ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

PREVALENCE AND INCIDENCE OF NEMATODES IN GOATS AT FIVE DIFFERENT VILLAGES OF BARWANI DISTRICT (M. P.)

S. Gaherwal, M. M. Prakash* and J. Dudwe.

P. G. Department of Zoology, Govt.(Model Autonomous) Holkar Science, Indore (M.P.), India

Manuscript Info

Manuscript History:

Received: 14 January 2016
Final Accepted: 29 February 2016
Published Online: March 2016

Key words:
Capra hircus (Goat), Nematodes, Prevalence, Rainy season, Winter season, Summer season.

Corresponding Author

M. M. Prakash.

Abstract

The present study deals with the prevalence and incidence of nematodes in goats at five different villages of Barwani district (M.P.). Survey was done on total 250 goats. 50 goats was analysed from each village. Eggs and worm collection were done from different sites studied like Pansemal, Khetia, Barwani, Niwali and Sendwa during rainy, winter and summer season. During the present study five genera of nematode were identified like. Haemonchus spp., Trichuris spp., Nematodirus spp., Trichostrongylus spp., and Strongyloides spp.

The overall infection on the basis of egg collection was 76.8% during rainy season, 72% during winter season and 66% during summer season. The overall infection on the basis of worm collection was 78% during rainy season, 72.4% during winter season and 66% during summer season.

Introduction:-

Goat is considered as an important livestock species all over the globe, especially in tropical and subtropical regions. Goat has a pivotal role in small scale farming and rural economy of developing societies because goat farming generate employment and supplement house hold income. Goats are primarily raised for milk, meat, hair and leather production (Hassan et al., 2011).

Sheep and goats are the earliest domesticated ruminants. These animals can withstand a long period of drought in better way than any other livestock. Goats can survive under limited fodder and are also capable to withstand water scarcity (Upadhyay, 2003).

Parasitic gastro-enteritis caused by gastro- intestinal nematodes pose a serious health threat and a limitation to the productivity of goats due to the associated morbidity and mortality (Nwosu et al., 2007; Bandyopadhyay et al., 2011). Infection in the gastrointestinal tract with parasitic nematodes is still one of the main constraints to dairy specialy goat production (Rinaldi et al., 2007). It is generally accepted by helminths specialists that goats are more susceptible than sheep to infection with gastrointestinal nematodes (Jallow et al., 1994).

Looking to the importance of goats in society and the present study was proposed to investigate the prevalence and incidence of gastrointestinal nematodes which affecting the goat population of the selected area.

Materials and methods:-

Materials:-

1. **Study Area:-** The proposed investigation was done in Barwani District. Following five villages of Barwani was selected for the present investigation -:
   - **i. Pansemal**
   - **ii. Khetia**
   - **iii. Barwani**
   - **iv. Niwali**
   - **v. Sendwa**
2. **Animal selected for study:-** Goats (Capra hircus).
3. **Survey:-** Survey was done on total 250 goat of selected villages. 50 goats was analysed from each study village.
4. **Study period:-** July – 2014 to Dec. 2015.

The study period was divided in to 3 season:-

- **A. Monsoon –** July to October,
- **B. Winter –** November to February,
- **C. Summer –** March to June**.**

Methods:-

1. **Faecal Sample Collection:-**For Faecal Sample Collection, guidelines of Hansen and Perry (1990) was followed.
2. **Examination of faecal sample:-**
   A. Qualitative examination:-This was done by sedimentation techniques of Soulsby (1982).
   B. Quantitative examination:-This was done by Mc Master and Stoll's techniques (Coles., et al., 1992).
3. **Collection of nematodes and post-mortem worm count:–** The intestine and stomach of goat were collected from slather house for nematodes identification which was done by Yamaguti method (1959).
4. **Calculation:-** Following parameters were calculated from the following formulas:-
   A. Incidence of infection: - It is the frequency of infection of host by the parasite, expressed in terms of per cent i.e.

$$\text{Incidence} = \frac{\text{Infected host}}{\text{Total host examined}} \times 100$$

B. Intensity of infection: - It is the quotient from the number of parasite obtained divided by the number of infected host's i.e.

$$\text{Intensity} = \frac{\text{Number of parasite obtained}}{\text{Number of infected host}} \times 100$$

C. Density of infection:- It is the concentration of the parasite in term of parasite (single host) per unit space i.e.

$$\text{Density} = \frac{\text{Number of parasite collected}}{\text{Number of host examined}} \times 100$$

D. Relative density: - It is the concentration of individual nematode burden in relation to total nematode burden and is expressed in term of percentage i.e.

$$\text{Relative Density} = \frac{\text{Individual burden}}{\text{Total burden}} \times 100$$

E. Index of infection: - It is expressed by the following formula

$$IF = \frac{NPC \times NHF}{(NHE)^2}$$

Where,
NPC = Number of parasite collected
NHF = Number of host infected
$(NHE)^2$ = (Number of host examined)^2
IF = Index of infection

Results and discussion:-

Table: 1. Prevalence and incidence of nematodes on the basis of eggs collection in goats during the rainy season.

S.No	Study area	Manson season							
		No. of host examined	**No. of host infected**	**No.ofeggs collected**	**Identified Genera**	**%Incidence of Infection**	**intensity of infection**	**Density of infection**	**Index of infection**
1.	Pansemal	50	35	480	-Trichuris spp. -Strongyloides spp. -Trichostrongylus spp.	70%	1371.4	960	6.72
2.	Khetia	50	38	530	-Nematodirus spp. -Strongyloides spp. -Haemonchus spp.	76%	1394.7	1060	8.05
3.	Barwani	50	36	520	-Strongyloides spp. -Trichuris spp. -Nematodirus spp.	72%	1444.4	1040	7.48
4.	Niwali	50	44	680	-Haemonchus spp. -Trichuris spp. -Trichostrongylus spp. -Nematodirus spp.	88%	1545.4	1360	11.9
5.	Sendwa	50	39	580	-Trichostrongylus spp. -Haemonchus spp. -Trichuris spp.	78%	1487.1	1160	9.04
	Average	250	192	2790	Genera-5	76.8%	1453.1	1116	8.57

Table: 2. Prevalence and incidence of nematodes on the basis of eggs collection in goats during the winter season.

S.No	Study area	Winter season							
		No. of host examined	No. of host infected	No.of eggs collected	Identified Genera	%Incidence of infection	intensity of infection	Density of infection	Index of infection
1.	Pansemal	50	33	450	-Trichuris spp. -Nematodirus spp. -Strongyloides spp.	66%	1363.6	900	5.94
2.	Khetia	50	35	490	-Trichostrongylus. -Strongyloides. - Haemonchus spp.	70%	1400	980	6.86
3.	Barwani	50	35	475	-Trichuris spp. -Nematodirus spp. -Trichostrongylus spp.	70%	1357.1	950	6.65
4.	Niwali	50	40	580	-Haemonchus spp. -Strongyloides spp. -Trichostrongylus spp,	80%	1450	1160	9.28
5.	Sendwa	50	37	509	-Trichuris spp. -Nematodirus spp, -Haemonchus spp.	74%	1375.6	1018	7.53
	Average	250	180	2504	Genera- 5	72%	1391.1	1001.6	7.21

Table: 3. Prevalence and incidence of nematodes on the basis of eggs collection in goats during the summer season.

S.No	Study area	Summer season							
		No. of host examined	No. of host infected	No. of eggs collected	Identified Genera	% Incidence of infection	intensity of infection	Density of infection	Index of infection
1.	Pansemal	50	30	400	-Trichuris spp., -Strongyloides spp -Trichostrongylus spp	60%	1333.3	800	4.8
2.	Khetia	50	32	467	-Nematodirus spp. -Strongyloides spp. -Haemonchus spp.	64%	1459.3	934	5.9
3.	Barwani	50	31	442	-Strongyloides spp -Trichuris spp. -Nematodirus spp.	62%	1425.8	884	5.4
4.	Niwali	50	37	569	-Haemonchus spp. -Trichuris spp. -Trichostrongylus -Nematodirus spp.	74%	1537.8	1138	8.42
5.	Sendwa	50	35	470	-Trichostrongylus spp -Haemonchus spp. -Trichuris spp.	70%	1342.8	940	6.5
	Average	250	165	2348	Genera- 5	66%	1423	939.2	6.19

Table: 4. Prevalence and incidence of nematodes on the basis of parasites collection in goats during the rainy season.

S. No	Study area	Manson season									
		No. of host examined	No. of host infected	No. of parasite collected	Individual burden	Identified Genera	% Incidence Of Infection	Intensity of infection	Density of infection	Relative density	Index of infection
1.	Pansemal	50	36	503	230	-Trichuris spp.	72%	1397.2	1006	45.7	7.2
					273	-Strongyloides spp.				54.2	
2.	Khetia	50	39	580	200	-Nematodirus spp.	78%	1487.1	1160	34.4	9.0
					180	-Trichostrongylus spp.				31.0	
					200	-Haemonchus spp				34.4	
3.	Barwani	50	37	520	217	-Trichostrongylus spp.	74%	1405.4	1040	41.7	7.6
					197	-Strongyloides spp.				37.8	
					106	-Haemonchus spp				20.3	
4.	Niwali	50	43	720	300	-Haemonchus spp.	86%	1674.4	1440	41.6	12.3
					267	-Trichuris spp.,				37.0	
					153	-Nematodirus spp.				21.2	
5.	Sendwa	50	40	620	287	-Strongyloides spp.	80%	1550	1240	46.2	9.9
					165	-Haemonchus spp.				26.6	
					168	-Nematodirus spp.				27.0	
	Average	250	195	2943	2943	Genera- 5	78%	1509.2	1177.2	100	9.1

Table: 5. Prevalence and incidence of nematodes on the basis of parasites collection in goats during the winter season.

S.No	Study area	Winter season									
		No. of host examined	No. of host infected	No. of parasite collected	Individual burden	Identified Genera	%Incidence Of Infection	intensity of infection	Density of infection	Relative density	Index of infection
1.	Pansemal	50	33	440	193	-Strongyloides	66%	1333	880	43.8	5.8
					147	-Trichuris spp.				33.4	
					100	-Trichostrongylus				22.7	
2.	Khetia	50	36	500	168	-Trichuris spp.	72%	1338	1000	33.6	7.2
					166	-Nematodirus spp				33.2	
					166	-Strongyloides spp.				33.2	
3.	Barwani	50	35	475	185	-Nematodirus spp	70%	1357	950	38.9	6.6
					161	-Haemonchus spp				33.8	
					129	-Strongyloides				27.1	
4.	Niwali	50	40	590	295	-Haemonchus spp	80%	1475	1180	50	9.4
					180	-Trichuris spp				30.5	
					115	-Nematodirus spp				19.4	
5.	Sendwa	50	37	520	179	-Trichostrongylus spp.	74%	1405	1040	34.4	7.6
					173	-Haemonchus spp				33.2	
					168	-Nematodirus spp				32.3	
	Average	250	181	2525	2525	Genera- 5	72.4%	1395	1010	100	7.3

Table: 6. Prevalence and incidence of nematodes on the basis of parasites collection in goats during the summer season.

Summer season											
S.No	**Study area**	**No. of host examined**	**No. of host infected**	**No. of parasites collected**	**Individual burden**	**Identified Genera**	**% incidence of infection**	**Intensity of infection**	**Density of infection**	**Relative density**	**Index of infection**
1	Pansemal	50	30	400	170	-Trichuris spp.	60%	1333.3	800	42.2	4.8
					122	-Nematodirus spp.				30.5	
					108	-Strongyloides spp.				27	
2	Khetia	50	33	465	175	-Trichostrongylus spp.	66%	1409	930	37.6	6.1
					189	-Strongyloides spp.				40.6	
					101	-Nematodirus spp.				21.7	
3	Barwani	50	31	430	112	-Trichuris spp.	62%	1387	860	26.0	5.3
					207	-Haemonchus spp.				48.1	
					111	-Nematodirus spp.				25.8	
4	Niwali	50	37	560	280	-Haemonchus spp.	74%	1513.5	1120	50	8.2
					170	-Trichuris spp.				30.3	
					110	-Nematodirus spp.				19.6	
5	Sendwa	50	34	490	153	-Trichostrongylus spp.	68%	1441.1	980	31.2	6.6
					163	-Strongyloides spp.				27.7	
					201	-Haemonchus spp.				41.0	
	Average	250	165	2345	2345	Genera – 5	66%	1421.2	938	100	6.1

Figure: 1. Prevalence and incidence of nematodes on the basis of eggs collection in goats during the rainy season.

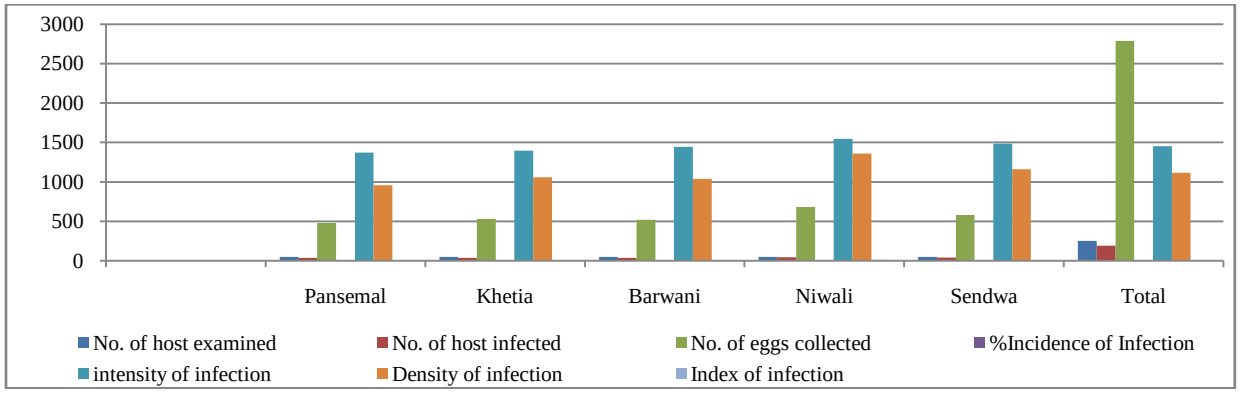


Figure: 2. Prevalence and incidence of nematodes on the basis of eggs collection in goats during the winter season.

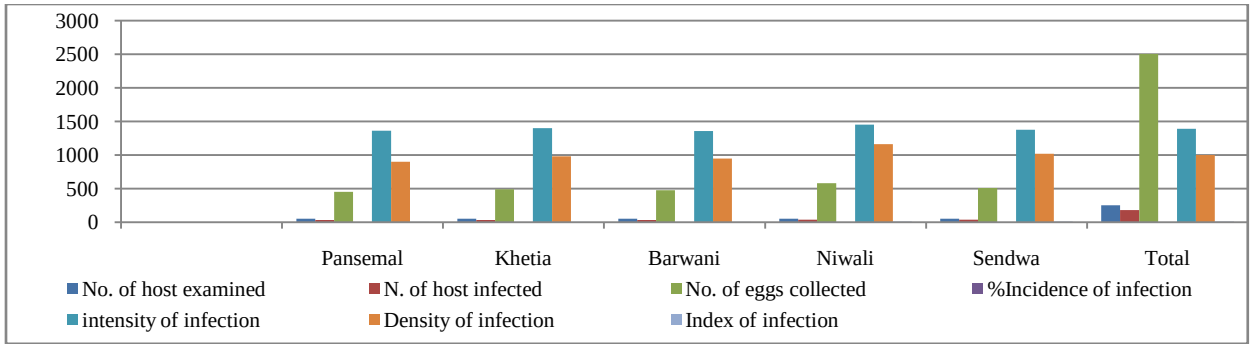


Figure: 3. Prevalence and incidence of nematodes on the basis of eggs collection in goats during the summer season.

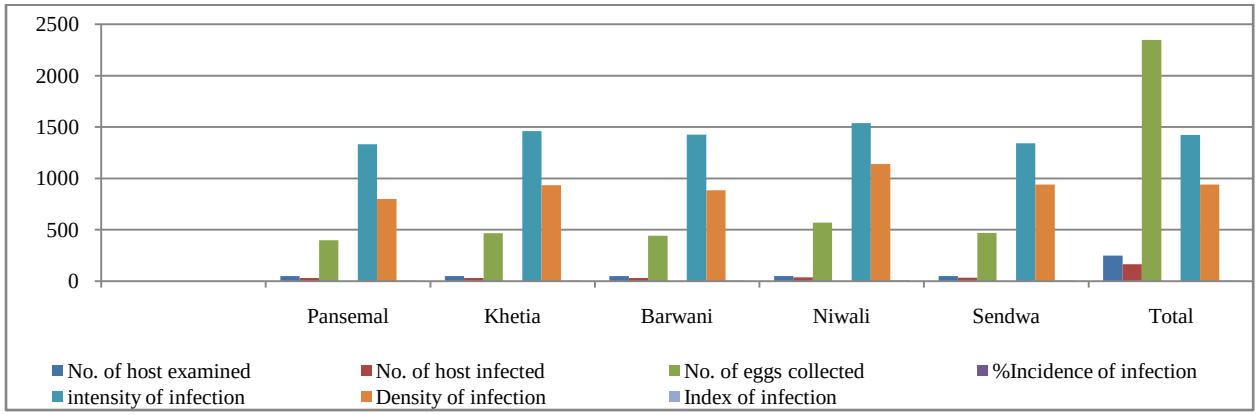


Figure: 4. Prevalence and incidence of nematodes on the basis of parasites collection in goats during the rainy season.

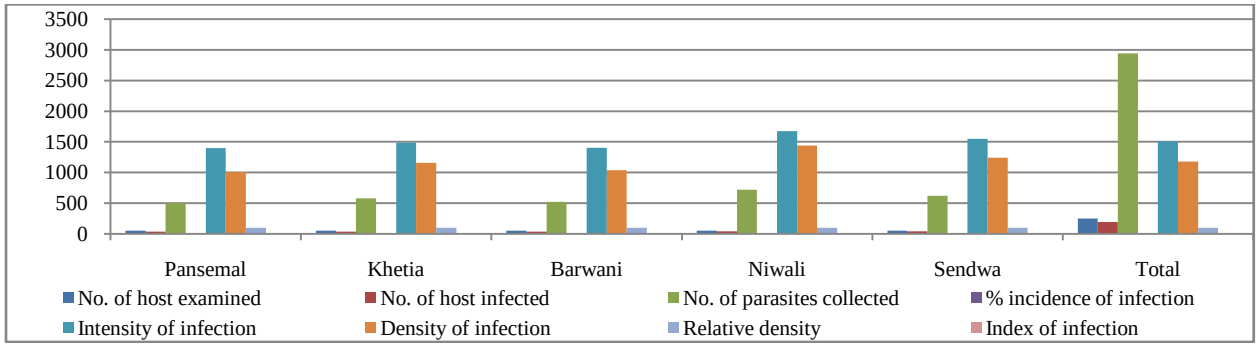


Figure: 5. Prevalence and incidence of nematodes on the basis of parasites collection in goats during the winter season.

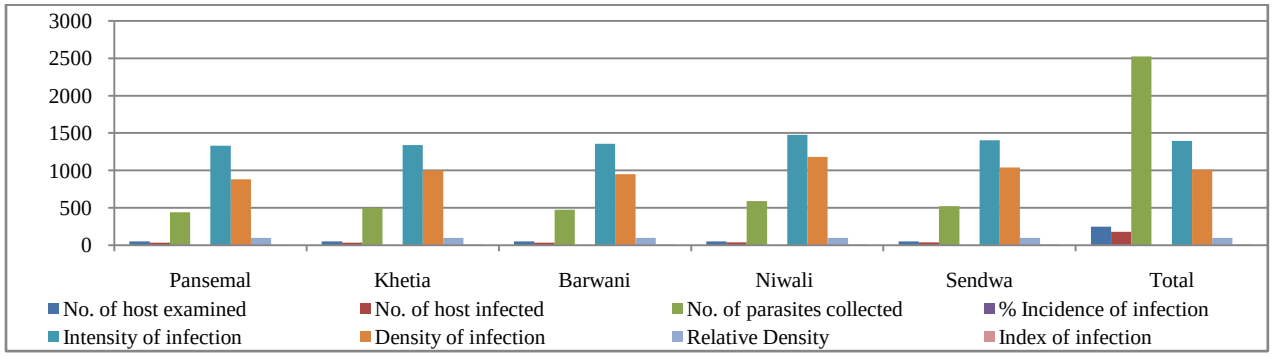
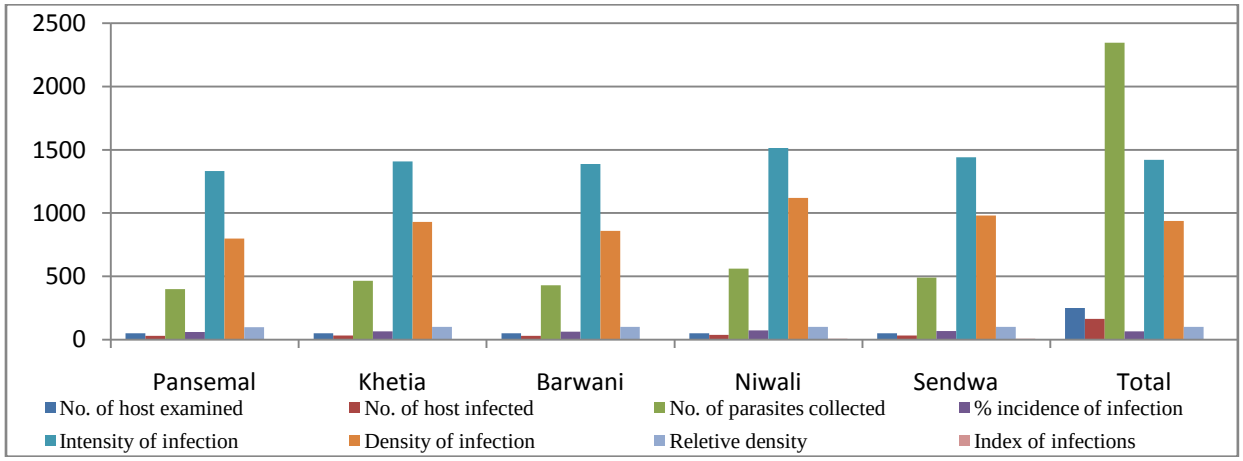


Figure: 6. Prevalence and incidence of nematodes on the basis of parasites collection in goats during the summer season.



Parasitic gastro-enteritis caused by gastro- intestinal nematodes pose a serious health threat and a limitation to the productivity of goats due to the associated morbidity and mortality (Nwosu et al., 2007). Infection of the gastrointestinal tract with parasitic nematodes is still one of the main constraints to dairy goat production (Rinaldi et al., 2007). Deaths due to Eimeria species may also occur though lowered productivity due to poor growth is usually unnoticed by farmers (Faizala et al., 1999).

In the present investigation eggs and worm were collected from goats of different study sites like Pansemal, Khetia, Barwani, Niwali and Sendwa during rainy, winter and summer season. In the present study total five genera of nematode were identified. These were Haemonchus spp., Trichuris spp., Nematodirus spp., Trichostrongylus spp., and Strongyloides spp.

The average infection on the basis of egg collection was 76.8% during rainy season, 72% during winter season and 66% during summer season. The order of infection can be represent as

Rainy season> Winter season>Summer season:-
The average infection on the basis of worm collection was 78% during rainy season, 72.4% during winter season and 66% during summer season. The order can be represented as

Rainy season> Winter season>Summer season:-
Higher rates of infection throughout the year in goats were reported by previous workers (Pandey et al., 1994; Saha, et al., 1996). Various studies have been conducted on prevalence of gastrointestinal parasites in sheep and goats in this country and abroad (Pathak and Pal., 2008; Pandey et al., 1994; Saha et al., 1996; Singh et al., 2010; Sutar et al., 2010; Om et al., 2010; Pant et al., 2009). This variation in prevalence of parasitic infestation depends upon different agro -climatic condition and availability of susceptible host (Radostits et al., 2000).

Genera-wise order of incidence can be represented as:-
Rainy season:- Haemonchus > Strongyloides > Nematodirus > Trichuris> Trichostrongylus
Winter season:- Haemonchus> Trichuris> Strongyloides> Nematodirus> Trichostrongylus
Summer season:- Haemonchus> Strongyloides> Trichuris> Nematodirus> Trichostrongylus

Generic order of nematodes in the present study reveals that in all the three season genera Haemonchus was dominated and genera Trichostrongylus was recessive, status of other genera were in between these two.

The various Genera of nematodes recorded during present investigation were abo reported in goat of other regions (Ahmed and Ansari., 1987: Asanji and Williams., 1987; Guiomaraes and Walter., 1987; Njau, 1987; Uriarte and Valderrabno., 1989; Pal and Qayyum., 1993).

Prevalence of the haemonchosis was significantly higher in goat of studied area. These results corroborate the finding of Riche et al., (1973) Suh et al., (1980) Javed et al., (1992). The higher prevalence of haemonchosis may be attributed to a variety of factors like ground grazing habit of sheep, relatively less cleanliness and extensive pasture grazing (Riche et al., 1973; Suh et al., 1980; Javed et al., 1992). Authors also support this region. Haemonchus is an important and common nematode parasite and requires special attention for its control. It has been suggested by Torres-Acosta et al., (2003) that Haemonchus can acquire resistance faster than other gastrointestinal nematodes, like Trichostrongylus, because of its high biotic potential. Thus present finding alarmed the farmers of the studied area because present infection in every season in more than 66% reporting the infection of goat which support the statement. That it has been reported that gastrointestinal nematodes infections are the major parasitic diseases in goats in tropical and temperate climates (Faizala and Rajapakse, 2001). The results of the present study show that Haemonchus spp., Trichuris spp., Nematodirus spp., Trichostrongylus spp., and Strongyloides spp. were prevalent in the areas of Barwani). Thus, farmer of this region are requested to use the appropriate drugs, which is more effective in the expulsion of these nematodes**.**

The overall higher incidence of nematodes infection in the areas surveyed could be attributed to lower immunity of hosts may be due to malnutrition. It is all the livestock in the area under investigation largely depended on grazing in the field which is may be deteriorated.

Keeping in view the present results it can be suggest that some control measure are necessary to control or reduce gastrointestinal parasites in the studied area. In author opinion separate grazing field for goats with low stocking rate may be effective. Furthermore, during the rainy season climatic factors like temperature and humidity are favorable for the development and survival of preparasitic stage of nematodes. It is, therefore, suggested that anthelmimtic treatment on quarterly basis may be implemented to reduce the risk of reinfection. To avoids the consistence farmers are recommended, not to use same drugs for long period or repeatedly.

References:-

1. Ahmed, M., and Ansari J.A., (1987). Prevalence of gastrointestinal nematodes of sheep and goats in Aligarh (India). Ind. Vet. Med. J. 11:165-170.
2. Amadi, A.N.C., Avoaja, D.A., Essien, E.J., (2012). Epidemiology of Helminth Parasites of West African Dwarf Goat (Capra hircus) in Umuariaga in Ikwuano L.G.A. Abia State. J. Appl. Sci. Environ. Manage., 4: 359-362.
3. Asanji, M.F., and Williams M.O., (1987). Variables affecting the population dynamics of gastrointestinal helminthes parasites of small farm ruminants in Siera Leone. Bull. Anim. Hlt. Prod. Afr. 35:308-313.
4. Bandyopadhyay, S., Devi, P., Bera, A., Bhattacharya, D., (2011). Prevalence of gastrointestinal parasite in goats in Shillong, Meghalaya, India. Webmed Central Parasitology; **1**(9):01-10.
5. Coles, G.C., Bauer, G., Borssreede, F.H.M., Geerts, S., Klei, T.R., Taylor, M.A., Waller, P.J., (1992). World Association for the advancement of veterinary parasitology (WAAVP) methods for the detection of arthelmintic resistance in nematodes of veterinary importance. Vet. Parasitol 44; 35-44.
6. Faizala, A. C. M., and Rajapakseb, R. P. V. J., (2001). Prevalence of Coccidia and gastrointestinal nematode infections in cross bred goats in the dry areas of Sri Lanka. Small Ruminant Research, 40: 233- 238.
7. Faizala, A. C. M., Rajapakseb, R. P. V. J., Jayasinghea, S. R., and Rupasinghe, V., (1999). Prevalence of Eimeria spp. and gastrointestinal nematodes versus weight gains in treated goats raised in the dry areas of Sri Lanka. Small Ruminant Research, 34: 21-25.
8. Guiomaraes, M.P., and Walter, D.S.L., (1987). Helminth parasites of caprine in the state of Minas Gerais, Brazil. Arg. Bas. Med. Vet. Zootec. 39: 557-576.
9. Hansen, J., and Perry, B., (1994). The epidemiology, diagnosis and control of helminth parasites of ruminants Internatiol Laboratory for Research on Animal Diseases (ILRAD), Nairobi (Kenya)' 2nd Ed;171.
10. Hassan, M. M., Hoque, M. A., Islam, S. K. M. A., Khan, S. A., Roy, K., Banu, Q., (2011). A prevalence of parasites in black Bengal goats in Chittagong, Bangladesh. Inter J Livestock Prod; **2**(4):40-4.
11. Ijaz, M., Khan, M.S., Avais, M., Ashraf, K., Ali, M., Saima., (2008). Infection rate and chemotherapy of various helminths in goats in and around Lahore. Pakistan Vet. J. 28: 167-170.
12. Jallow, O.A., McGregor, B.A., Anderson, N., Holmes, J.H.G., (1994). Intake of trichostrongylid larvae by goats and sheep grazing together. Aust. Vet. J.71,361-364 (abstract).
13. Javed, M.S., Iqbal, Z., and Hayat, B., (1992). Prevalence and economics of haemonchosis in sheep and goats. Pak. Vet. J. 12: 36-38.
14. Njau, B.C., (1987). Gastrointestinal nematodes of small ruminants of king "roi" in Northern Tanzania. Bull. Anim. Hlth. Prod. Afr. 35:298-303.
15. Nwosu, C.O., Madu, P.P., and Richards, W.S., (2007). Prevalence and seasonal changes in the population of gastrointestinal nematodes of small ruminants in the semi-arid zone of north- eastern Nigeria. Vet. Parasitol. 144: 118-124.
16. Om, H., Kumar, S., Singh, P., (2010). Prevalence of Coccidia in Mathura Region of Uttarpradesh. Vet. World. 3(11): 503-505.
17. Pal, R.A., and Qayyum, M., (1993). Prevalence of gastrointestinal nematodes of sheep and goats in upper Punjab, Pakistan. Pak. Vet. J. 13 (3): 138-141.
18. Pandey, V. S., Ndao, M., and Kumar, V., (1994). Seasonal prevalence of gastrointestinal nematodes in communal land goats from high yield of Zimbabwe. Vet. Parasitol. 51: 241- 248.
19. Pant, K., Rajput, M. K. S., Kumar, J., Sahu, S., Rajkumari, V., Gangwar, P., (2009). Prevalence of helminthes in small ruminants in Tarai region of Uttarakhand. Vet. World. 2 (7): 265-266.
20. Pathak, A. K., and Pal, S., (2008). Seasonal prevalence of gastrointestinal parasites in goats from Durg district of Chhattisgarh. Vet. World. 5: 136-137.
21. Radostits, O. M., Gay, G. C., Blood, D. C., Hinchkiliff, K. W., (2000). Veterinary medicine 9th ed. EIBS and Bailliere Tindal.
22. Riche, P.D., Efstathiou, G.C., Alfan, Y., and Campbell, J.B., (1973). A helminth survey of sheep and goats in Cyprus. J. Helminthol. 43: 251-262.
23. Rinaldi, L., Veneziano, V., Cringoli, G., (2007). Dairy goat production and the importence of gestroinestinal strongyle parasitism. Trans. R. Soc. Trop. Med. Hyg. 101,745-746.
24. Saha, S. B., Pramanik, S., and Mukherjee, G. S., (1996). Prevalence of gastrointestinal nematodes of goats in West Bengal. Indian Journal of Animals Science, 11 (1): 51-52.
25. Singh, A., Hazarika, G. C., Pukhan, A., Hussain, P., (2010). Seasonal Incidence of Caprine Gastrointestinal Nemato- dosis. Vet. World 3(7): 321-322.
26. Soulsby, E.J.L., (1982) Helminths, arthropods and lnotozoa of domes_ ticated animals, 7th edn. The English Language Book Socief, London, pp 126-173.

27. Suh, M.D., Kim, C.S., and Jung, M.K., (1980). Epidemiological study on the infection rate of internal parasites of sheep at an alpine breeding station. Res. Reports Rural Dev. Korea, 22: 138-146.
28. Sutar, A. U., Kengar, S. B., Patil, S. S., Khan, M. R., (2010). Prevalence of gastrointestinal Parasites in Goats of Ahmednagar district of Maharashtra. Vet. World 3(10): 456- 457.
29. Torres-Acosta, J. F. J., Dzul-Canche, U., Caballero, A. J. A., Vivas, R. I. R., (2003). Prevalence of benzimidazole resistant nematodes in sheep flocks in Yucatan, Mexico. Veterinary Parasitology, 114: 33–42.
30. Upadhyay, B. A., (2003). Goat breeding srrategy with reference to commercial goat production. Deptt. of Animal Science & Dairy Science, Mahatma phule Krishi Vidhyapeeth, Rabtri, Maharastra. State level worksbop on recent advance in goat rearing, 29-30 Dec.
31. Uriarte, J., and Valderrabno, P., (1989). An epediommolgical study of parasitic gastroenteritis in sheep under an intensive grazing system. Vet. Parasitol. 31:71-81.
32. Yamaguti, S., (1959). Systema helminthum, Vol. 2. The nematodes of vertebrates inter science publication, Inc, New york, pp 415-419.