

# Gastrointestinal parasitic infection in Gir Cattle (*Bos primigenius indicus*) and Jaffrabadi Buffalo (*Bubalus bubalis*) from Junagadh, Gujarat, India

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## Research Article

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# Abstract

Coprological analysis was performed to check the presence and prevalence of gastrointestinal parasites. One hundred seventy six bovine faecal samples were studied. The study reported the presence of parasitic stages of *Balantidium coli*, *Buxtonella sulcata*, *Trichostrongylus spp.*, *Toxocara vitulorum*, *Fasciola spp.*, *Strongyloid spp.*, and *Paraamphistomum spp.* 43.51 % (n = 108) faecal samples from Gir cattle (*Bos primigenius indicus*) were positive for Gastrointestinal parasitic infections. and 36.76 % (n = 68) faecal samples from Jaffrabadi Buffaloes (*Bubalus bubalis*) were positive for Gastrointestinal parasitic infections. In Cattle *Balantidium coli* was found highest (20.37 %) and in Buffaloes *Buxtonella sulcata* was found highest (8.82%). the highest incidence was recorded during august for both cattle (6.48 %) and buffalo (7.35 %). Gastrointestinal parasitic infections in calves (< 12 Months) was higher than older (> 60 Months) and adult animals (12-60 Months). Season wise gastrointestinal parasitic infections in cattle were reported maximum (23.15 %) during monsoon. Maximum prevalence in buffalo was reported during Monsoon (16.18 %). similarly, females recorded higher infection rates than males for both cattle and buffalo.

## Introduction

Gastrointestinal parasitic infection is a major health problem in domestic animals. Gastrointestinal parasitism is a chief constraint for livestock production leading to heavy economic loss. They have an important impact on the profitability of dairy production systems (Beasley *et al.*, 2010) [5] by affecting the productivity and reproductively of the animals. Gastrointestinal (GI) parasites cause remarkable universal economic losses as a result of digestive disturbance, lowered production, reduced weight gain, impaired reproductive performance, condemnation of affected organs and mortality in infected animals (Raza *et al.*, 2007) [23].

Parasitic diseases caused by intestinal parasites constitute (generate) a major drawback to livestock production (Hosteet *et al.*, 2006) [14]. The hot and humid climatic conditions are very native for propagation and perpetuation of parasites (Enderjat, 1964) [10]. Country like India has this kind of climatic conditions throughout the year except three to four months of winter, Therefore, documentation on parasitic prevalence are very necessary to make a suitable plan for its prevention and control (Thakreet *et al.*, 2019) [32]. The present communication deals with the prevalence of gastrointestinal (GI) parasites in Gir cattle and Jaffrabadi buffalo of Junagadh.

## DETAILS OF THE SPECIES ENCOUNTERED

In present study total seven species of gastrointestinal parasites were recorded. Out of which two species of phylum Protozoa, two species of phylum Platyhelminthes and three species of phylum Nematelminthes of Gastrointestinal (GI) parasites were recorded.

### 1. *Balantidium coli* (Malmsten, 1857)

Balantidiasis caused by *Balantidium coli* could be emerged as a significant pathogen that is able to cause disease in horses (Headley et al., 2008) [12], buffaloes (Tarrar et al., 2008) [30], cattle (Randhawa et al., 2010) [22] and camels (Abubakr et al., 2000 [1]; AL-Tayib, 2014 [4]; Cox, 2005) [7].

### 2. *Buxtonella sulcata* (Jameson, 1926)

*B. sulcata* is a ciliate protozoan inhabiting colon which is considered as an opportunistic *B. sulcata* is considered as an opportunistic ciliate protozoan inhabiting colon of cattle and buffalo (Levine, 1985; [17] Bhatia, 2000) [6].

### 3. *Toxocara vitulorum* (Goeze, 1782)

*T. vitulorum* is one of the most common and hazardous intestinal parasite (Woodbury, 2012) [34] which cause anorexia, diarrhoea, weight loss and calf mortality (Roldan et. al., 2010) [25]. Bovine toxocariosis is among the most economically important diseases, affecting animals mainly at young age due to maternal infection, and frequently causing death (Devi et al. 2000) [9].

### 4. *Trichostrongylus spp.* (Looss, 1905)

In ruminants *Trichostrongylus* worms are mostly found in mixed infections with other gastrointestinal roundworms. *Trichostrongylus* worms damage the lining of the small intestine or the stomach of the host, which can lead to enteritis, gastritis, and sometimes anemia as well (Junquera, 2017/ parasitepedia.net) [15].

### 5. *Strongyloides spp.* (Grassi, 1879)

*Strongyloides* is a parasite of world-wide distribution that can remain dormant for many years in the intestine, and then cause a devastating syndrome of disseminated strongyloidiasis (Gelberg, 2017) [11].

### 6. *Fasciola spp.* (Linnaeus, 1758)

Fasciolosis is important food born and water born parasitic zoonosis caused by liver fluke of the genus *Fasciola*. Fascioliasis, a serious infectious parasitic disease infecting domestic ruminants and humans, tops all the zoonotic helminthes worldwide (Mas-Coma et.al., 2005) [19].

### 7. *Paramphistomum spp.* (Fischoeder, 1901)

*Paramphistomum* flukes are also called rumen flukes or stomach flukes (source: parasitepedia.net) [29]. Adult *Paramphistomes* are the main parasites in the rumen and reticulum of sheep, goats, cattle and water buffaloes (Al-Gaabary, 2009) [3].

## Materials And Methods

Faecal samples of cattle and buffaloes were collected from Junagadh region. The samples were examined in the laboratory by sedimentation and floatation technique (Soulsby, 1982) [28]. A total of 176 (108-Gir cattle & 68-Jaffrabadi buffalo) faecal samples were collected from selected sites i.e. farms and cowshed (Gaushala) of Junagadh area from period August, 2019 to March, 2020. Freshly dropped faecal samples were collected for parasitological examination. Approximately 40g faeces were collected into individual zipper storage bags or plastic pots with label. Collected samples were stored with ice bags until examined. The samples were examined for parasitic eggs and protozoan ova/oocyst with 10x and 40x magnification of compound microscope (Zajac and Conboy, 2012) [35], (Hendrix *et al.*, 2006) [13].

## Result And Discussion

The present study was conducted to know the month, season, sex, age and species wise prevalence (%) of gastrointestinal parasites in Gir Cattle and Jaffrabadi Buffalo in Junagadh area. Samples were collected from August-2019 to March-2020. The incidence of diversified GI parasites encountered in this study in cattle and buffaloes are summarized in [Table 1]. Microscopic examination exposed that (43.52%) faecal samples from cattle were positive for GI parasitic infections. And (36.76%) faecal samples from buffaloes were positive for GI parasitic infections. The highest load of GI parasites was recorded during August (wet month) in both cattle (23.15 %) and buffalo (16.18 %). According to (Degefu *et al.*, 2011) [8] the overall prevalence of GI helminths infection was higher in October (wet month) and lower in February, reason for this could be conducive environment for the development of larvae.

The different species of GI parasites which were found after examination of faecal samples has been represented in [Table 2]. Species wise prevalence showed the presence of seven species of different parasite (eggs/ova/cysts). Out of it two species are of protozoa (Ciliate) *viz. Balantidium coli* in cattle (20.37 %) and buffalo (8.82 %) and *Buxtonella sulcata* in cattle (9.26 %) and buffalo (16.18 %). This was in close agreement with (Singh, 2014) [27] and (Nath *et al.*, 2016) [20] who recorded *Balantidium Coli* as dominant protozoa. Though, *Buxtonella sulcata* and *Balantidium coli* are considered as non-pathogenic protozoa, recently many researchers had reported its pathogenicity leading to diarrhoea (Al-Saffar *et al.* 2010) [2]. The lower prevalence of trematodal infections (amphistomosis and fasciolosis) recorded is mainly because of the occurrence that the animals of Junagadh region are mostly stall fed thus decreasing the chances of exposure to the infective intermediate host present on the vegetation in the vicinity of water bodies (Maharana *et al.*, 2016) [18].

It was observed studied that the age wise prevalence of GI parasitic infection was highest in young cattle (23.15 %) than old (12.96 %) and adults (7.41 %). Highest incidence was recorded in young buffalo (14.71) than old (13.24) and adults (8.82). [Table 3]. The prevalence of GI parasites with the age has also been reported by Quershii and Tanveer (Quershii and Tanveer, 2009) [21] and (Telila *et al.*, 2014) [31]. On the contrary, Regassa *et al.*, 2006 (Regassa *et al.*, 2006) [24] stated that the younger animals are more susceptible than adult animals. Age wise percentage (%) based on species is summarised in [Fig 1].

Regarding over all sex wise prevalence, though positive ratio of gastrointestinal parasitic infection was higher in female cattle than male (32.41 %vs 11.11 %) and a similarly observed for buffaloes (29.85 %vs 7.46 %), [Table 4] This findings can be supported by the fact that this region of Gujarat usually shows common managemental practices that are adopted for animals of both male and female followed by deworming programme which is similar for each that give reason of being no significant difference in prevalence of parasitic infections among males and females could be detected (Maharana *et al.*, 2016) [18]. Sex wise percentage (%) based on species is summarised in [Fig 2].

Season wise prevalence (%) of GI parasitic infections in Gir cattle & Jaffrabadi buffalo is presented in [table 5]. In present study, maximum prevalence in cattle was reported during monsoon (23.15 %) followed by Post monsoon (12.04 %), winter (7.41 %) and summer (0.93 %). Maximum prevalence in buffalo was reported during Monsoon (16.18 %) followed by Post monsoon (11.76 %), winter (7.35 %), and summer (1.47 %). As well as minimum prevalence was reported during Summer in cattle (0.93 %) and buffalo (1.47 %). The reason for highest prevalence of GI parasitic infections during monsoon is High moisture content along with temperature prevailed during rainy season favours the growth and development of larvae, as also observed in earlier studies carried out by various researchers (Laha *et al.*, 2013) [16], (Vanisriet *et al.*, 2016) [33] and (Shit *et al.*, 2017) [26].

The overall phylum wise incidence of parasitic infections in both cattle and buffalo is given in [Fig 3]. Highest incidence (68%) was recorded in phylum Protozoa followed by Nematelminthes (23%) and Platyhelminthes (9%).

**Table 1:** Month wise incidence (%) of GI parasitic infections in Gir Cattle & Jaffrabadi buffalo.

Month	Cattle (n=108)			Buffalo (n=68)		
	Samples examined	No. infected	Incidence (%)	Samples examined	No. infected	Incidence (%)
Aug-19	38	25	23.15	26	11	16.18
Sep-19	9	7	6.48	9	4	5.88
Oct-19	9	3	2.78	7	3	4.41
Nov-19	10	3	2.78	6	1	1.47
Dec-19	8	4	3.70	6	3	4.41
Jan-20	11	2	1.85	4	1	1.47
Feb-20	10	2	1.85	2	1	1.47
Mar-20	13	1	0.93	8	1	1.47
Total	108	47	43.52	68	25	36.76

**Table 2:** Species wise incidence (%) of GI parasitic infections in Gir Cattle & Jaffrabadi buffalo.

Parasite	Cattle (n=108)		Buffalo (n=68)	
	No. infected	Incidence (%)	No. infected	Incidence (%)
<i>Balantidium coli</i>	22	20.37	6	8.82
<i>Buxtonella sulcata</i>	10	9.26	11	16.18
<i>Fasciola spp.</i>	2	1.85	3	4.41
<i>Paraamphistomum spp.</i>	1	0.93	0	0.00
<i>Strongyloid spp.</i>	3	2.78	1	1.47
<i>Toxocara vitulorum</i>	2	1.85	3	4.41
<i>Trichostrongylus spp.</i>	7	6.48	1	1.47
Total	47	43.52	25	36.76

**Table: 3** Overall age wise incidence (%) of GI parasitic infections in Gir Cattle & Jaffrabadi buffalo.

Total positive	Young		Adult		Old	
	No. infected	Incidence (%)	No. infected	Incidence (%)	No. infected	Incidence (%)
Cattle (n=108)	25	23.15	8	7.41	14	12.96
Buffalo (n=68)	10	14.71	6	8.82	9	13.24

**Table: 4** Over all sex wise incidence (%) of GI parasitic infections in Gir Cattle & Jaffrabadi buffalo.

Type	Sex	No. of Sample	No. infected	Incidence (%)
Cattle (n=108)	Male	22	12	11.11
	Female	86	35	32.41
Buffalo (n=68)	Male	9	5	7.46
	Female	59	20	29.85

**Table: 5** Season wise incidence (%) of GI parasitic infections in Gir cattle & Jaffrabadi buffalo in Junagadh region.

season	Cattle (n=108)			Buffalo (n=68)		
	sample examined	No. infected	Incidence (%)	sample examined	No. infected	Incidence (%)
Monsoon	38	25	23.15	26	11	16.18
Post monsoon	28	13	12.04	22	8	11.76
Winter	29	8	7.41	12	5	7.35
Summer	13	1	0.93	8	1	1.47
Total	108	47	43.52	68	25	36.76

## Conclusion

Various gastrointestinal parasites have been found in Gir Cattle and Jaffrabadi buffaloes in Junagadh region were infected with *Balantidium coli*, *Buxtonella sulcata*, *Fasciola spp.*, *Paraamphistomum spp.*, *Toxocara vitulorum*, *Trichostrongylus spp.* *Strongyloid spp.* of GI parasites. The present study showed a higher prevalence of GI parasites in cattle 43.52 % (n = 108) than in buffaloes 36.76 % (n = 68). The prevalence rates of GI parasites varied with month. Females carried higher GI parasitic burden than males. In young animals (calves - below 1 year) GI parasitic infection was higher followed by older (more than 5 years) and adults (1-5 years). Seasonal GI parasitic load were maximum in monsoon and post monsoon.

## Declarations

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**Competing interests:** The authors declare no competing interests.

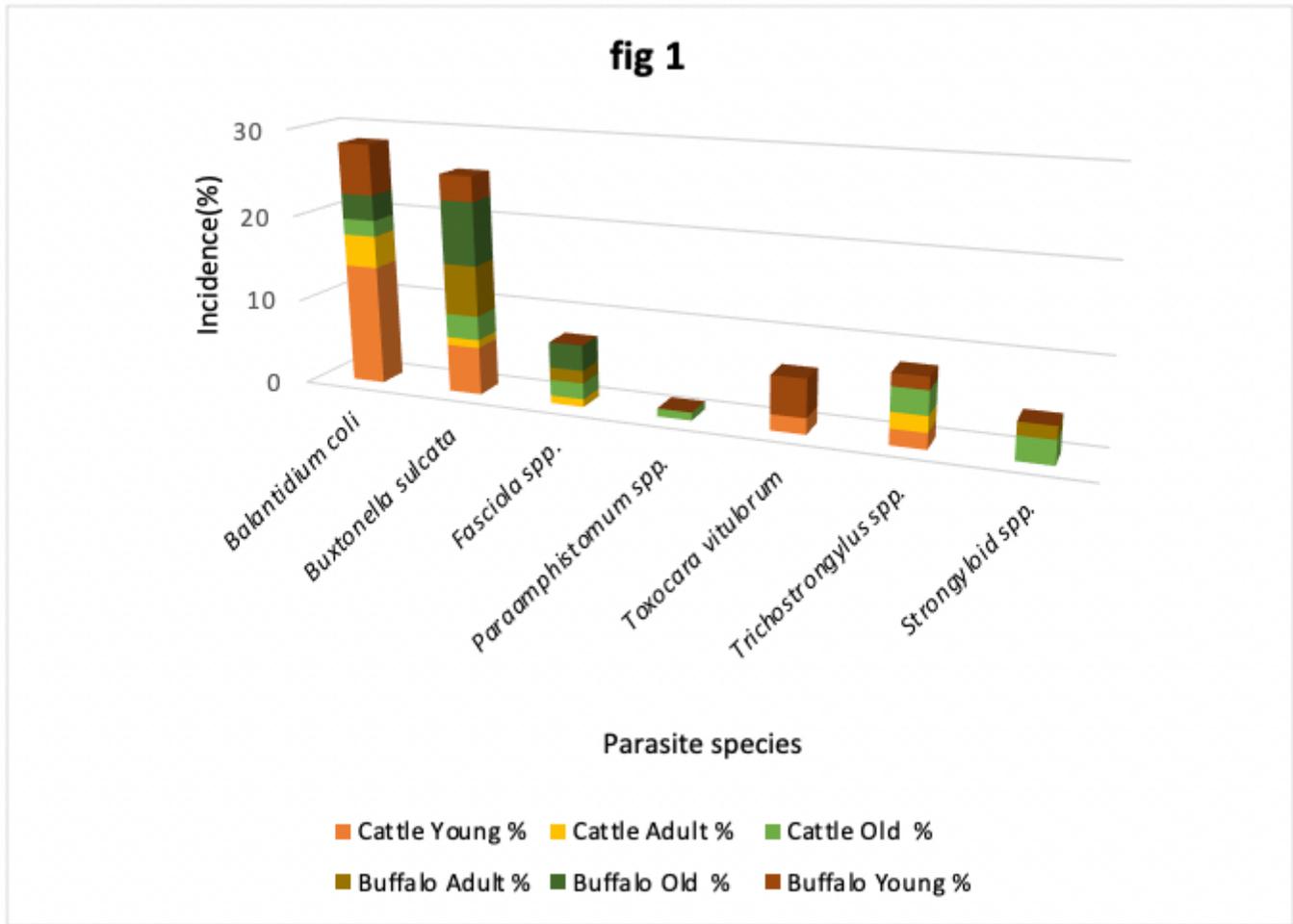
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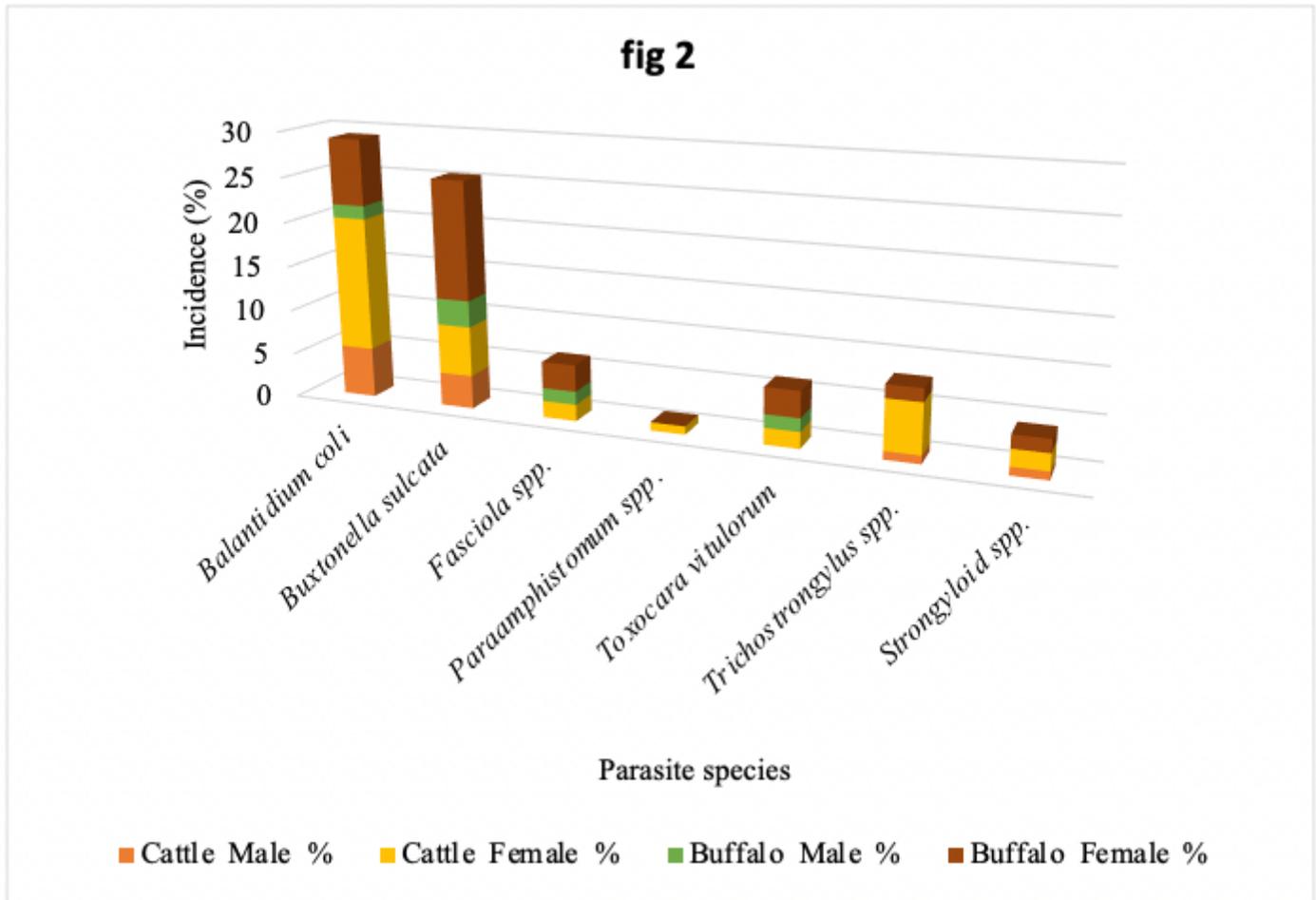
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## Figures



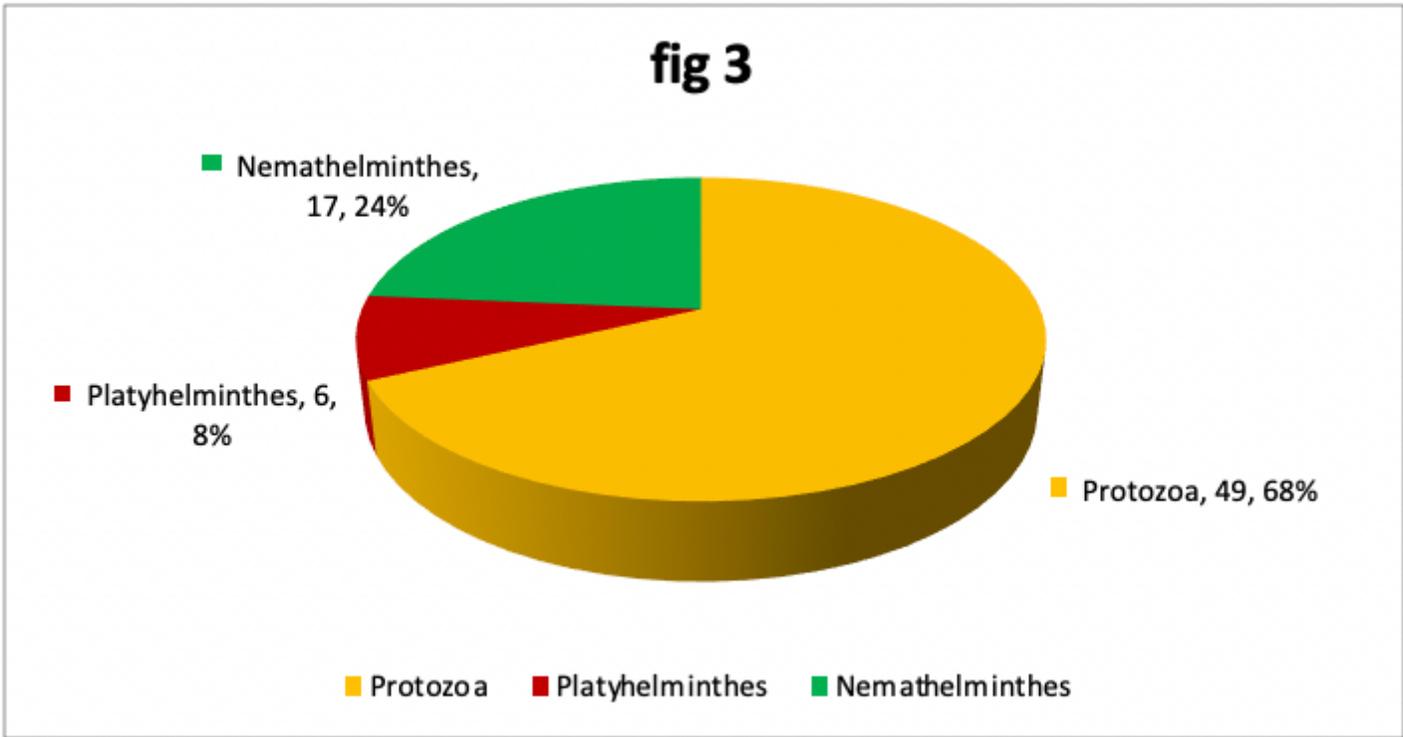
**Figure 1**

Age wise incidence (%) based of species of parasites of GI parasitic infections in Gir Cattle & Jaffrabadi buffalo in Junagadh region.



**Figure 2**

Sex wise incidence (%) based on parasite species of GI parasitic infections in Gir cattle & Jaffrabadi buffalo.



**Figure 3**

Overall Phylum wise incidence (%) of Parasite species in Gir cattle and Jaffrabadi Buffalo.