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Research Article

SEASONAL PREVALENCE AND INCIDENCE OF GASTROINTESTINAL NEMATODES IN GOATS OF BARWANI REGION (M.P)

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A B S T R A C T

The present study deals with the prevalence and incidence of nematodes in goats at five different sites of Barwani district (M.P), sites selected were Barwani, Sendhwa, Niwali, Pansemal and Khetia. Survey was conducted on total 600 goats. Out of which 300 goats belong to slaughter house and 300 goats belong to Farm house holder.. Egg and Worm collection were done during rainy, winter and summer season. During the present study five genera of nematode were identified *i.e*. *Nematodirus spp., Trichuris spp., Haemonchus spp., Strongyloides spp.* and *Trichostrongylus spp.*
On the basis of egg and worm collection the overall infection in goats at Slaughter house was 84% during rainy season, 78% during winter season and 70% during summer season and in Farm house goat's egg collection was 77% during rainy season, 66% during winter season and 60% during summer season.

INTRODUCTION

Parasitic gastro-enteritis is caused by gastro- intestinal nematodes this disease created a serious health threat on one side and limitation to the productivity of goats on the other side due to the associated morbidity and mortality (Nwosu *et al.,* 2007). Infection in the gastrointestinal tract with nematodes is still one of the major constraints to dairy, especially goat production (Rinaldi *et al.,* 2007). Gastrointestinal nematodes (GINs) also considered the main constraints to ruminant production, because they can cause reduction in skeletal growth, live –weight gain and in milk yield (Waller, 1997; Van Houtert and Sykes, 2010; Mavrot *et al.,* 2015). Nematode infection causes heavy economic losses due to reduced productivity, mortality and parasite control measures (Theodoropoulos *et al.,* 2002). Prevalence of GIT nematodes vary geographically and influenced by climate, management, vegetation and livestock density (Hansen and Perry, 1994).Looking at the importance of goats in the society the present study was proposed to investigate the prevalence and incidence of gastrointestinal nematodes which affect the goat population of the selected area.

MATERIALS AND METHODS

MATERIALS

Study Area: The present study was carried out in the Barwani District of (M.P).

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Following five villages of Barwani District were selected.

1. Barwani
2. Sendhwa
3. Niwali
4. Pansemal
5. Khetia

***Animal selected for the study*:** Goat (*Capra hircus*)

***Survey*:** Survey was conducted on total 600 goats of selected villages. Out of these 300 goats were selected from Slaughter house and 300 goats were selected from Farm house. The study was conducted in the following three seasons:-

***Study period*:** 2018 to 2019.

1. **Rainy-** July to October,
2. **Winter -** November to February,
3. **Summer –** March to June.

METHODS

***Faecal Sample Collection*:** For faecal sample collection, guidelines of Chouhan and Chandra (1998) were followed.

Examination of fecal sample

***Qualitative examination*:** This was done by sedimentation techniques of Soulsby (1982).

***Quantitative examination*:** This was done by Mc Master and Stoll's techniques (Coles *et al.,* 1992).

***Collection of nematodes and post-mortem worm count*:** The stomach and intestine of goat were collected from slaughter

house and the collection and identification of worm was done by Yamaguti method (1959).

***Calculation*:** Following Parameters were calculated from the following formulas:

***Incidence of infection*:** It is the frequency of infection of host by the parasite expressed in terms of per cent i.e.

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

Intensity of infection: - It is the quotient from the number of parasite divided by the number of infected hosts i.e.

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

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

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

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

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

***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

Statistical analysis of data

The data was analyzed statistically as per the method described by Snedecor and Cochran, (1980).

RESULTS AND DISCUSSION

In the present investigation eggs and worm were collected from the goats of Slaughter house and Farm house of different study sites i.e Barwani, Sendhwa, Niwali, Pansemal and Khetia during rainy season, winter season and summer season. In the present study total five genera of nematode were identified. These were *Trichuris spp., Haemonchus spp., Trichostrongylus spp., Strongyloides spp.* and*Nematodirus spp.,* The average infection in the Slaughter house goat on the basis of egg collection and worm collection was 84% during rainy season, 78% during winter season and 70% during summer season. The order of infection can be represent as

Rainy season >Winter season > Summer season

The average infection in the Farm house goat on the basis of egg collection and parasites collection was 77% during rainy season, 66% during winter season and 60% during summer season. The order of infection can be represent as

Rainy season >Winter season > Summer season

Genera-wise seasonal incidence of *Haemonchus spp., Trichuris spp., Nematodirus spp., Trichostrongylus spp.,* and *Strongyloides spp.* were recorded and can be represented as:
***Rainy season*:** *Haemonchus spp. >Trichuris spp. >Strongyloides spp.>Trichostrongylus spp.>Nematodirus spp.*
***Winter season*:** *Haemonchus spp. >Strongyloides spp.>Trichuris spp. >Trichostrongylus spp.>Nematodirus spp.*
***Summer season*:** *Haemonchus spp. >Trichostrongylus spp.>Trichuris spp. >Strongyloides spp.>Nematodirus spp.*
Generic order of nematodes in the present study reveals that in all the three season genera *Haemonchus* dominated and genera *Nematodirus spp.* was recessive, status of other genera were in between these two.

Prevalence of the haemonchosis was significantly higher in goat of studied area in all the three seasons. These results are in agreement with the findings of Riche *et al.,* (1973) Suh *et al.* (1980) Javed *et al.* (1992). The higher prevalence of haemonchosis may be due to ground grazing habit of sheep, relatively less cleanliness and extensive pasture grazing (Riche *et al.,* 1973; Suh *et al.,* 1980; Javed *et al.,* 1992). Our results also support these authors findings because in the present study Haemonchus infection index calculated suggests that it is always higher in the slaughter house goats than the farm house goats in all the three study season .This suggests that hygienic condition play important role in reducing the parasitic infection. Haemonchus is an important and common nematode parasite and requires special attention for its control. According to Torres-Acosta *et al.* (2003) that Haemonchus can acquire resistance faster than other gastrointestinal nematodes. As the parasite was recorded in the goats of the study area the local farmers are advised to be alert and cautious for such parasitic infection. It has been reported that gastrointestinal nematodes infections are the major parasitic diseases goats in tropical and temperate climates (Faizala and Rajapakse, 2001). The results of the present study show that *Trichuris spp., Nematodirus spp., Haemonchus spp., Strongyloides spp.* and *Trichostrongylus spp.* Were prevalent in the areas of Barwani). Thus, farmer of these are requested to use the drugs, which is more effective in the expulsion of these nematodes.

Prevalence of GI nematode with regard to species in the present study was 75.8% and 61.2% in sheep and in goats respectively. These observations are relatively close with previous observation reported by (Mideksa *et al.,* 2016) 89.2% in sheep and 88.4% in goats, (Andrews, 1999) who reported 85.25% in sheep and 85.05% in goats around Haramaya town. Nearly similar results were reported by Zaghawa *et al*. (1992); Costa *et al*. (2007) and Tariq *et al*. (2008). The reason for the high prevalence of the species of nematodes *Haemochus* in the area may also be due to because this genus dominated slaughter house compared to farm house reason being unhygienic conditions at slaughter houses than the farm houses.

Our study recommends the following measures to reduce the incidence of gastro intestinal parasites in goats

1. Provide hygienic conditions to goats.
2. Provide proper food to the goats.
3. Regular investigation of faecal matter for parasitic infection analysis.
4. To establish and run modern veterinary hospital with adequate medications.

5. Provide anti-helminthes doses (herbal or chemical) with consultation of veterinary doctor.

Table 1 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Slaughter house goats) during the rainy season

S.No	Study area	No. of host examined	No. of host infected	No. of eggs collected	Identified Genera	Infection %Incidence	intensity	Density	Index
1.	Barwani	20	19	442±0.43	• *Strongyloidesspp.* • *Trichuris spp.* • *Nematodirus spp.* • *Trichostrongylus spp.*	95%	2326.3	2210	20.9
2.	Sendhwa	20	17	410±0.52	• *Trichostrongylus spp.* • *Haemonchus spp.* • *Trichuris* spp.	85%	2411.7	2050	17.4
3.	Niwali	20	16	398±0.38	• *Haemonchus spp.* • *Trichuris spp.* • *Nematodirus spp.*	80%	2487.5	1990	15.92
4.	Pansemal	20	16	376±0.31	• *Trichuris spp.* • *Strongyloidesspp.* • *Trichostrongylus spp.*	80%	2350	1880	15.04
5.	Khetia	20	16	354±0.61	• *Nematodirus spp.* • *Strongyloidesspp.* • *Trichuris spp.*	80%	2212.5	1770	14.16
	Average	20	16.8	396	5 Species	84%	2357.1	1980	16.6

Table 2 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Farm house goats) during the rainy season.

S.No	Study area	No. of host examined	No. of host infected	No. of eggs collected	Identified Genera	Infection %Incidence	intensity	Density	Index
1.	Barwani	20	18	429±1.45	• *Haemonchus spp.* • *Trichuris* spp. • *Strongyloidesspp.* • *Trichostrongylus spp.*	90%	2383.3	2145	19.30
2.	Sendhwa	20	16	386±0.43	• *Trichuris* spp. • *Strongyloidesspp* • *Nematodirusspp*	80%	2412.5	1930	15.44
3.	Niwali	20	16	362±0.59	• *Trichuris spp.* • *Nematodirus spp.* • *Haemonchus spp.*	80%	2262.5	1810	14.48
4.	Pansemal	20	14	346±0.34	• *Trichuris spp.* • *Nematodirus spp.* • *Trichostrongylus spp.*	70%	2471.4	1730	12.11
5.	Khetia	20	13	337±0.45	• *Strongyloidesspp.* • *Trichostrongylusspp* • *Nematodirus spp.*	65%	2592.3	1685	10.95
	Average	20	15.4	372	5 Species	77%	2415.5	1860	14.32

Table 3 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Slaughter house goats) during the winter season.

S.No	Study area	No. of host examined	No. of host infected	No. of eggs collected	Identified Genera	Infection %Incidence	intensity	Density	Index
1.	Barwani	20	18	401±0.45	• *Haemonchus spp.* • *Trichuris* spp. • *Strongyloidesspp.* • *Trichostrongylus spp.*	90%	2227.7	2005	18.04
2.	Sendhwa	20	17	377±1.72	• *Trichuris* spp. • *Strongyloidesspp* • *Nematodirusspp*	85%	2217.6	1885	16.02
3.	Niwali	20	15	348±0.79	• *Trichuris spp.* • *Nematodirus spp.* • *Haemonchus spp.*	75%	2320	1740	13.05
4.	Pansemal	20	15	338±0.84	• *Trichuris spp.* • *Nematodirus spp.* • *Trichostrongylus spp.*	75%	2253	1690	12.67
5.	Khetia	20	13	314±0.99	• *Strongyloidesspp.* • *Trichostrongylus spp.* • *Haemonchus spp.*	65%	2415.3	1570	10.20
	Average	20	15.6	355.6	5 Species	78%	2279.4	1778	13.86

Table 4 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Farm house goats) during the winter season

S.No	Study area	No. of host examined	No. of host infected	No. of eggs collected	Identified Genera	Infection			
						%Incidence	intensity	Density	Index
1.	Barwani	20	16	388±0.87	• *Trichuris* spp. • *Strongyloidesspp* • *Nematodirusspp* • *Haemonchus spp.*	80%	2425	1940	15.52
2.	Sendhwa	20	14	372±0.62	• *Strongyloidesspp* • *Trichuris* spp. • *Haemonchus spp.*	70%	2657.1	1860	13.02
3.	Niwali	20	14	342±0.49	• *Nematodirusspp* • *Strongyloidesspp.* • *Trichostrongylus*	70%	2442.8	1710	11.97
4.	Pansemal	20	12	331±0.53	• *Trichuris* spp. • *Strongyloidesspp* • *Haemonchus spp.*	60%	2758.3	1655	9.93
5.	Khetia	20	10	305±1.28	• *Nematodirusspp* • *Trichuris* spp. • *Trichostrongylus app.*	50%	3050	1525	7.62
	Average	20	13.2	337.6	5 Species	66%	2557.5	1688	11.14

Table 5 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Slaughter house goats) during the summer season

S.No	Study area	No. of host examined	No. of host infected	No. of eggs collected	Identified Genera	Infection			
						%Incidence	intensity	Density	Index
1.	Barwani	20	16	382±0.86	• *Strongyloidesspp.* • *Haemonchus spp.* • *Trichuris* spp. • *Trichostrongyluss pp*	80%	2387.5	1910	15.28
2.	Sendhwa	20	16	367±0.37	• *Haemonchus spp.* • *Trichuris* spp. • *Strongyloidesspp*	80%	2293.7	1835	14.68
3.	Niwali	20	14	322±0.57	• *Haemonchus spp.* • *Trichuris* spp. • *Nematodirus spp.*	70%	2300	1610	11.27
4.	Pansemal	20	13	291±0.16	• *Strongyloidesspp* • *Haemonchus spp.* • *Trichuris* spp.	65%	2238.4	1455	9.45
5.	Khetia	20	11	285±0.73	• *Haemonchus spp.* • *Trichuris* spp. • *Strongyloidesspp*	55%	2590	1425	7.83
	Average	20	14	329.4	5 Species	70%	2352.8	1647	11.52

Table 6 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Farm house goats) during the summer season.

S.No	Study area	No. of host examined	No. of host infected	No. of eggs collected	Identified Genera	Infection			
						%Incidence	intensity	Density	Index
1.	Barwani	20	16	362±0.75	• *Haemonchus spp.* • *Trichuris* spp. • *Strongyloidesspp.*	80%	2262.5	1810	14.48
2.	Sendhwa	20	13	346±0.94	• *Trichostrongylus spp.* • *Trichuris* spp. • *Strongyloidesspp* • *Nematodirusspp*	65%	2661.5	1730	11.24
3.	Niwali	20	11	312±0.66	• *Trichuris spp.* • *Nematodirus spp.* • *Haemonchus spp.*	55%	2836.3	1560	8.58
4.	Pansemal	20	10	286±0.21	• *Trichuris spp.* • *Nematodirus spp.* • *Trichostrongylus spp.*	50%	2860	1430	7.15
5.	Khetia	20	10	266±0.56	• *Strongyloidesspp.* • *Trichostrongylusspp* • *Haemonchus spp.*	50%	2660	1330	6.65
	Average	20	12	314.4	5 Species	60%	2620	1572	9.43

Table 7 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Slaughter house goats) during the Rainy season

S. No	Study area	No. of host examined	No. of host infected	No. of parasite collected	Individual burden	Identified Genera	Infection: % Incidence	Intensity	Density	Relative density	Index
1.	Barwani	20	19	426±0.96	114 100 110	• *Strongyloidesspp.* • *Trichuris spp.* • *Nematodirus spp.*	95%	2242.1	2130	26.76 23.47 25.82	20.23
2.	Sendhwa	20	17	394±0.42	102 140 131 123	• *Trichostrongylus spp.* • *Trichostrongylus spp.* • *Haemonchus spp.* • *Trichuris* spp.	85%	2317.6	1970	23.94 35.53 33.24 31.21	16.74
3.	Niwali	20	16	355±0.55	120 105 130	• *Haemonchus spp.* • *Trichuris* spp. • *Nematodirus spp.*	80%	2218.75	1775	33.80 29.57 36.61	14.2
4.	Pansemal	20	16	326±0.29	108 117 101	• *Trichuris spp.* • *Strongyloidesspp.* • *Trichostrongylus spp.*	80%	2037	1630	33.12 35.88 30.98	13.04
5.	Khetia	20	16	312±0.94	107 104 101	• *Nematodirus spp.* • *Strongyloidesspp.* • *Trichuris spp.*	80%	1950	1560	34.29 33.33 32.37	12.48
	Average	20	16.8	362.6	1813	5 Species	84%	2158.33	1813	100	15.22

Table 8 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Farm house goats) during the Rainy season

S. No	Study area	No. of host examined	No. of host infected	No. of parasite collected	Individual burden	Identified Genera	Infection: % Incidence	Intensity	Density	Relative density	Index
1.	Barwani	20	18	411±1.28	102 109 95 105	• *Haemonchus spp.* • *Trichuris* spp. • *Strongyloidesspp.* • *Trichostrongylus spp.*	95%	2283.33	2055	24.81 26.52 23.11 25.54	18.49
2.	Sendhwa	20	16	381±0.61	114 131 136	• *Trichuris* spp. • *Strongyloidesspp.* • *Nematodirus spp.*	80%	2381.25	1905	29.92 34.38 35.69	15.24
3.	Niwali	20	16	341±0.55	113 121 107	• *Trichuris* spp. • *Nematodirus spp.* • *Haemonchus spp.*	80%	2131.25	1705	33.13 35.48 31.37	13.64
4.	Pansemal	20	14	310±1.76	98 103 109	• *Trichuris* spp. • *Nematodirus spp.* • *Strongyloidesspp.*	70%	2214	1550	31.61 33.22 35.16	10.85
5.	Khetia	20	13	278±0.37	100 86 92	• *Strongyloidesspp.* • *Trichostrongylus spp.* • *Nematodirus spp.*	65%	2138	1390	35.97 30.93 33.09	9.03
	Average	20	15.4	344.2	1721	5 Species	77%	2235.06	1721	100	13.25

Table 9 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Slaughter house goats) during the winter season

S. No	Study area	No. of host examined	No. of host infected	No. of parasite collected	Individual burden	Identified Genera	Infection: % Incidence	Intensity	Density	Relative density	Index
1.	Barwani	20	18	401±1.83	95 95 100	• *Haemonchus spp.* • *Trichuris* spp. • *Strongyloidesspp.*	90	2227.77	2005	23.69 23.69 24.93	18.04
2.	Sendhwa	20	17	388±0.77	110 128 120 140	• *Trichostrongylus spp.* • *Trichuris* spp. • *Strongyloidesspp.* • *Nematodirus spp.*	85%	2282.35	1940	27.68 32.98 30.92 36.08	16.49
3.	Niwali	20	15	346±0.51	108 120 118	• *Trichuris* spp. • *Nematodirus spp.* • *Haemonchus spp.*	75%	2306.66	1730	31.21 34.68 34.10	12.97
4.	Pansemal	20	15	314±0.66	100 109 105	• *Trichuris* spp. • *Nematodirus spp.* • *Trichostrongylus spp.*	75%	2093.33	1570	31.84 34.71 33.43	11.77
5.	Khetia	20	13	286±0.44	90 97 99	• *Strongyloidesspp.* • *Trichostrongylusspp* • *. Haemonchus spp.*	65%	2200	1430	31.46 33.91 34.61	9.29
	Average	20	15.6	347	1735	5 Species	78%	2224.35	1735	100	13.53

Table 10 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Farm house goats) during the winter season

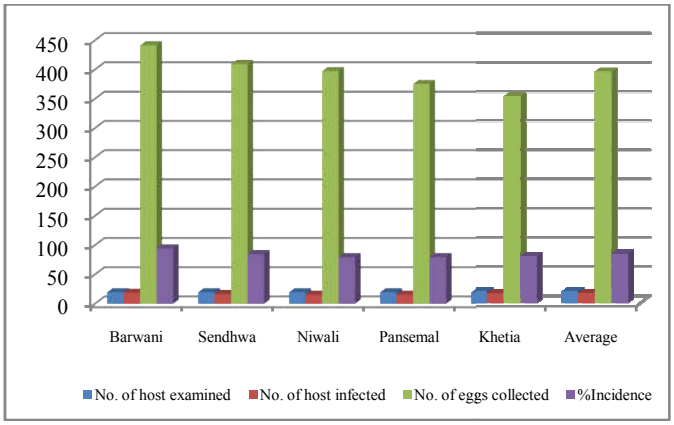
S. No	Study area	No. of host examined	No. of host infected	No. of parasite collected	Individual burden	Identified Genera	Infection: % Incidence	Intensity	Density	Relative density	Index
					96	• *Trichuris* spp.				24.74	
1.	Barwani	20	16	388±0.24	104	• *Strongyloidesspp*	80%	2425	1940	26.80	15.52
					92	• *Nematodirusspp*				23.71	
					96	• *Haemonchus spp.*				24.74	
					107	• *Strongyloidesspp*				30.39	
2.	Sendhwa	20	14	352±0.95	118	• *Trichuris* spp.	70%	2514.28	1760	33.52	12.35
					127	• *Haemonchus spp.*				36.07	
					105	• *Nematodirusspp*				30.61	
3.	Niwali	20	14	343±1.82	117	• *Strongyloidesspp*	70%	2450	1715	34.11	12.00
					121	• *Trichostrongylus spp.*				35.27	
					91	• *Trichuris* spp.				29.83	
4.	Pansemal	20	12	305±1.34	98	• *Strongyloidesspp*	60%	2561.66	1525	32.13	9.15
					116	• *Haemonchus spp.*				38.03	
					87	• *Nematodirusspp*				32.10	
5.	Khetia	20	10	271±0.64	103	• *Trichuris* spp.	50%	2710	1355	38.00	6.77
					81	• *Trichostrongylus spp.*				29.88	
	Average	20	13.2	331.8	1659	5 Species	66%	2513.63	1659	100	10.94

Table 11 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Slaughter house goats) during the summer season.

S. No	Study area	No. of host examined	No. of host infected	No. of parasite collected	Individual burden	Identified Genera	Infection: % Incidence	Intensity	Density	Relative density	Index
					100	• *Strongyloidesspp.*				25.97	
					92	• *Haemonchus spp.*				23.89	
1.	Barwani	20	16	385±0.87	99	• *Trichuris* spp.	80%	2406.25	1925	25.71	15.4
					94	• *Trichostrongyluss pp*				24.71	
					107	• *Haemonchus spp.*				28.84	
2.	Sendhwa	20	16	371±0.39	119	• *Trichuris* spp.	80%	2318.75	1855	32.07	14.84
					145	• *Strongyloidesspp.*				39.08	
					103	• *Haemonchus spp.*				32.59	
3.	Niwali	20	14	316±0.58	109	• *Trichuris* spp.	70%	2257.14	1580	34.49	11.06
					104	• *Nematodirus spp.*				32.91	
					93	• *Strongyloidesspp.*				33.69	
4.	Pansemal	20	13	276±0.76	100	• *Haemonchus spp.*	65%	2123.07	1380	36.23	8.97
					83	• *Trichuris* spp.				30.07	
					80	• *Haemonchus spp.*				30.30	
5.	Khetia	20	11	264±0.56	94	• *Trichuris* spp.	55%	2400	1320	35.60	7.26
					90	• *Strongyloidesspp.*				34.09	
	Average	20	14	332.4	1612	5 Species	70%	2302.85	1612	100	11.28

Table 12 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Farm house goats) during the summer season

S. No	Study area	No. of host examined	No. of host infected	No. of parasite collected	Individual burden	Identified Genera	Infection: % Incidence	Intensity	Density	Relative density	Index
					111	• *Haemonchus spp.*				30.41	
1.	Barwani	20	16	365±0.52	94	• *Trichuris* spp.	80%	2281.25	1825	25.75	14.6
					73	• *Strongyloidesspp.*				20	
					87	• *Trichostrongylus spp.*				23.83	
					123	• *Trichuris* spp.				35.75	
2.	Sendhwa	20	13	344±1.46	103	• *Strongyloidesspp.*	65%	2646.15	1720	29.94	11.18
					118	• *Nematodirusspp*				34.30	
					85	• *Trichuris* spp.				29.41	
3.	Niwali	20	11	289±1.84	95	• *Nematodirusspp*	55%	2627.27	1445	32.87	7.94
					109	• *Haemonchus spp.*				37.71	
					77	• *Trichuris* spp.				29.96	
4.	Pansemal	20	10	257±0.37	83	• *Nematodirusspp*	50%	2570	1285	32.29	6.42
					97	• *Trichostrongylus spp.*				37.74	
					71	• *Strongyloidesspp.*				31.69	
5.	Khetia	20	10	224±0.73	83	• *Trichostrongylus spp.*	50%	2240	1120	37.05	5.6
					70	• *Haemonchus spp.*				31.25	
	Average	20	12	295.8	1479	5 Species	60%	2465	1479	100	8.87



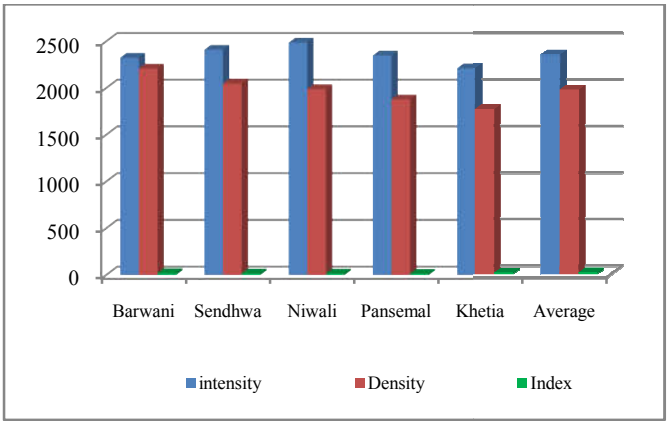
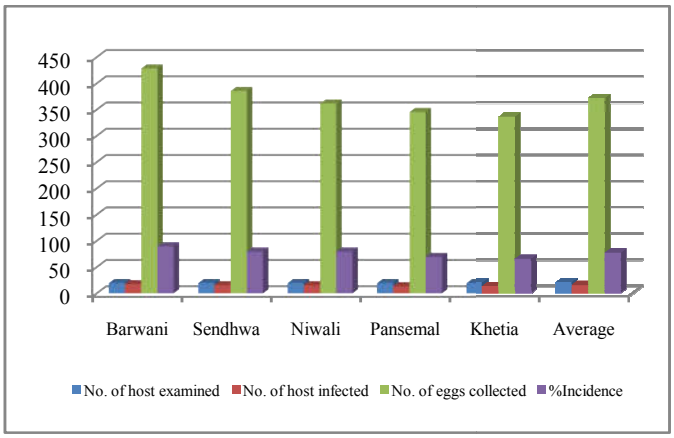


Fig 1 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Slaughter house goats) during the rainy season



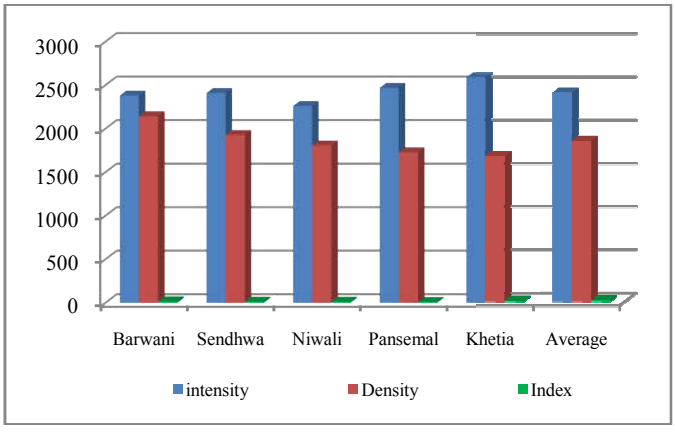
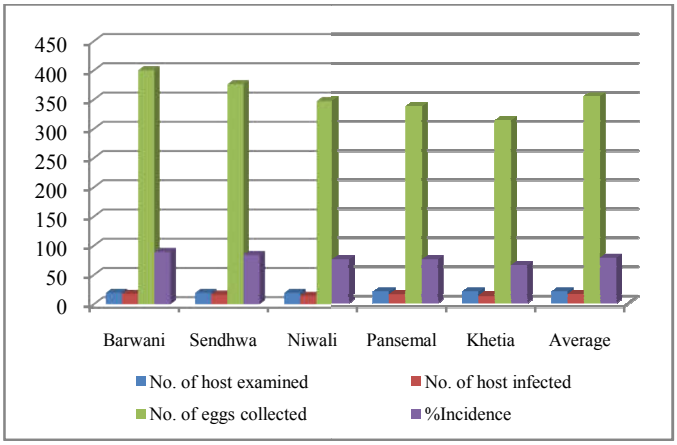


Fig 2 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Farm house goats) during the rainy season.



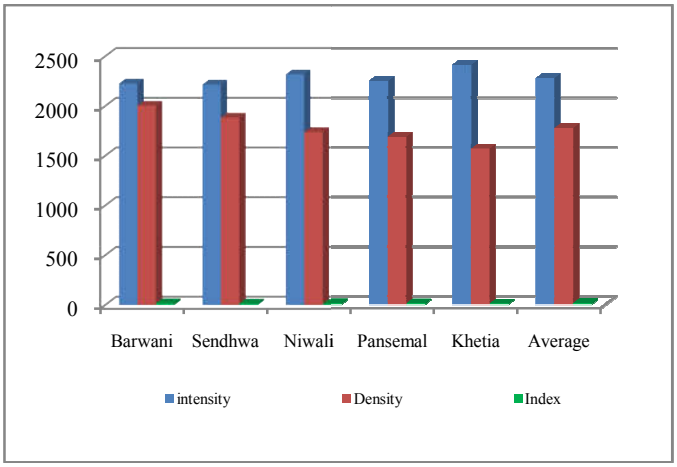
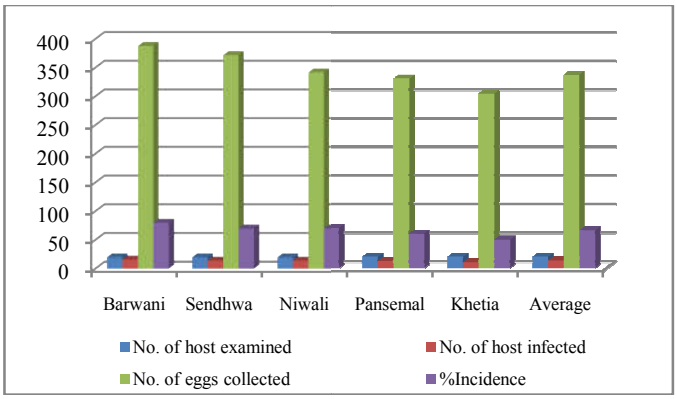


Fig 3 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Slaughter house goats) during the winter season.



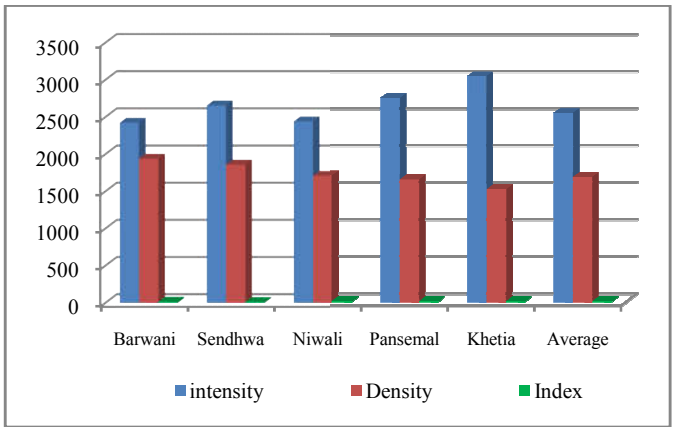


Fig 4 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Farm house goats) during the winter season

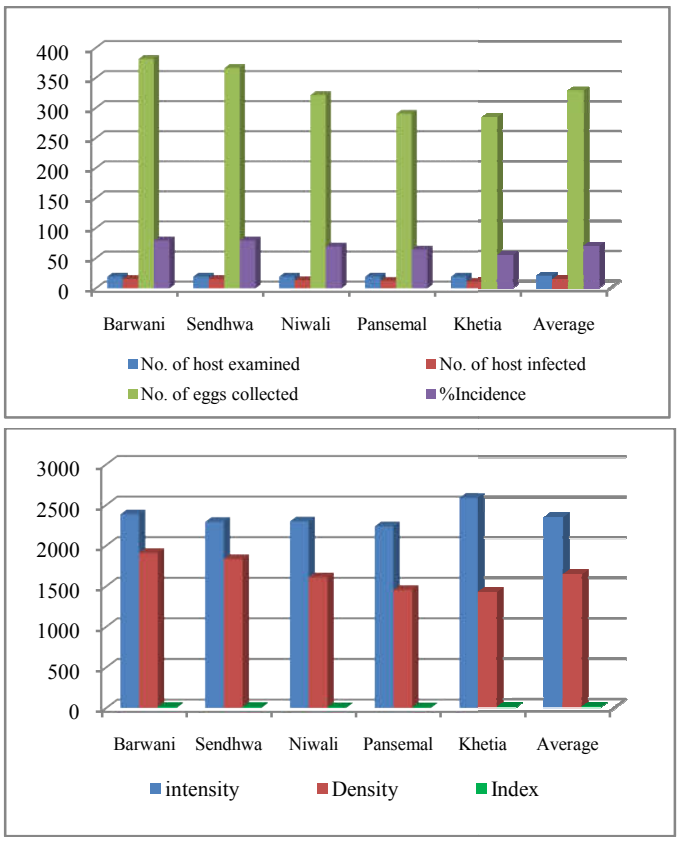


Fig 5 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Slaughter house goats) during the summer season.

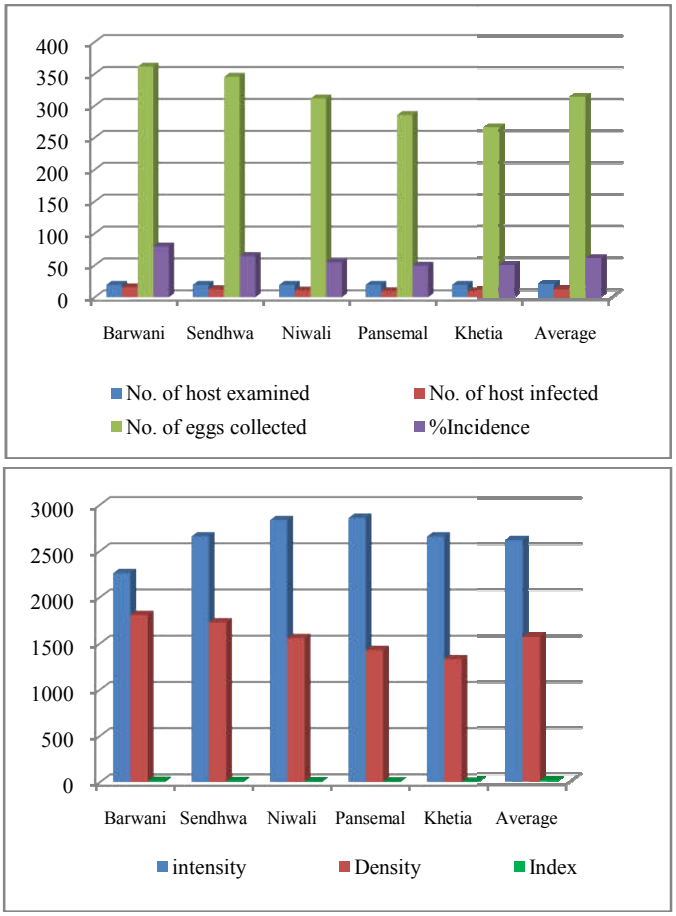


Fig 6 Prevalence and incidence of nematodes on the basis of eggs collection in goats (Farm house goats) during the summer season.

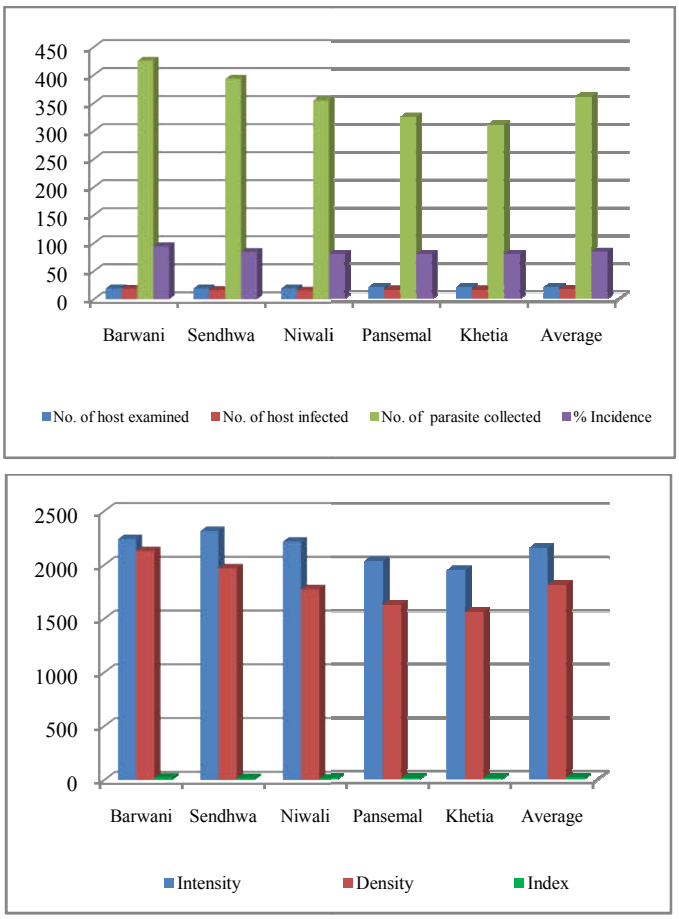


Fig 7 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Slaughter house goats) during the rainy season

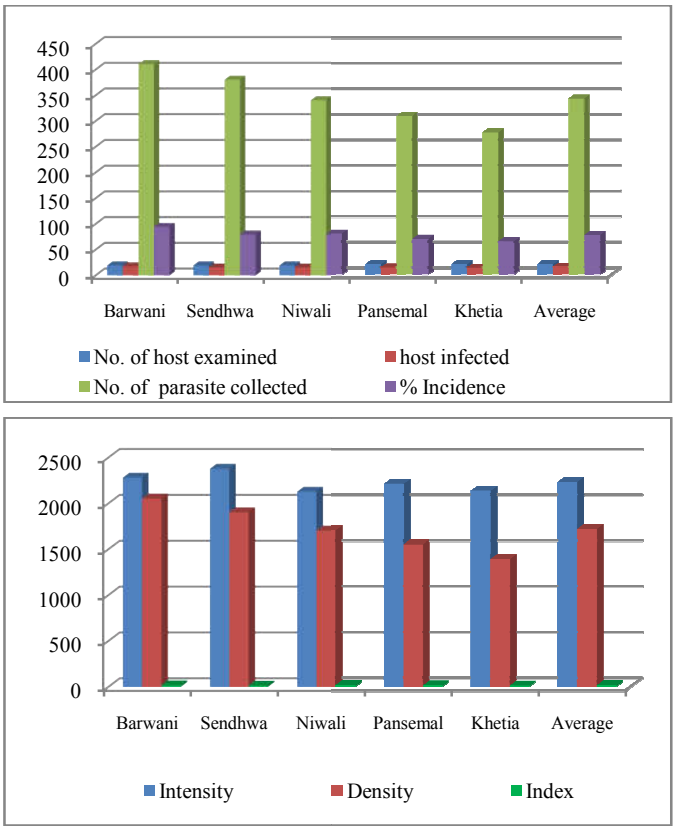


Fig 8 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Farm house goats) during the Rainy season.

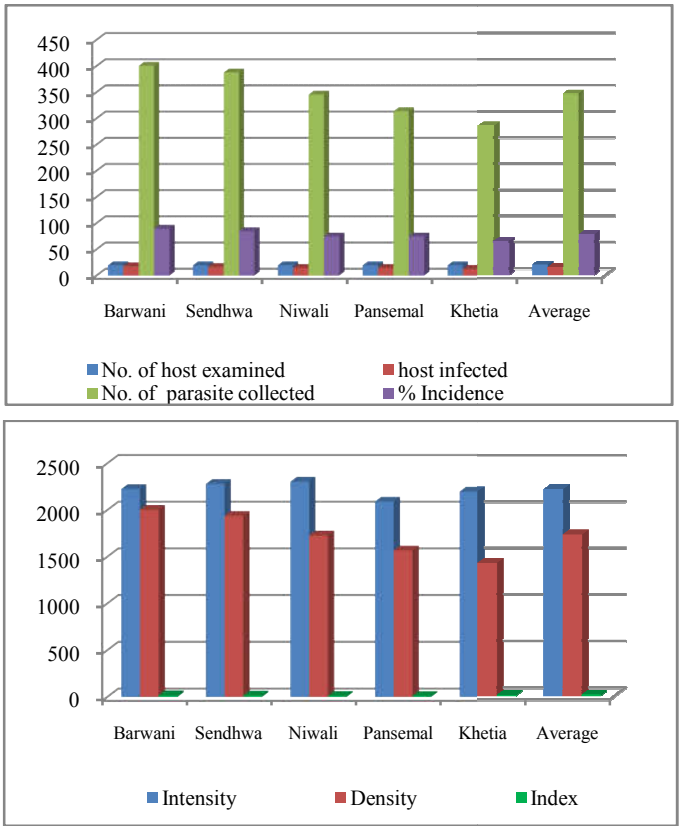


Fig 9 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Slaughter house goats) during the winter season

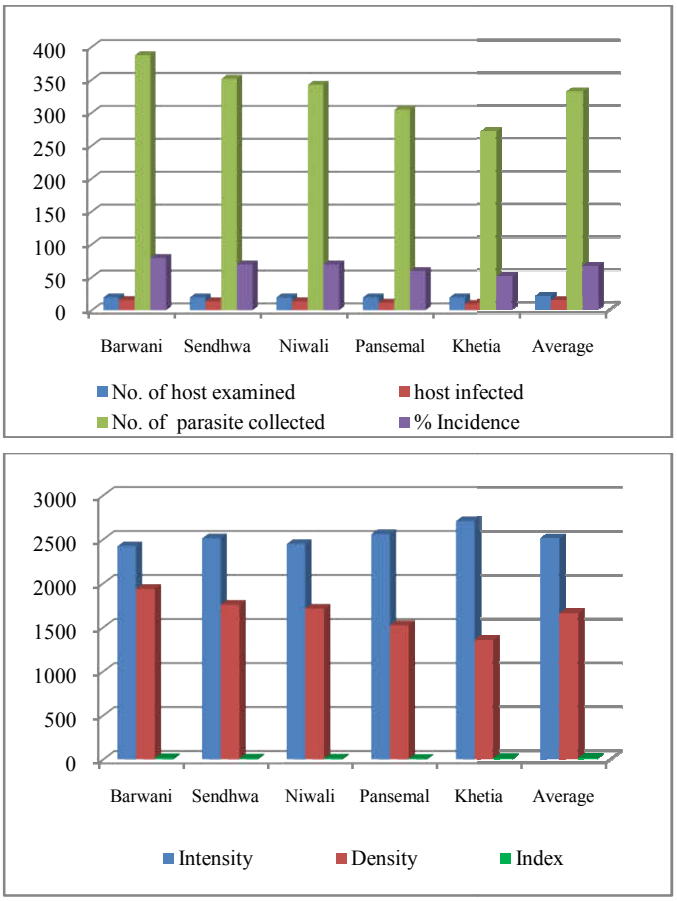


Fig 10 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Farm house goats) during the winter season

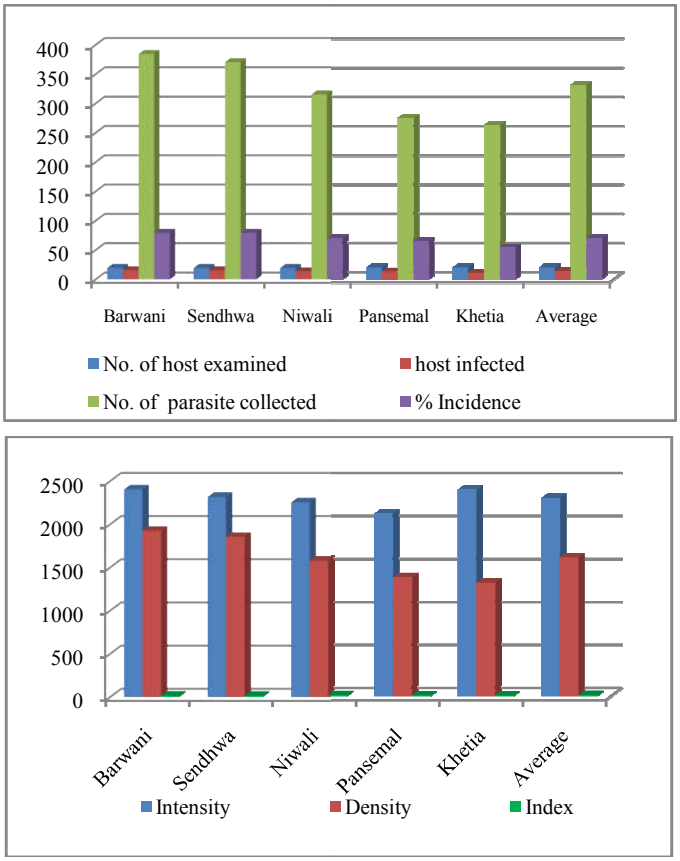


Fig 11 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Slaughter house goats) during the summer season

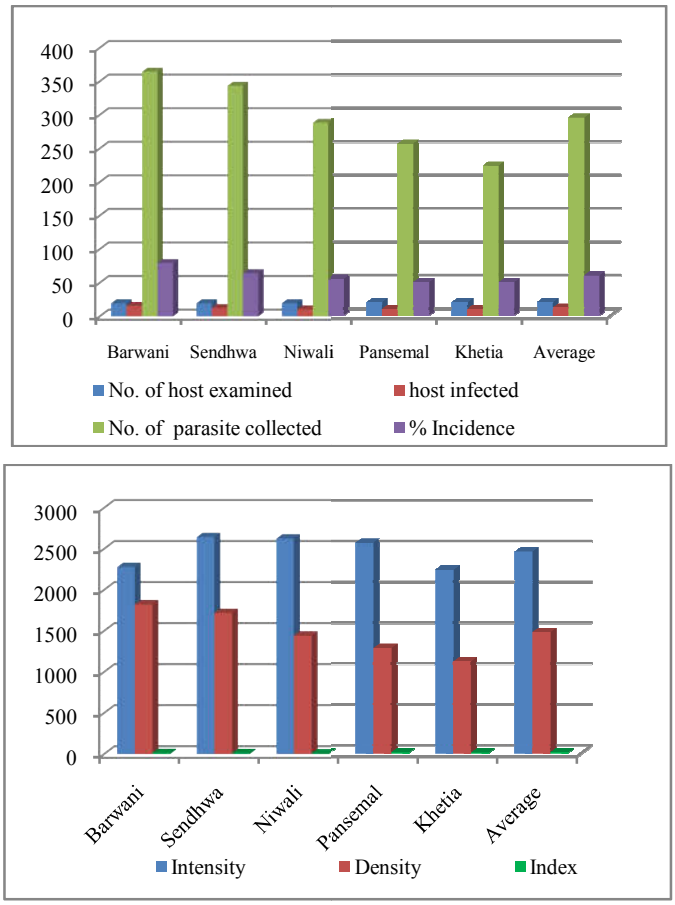


Fig 12 Prevalence and incidence of nematodes on the basis of parasites collection in goats (Farm house goats) during the summer season

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