findings observed by Afzan, *et al* (2016). The variation in incidence rate could be due to managements systems and other underlying disease conditions un noticed.

The incidence of Coccidiosis in goats differs significantly (P<0.05) according to weight it can be observed that those with lower weights had high incidence rates than those with higher weights, this agrees

with the findings of Burna *et al* (2020) who reported that intestinal tract infection usually occur as mild subclinical disease in healthy animals and severe in malnourished and immuno -compromised animals. This indicates that proper feeding with good husbandry practices can be used as one of the tools for control and prevention of Coccidia infection in goats. The study also showed that the floatation techniques yielded more of the Coccidia parasites as reported by Nanshan, *et al.,* (2020), compared to sedimentation

Conclusion

The study on monthly incidence of Coccidiosis in goats in Riyom District of Riyom LGA, Plateau State shows that goats suffer some level of Coccidia infection with an incidence rate of 25.1% with no significant difference (P>0.05) in infection rate according to Age, sex and reproductive status. The floatation techniques yielded more positive results than that of sedimentation. However, infection rate differs significantly (P<0.05) on weight bases. The study concluded that proper feeding with good husbandry practices combine with timely administration of anti-coccidiostats will help sustain goat's production in the study area.

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