Research Article

RECENT CASE FLOW PATTERN IN VETERINARY TEACHING HOSPITAL OF AGRICULTURE AND FORESTRY UNIVERSITY, CHITWAN, NEPAL

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ABSTRACT

A retrospective study was done to determine last two years case flow pattern at Veterinary Teaching Hospital (VTH) of Agriculture and Forestry University. Registered cases of fiscal year (FY) 2014/2015 and 2015/2016 were categorized and analyzed using appropriate tools. Total cases during this period decreased drastically compared with the earlier case flow of 15-20 years ago. Species wise, poultry cases were highest in number, and category-wise, fecal examination was highest. Prevalence of endoparasitic infection was higher during rainy than during winter season ($P<0.05$). There was a tendency ($P=0.09$) that the prevalence of anestrus in cow and buffalo was higher during spring than during rainy season. Collibacillosis was highest among all poultry diseases. There was a clear trend that the prevalence of colibacillosis was highest during winter (39%) and lowest during autumn (14%), while the highest prevalence of mycotoxicity was during autumn (23%) and rainy season (22%), and that of IBD was recorded during spring season.

Keywords: Endoparasitic infection; anestrus; poultry disease

INTRODUCTION

Nepal is an agricultural country with approximately 65.6% Nepalese people engaging in agricultural activities. Agriculture sector contributes approximately 35% to national gross domestic product (GDP) (MoAD, 2014). Livestock is an integral and indispensible component of Nepalese agriculture sector that contributes approximately 24% to the agricultural GDP (ADS, 2012). Chitwan is one of the pocket areas of livestock production in the nation; there were 91,496 cattle, 118,865 buffaloes, 2,775 sheep, 199,035 goats, 10,801 pigs, 7,126,704 fowl and 22,946 ducks in this District during 2013/14 i.e. BS 2070/71 (MoAD, 2014). Poultry farming boom began in Chitwan for last two decades making the area a poultry hub. Chitwan District is the largest egg producer, with approximately 68% of the total production in the country, and has approximately 10% share of the total chicken meat production in the country (CBS, 2016).

Chitwan is located in mid-southern part of Nepal. It has tropical climatic conditions with four main seasons: cold and semi-dry to dry winter (December to February), rapidly increasing hot and dry spring (March to May), very hot and humid monsoon or summer (June to August) and moderate autumn (September to November) (Devkota and Bohora, 2009).

The Veterinary Teaching Hospital (VTH) of Rampur, Chitwan was established almost 3 decades back by Institute of Agriculture and Animal Science. After the establishment of Agriculture and Forestry University (AFU) in 2010, the VTH came under AFU and has become the part of Faculty of Animal Science, Veterinary Science and Fisheries (FAVF). Since its establishment, a large number of the livestock and poultry species have been brought by the farmers of western Chitwan for

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diagnosis and treatment of various diseases. Sometimes, the cases of poultry are brought also from the neighboring Districts. The hospital clinicians or the faculty members of the FAVF diagnose and treat such cases. All the cases brought to VTH are registered daily in its register book. Although there are some reports describing the patterns of poultry diseases diagnosed at VTH, the systemic analysis of the entire case flow pattern at VTH during recent years has not been reported yet. The objectives of the present study were, therefore, to determine the livestock disease case flow pattern at VTH during the last two fiscal years, and to examine the effect of season on prevalence of various diseases.

MATERIALS AND METHODS

All the cases brought to VTH were diagnosed by the hospital clinicians or faculty veterinarians mainly on the basis of clinical examination with limited laboratory confirmation. Endoparasitic cases are diagnosed based on fecal examination by light microscopy. Mastitis is diagnosed by California Mastitis Test (CMT) and cultural examination of milk sample taken from affected animals and in-vitro drug sensitivity testing is done. Gynecological cases are diagnosed based on history and transrectal palpation findings by the clinicians. Poultry diseases are diagnosed mainly based on post-mortem examination findings. Recently, the bacterial culture has been utilized for the diagnosis of poultry diseases in some cases.

For this study, retrospective epidemiological method was used. The case record books of the VTH of last two fiscal years, 2014/2015 and 2015/2016 (FY BS 2071/72 and FY 2072/73) were collected. All the cases registered from these two years were counted and grouped under various categories such as: species, month, season, type of disease etc. Then various patterns of disease cases were analyzed and the results were expressed in tabular and chart forms.

Broadly the cases were classified into: poultry disease, fecal examination cases, medicinal cases, mastitis, gynecological cases and surgical cases. Poultry diseases were further classified into IBD, ND, Mareks disease, colibacillosis, salmonellosis, CRD, coccidiosis, mycotoxicity, and others (that included the cases of immunosuppression, heat stress, necrotic enteritis, gout, helminthic infection and other non-specific cases). Fecal examination cases included the number of fecal samples subjected to VTH; most of cases in this category included only the fecal samples brought by the owner, not the animals. Fecal examination cases were further classified into nematodes, trematodes, cestodes and negative cases. Medicinal cases included diarrhea, anorexia, bloat, fever, alopecia, itching etc. Mastitis was put in separate category because this category mainly included only the milk samples subjected for cultural examination and antibiotic sensitivity test; only three animals with mastitis were presented to the VTH. Gynecological cases included the cases of pregnancy diagnosis, anestrus and repeat breeding. Surgical cases included the castration, wound, and other surgical operations.

Prevalence rates of endoparasitic infections in cattle, buffaloes and goats during various seasons of the year were compared using Chi-square test. Also, the prevalence rates of anestrus in cattle and buffaloes during various seasons of the year were compared using Chi-square test. Statistical analyses were performed using MS Excel (2010) and SPSS version 11.5 (SPSS Inc., Chicago, IL, USA). The P value less than 0.05 were considered significant, and the P value more than 0.05 and less than 0.1 was considered to have a tendency.

RESULTS

Total 658 and 917 cases were subjected to VTH during FY 2014/2015 and 2015/2016, respectively. Regarding the species, in both the years, the highest number of cases was of poultry followed by cow, buffalo, goat and dog (Fig. 1). During this two years period, there were only five cases of sheep, two cases of cat and only one case of pig (Table 1). In poultry, broilers were higher in number (69%) than the layers (28%). Besides, there were 17 cases (3%) of turkey, two cases of pigeon and one case of duck. Figure 2 shows the month-wise case flow pattern; during both the years, the highest number of cases were brought in the month of March-April (82 and 112, respectively). Figure 3 shows the distribution of cases according to type of disease during last two fiscal years. The highest numbers of cases were of fecal examination followed by poultry in FY 2014/2015, and vice-versa in FY 2015/2016. After fecal examination and poultry cases, the other major cases were of medicinal, mastitis, gynecological and surgical (Table 2).

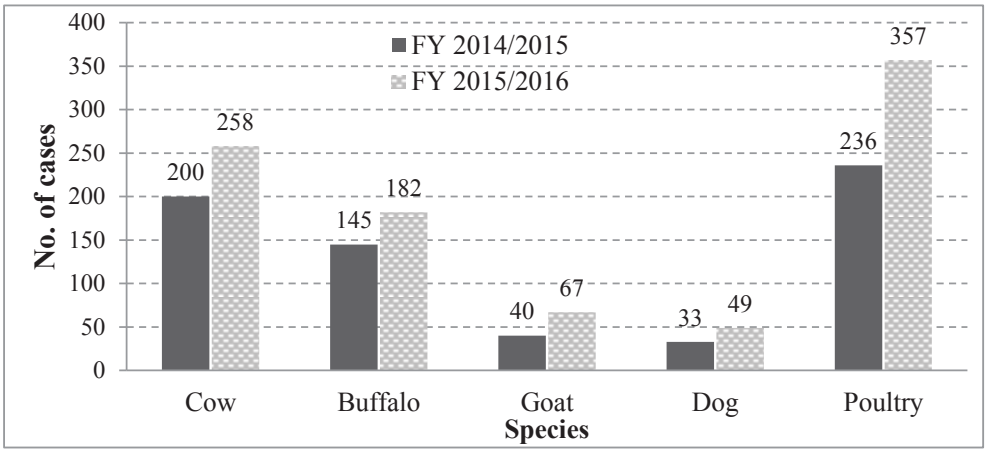

Figure 1. Species-wise case flow pattern at VTH during fiscal year 2014/2015 & 2015/2016

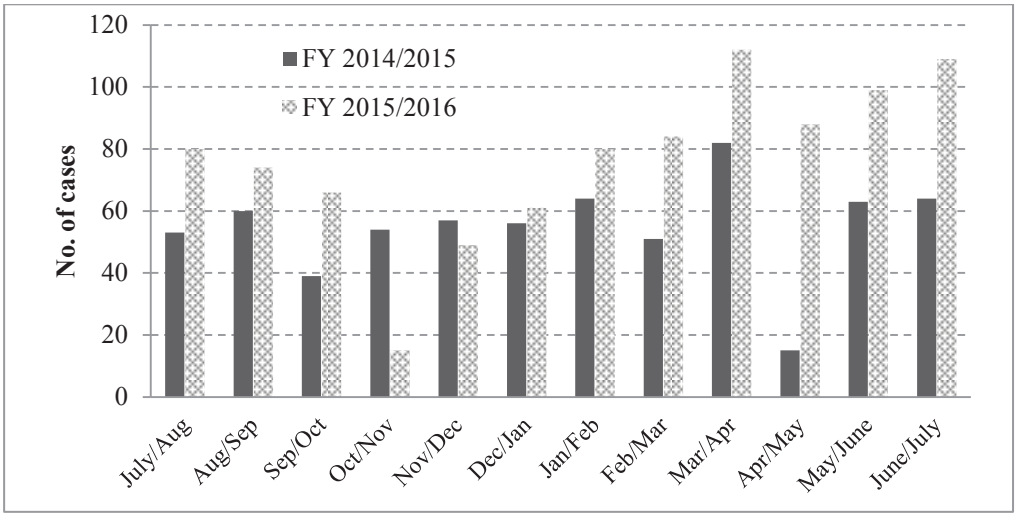

Figure 2. Month-wise case flow pattern at VTH during fiscal year 2014/2015 & 2015/2016

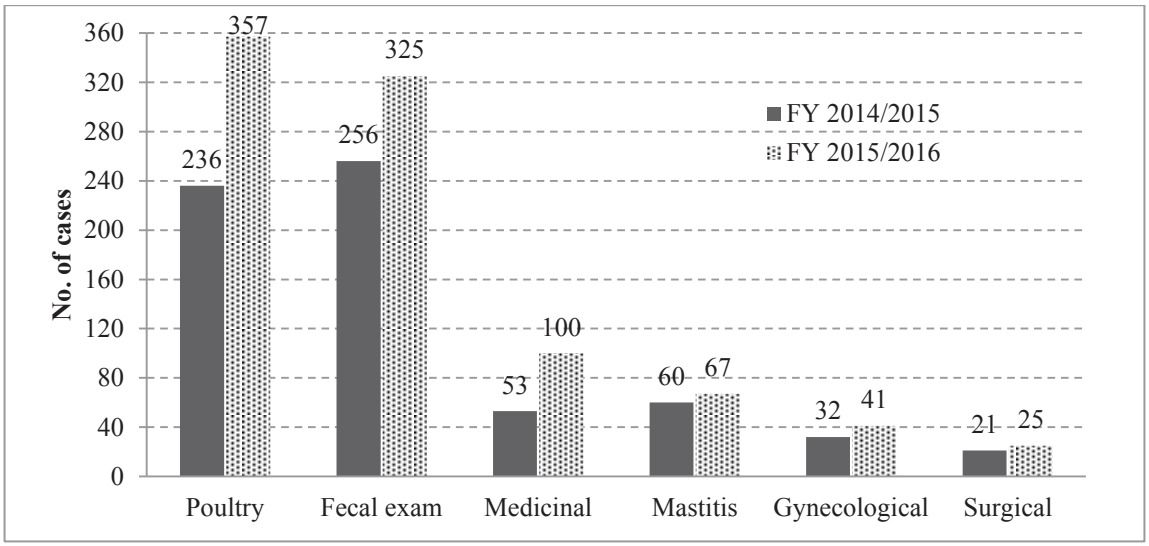

Figure 3. Category-wise case flow pattern at VTH during fiscal year 2014/2015 & 2015/2016

Table 1. Number of animal species brought at VTH, Rampur during fiscal year 2014/2015 & 2015/2016

Month	Species									
	Cow	Buffalo	Goat	Dog	Poultry				Others*	**Total**
					Broilers	Layers	Others	Total		
2014 July-Aug	16	11	3	1	15	7		22		**53**
2014 Aug-Sep	26	8	0	2	15	9		24		**60**
2014 Sep-Oct	15	14	1	1	3	4		7	1	**39**
2014 Oct-Nov	12	18	6	4	8	5	Turkey-1	14		**54**
2014 Nov-Dec	11	12	5	2	16	8		24	3	**57**
2014 Dec-2015 Jan	28	17	3	1	6	1		7		**56**
2015 Jan-Feb	18	14	6	3	22	2		24		**64**
2015 Feb-Mar	9	9	5	3	21	3	Turkey-1	25		**51**
2015 Mar-Apr	25	17	2	8	25	5		30		**82**
2015 Apr-May	4	6	1	0	3	1		4		**15**
2015 May-June	20	11	4	4	15	5	Turkey-3	23		**63**
2015 June-July	16	8	4	4	17	14	Turkey-1	32		**64**
Total FY 2014/2015	**200**	**145**	**40**	**33**	**166**	**64**	**6**	**236**		**658**
2015 July-Aug	27	14	5	4	14	14	Turkey-2	30		**80**
2015 Aug-Sep	19	10	2	2	32	8		40	1	**74**
2015 Sep-Oct	18	17	1	1	20	8	Pigeon-1	29		**66**
2015 Oct-Nov	7	7	1	0	0	0		0		**15**
2015 Nov-Dec	16	16	1	4	9	2	Pigeon-1	12		**49**
2015 Dec-2016 Jan	24	14	7	4	9	3		12		**61**

2016 Jan-Feb	16	21	7	4	23	8	Turkey-1	32		**80**
2016 Feb-Mar	28	11	11	4	25	5		30		**84**
2016 Mar-Apr	25	19	12	13	31	11	Turkey-1	43		**112**
2016 Apr-May	18	21	10	5	19	10	Turkey-5	34		**88**
2016 May-June	24	21	5	5	23	18	Turkey-2	43	1	**99**
2016 June-July	36	11	5	3	37	14	Duck-1	52	2	**109**
Total FY 2015/2016	**258**	**182**	**67**	**49**	**242**	**101**	**14**	**357**	**4**	**917**

* Others included sheep, cat and pig.

Table 2. Various categories of cases brought to VTH, Rampur during fiscal year 2014/2015 & 2015/2016

Month	Fecal exam	Mastitis	Gynecological	Surgical	Medicinal	Poultry	Total
2014 July-Aug	16	8	3	1	3	22	53
2014 Aug-Sep	20	5	8	0	3	24	60
2014 Sep-Oct	23	3	2	0	4	7	39
2014 Oct-Nov	21	6	3	4	6	14	54
2014 Nov-Dec	18	2	3	5	5	24	57
2014 Dec- 2015 Jan	41	2	1	1	4	7	56
2015 Jan-Feb	30	4	2	0	4	24	64
2015 Feb-Mar	15	3	1	0	7	25	51
2015 Mar-Apr	33	2	6	2	9	30	82
2015 Apr-May	9	1	0	1	0	4	15
2015 May-June	21	10	2	2	5	23	63
2015 June-July	9	14	1	5	3	32	64
Total FY 2014/2015	**256**	**60**	**32**	**21**	**53**	**236**	**658**
2015 July-Aug	33	8	1	2	6	30	80
2015 Aug-Sep	17	5	4	3	5	40	74
2015 Sep-Oct	24	3	6	0	4	29	66
2015 Oct-Nov	13	0	1	0	1	0	15
2015 Nov-Dec	22	4	2	2	7	12	49
2015 Dec-2016 Jan	32	5	0	5	7	12	61
2016 Jan-Feb	28	1	9	3	7	32	80
2016 Feb-Mar	36	1	5	1	11	30	84
2016 Mar-Apr	32	7	3	5	22	43	112
2016 Apr-May	35	5	0	0	14	34	88
2016 May-June	29	12	4	2	9	43	99
2016 June-July	24	16	6	4	7	52	109
Total FY 2015/2016	**325**	**67**	**41**	**25**	**100**	**357**	**917**

Out of 581 cases of fecal samples examination, 420 cases (72.3%) were positive for endoparasitic infection, of which the infection by the nematodes was the highest (41.7%) followed by trematodes (28.1%) and cestodes (2.6%). Prevalence of overall endoparasitic infection was the highest during rainy season (77%); in FY 2014/2015 as well as in total, its prevalence was significantly (P<0.05) higher during rainy season than during winter season (Fig. 4).

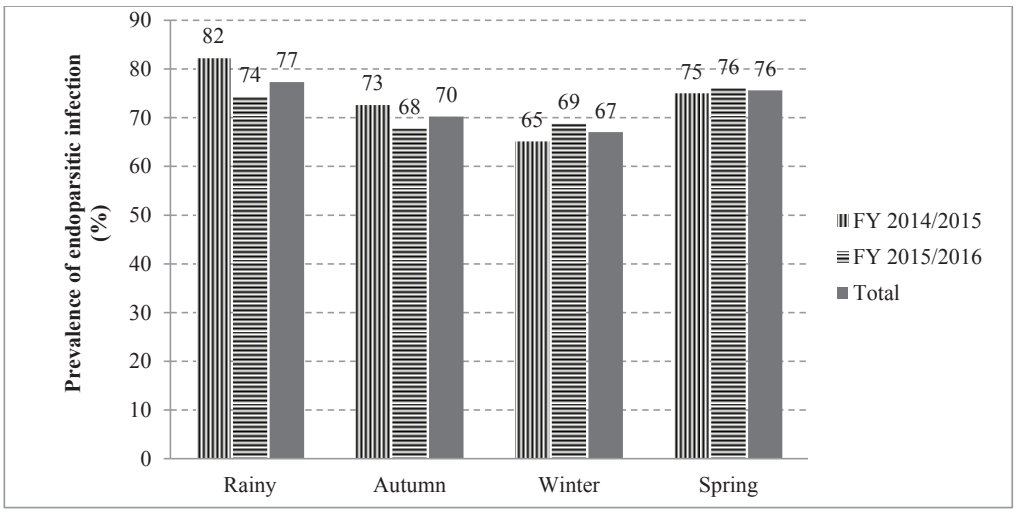

Figure 4. Season-wise prevalence of endoparasitic infection in livestock species

Fig. 5 shows the prevalence of anestrus in cow and buffalo during various seasons of the year. There was a tendency (P=0.09) that the prevalence of anestrus in cow and buffalo was higher during hot spring (67%) than during rainy season (39%). There were some cases of anestrus that were actually brought for pregnancy diagnosis after four to six months of mating but during examination, these were found to be non-pregnant and anestrus. Besides anestrus, there were a few cases of repeat breeding.

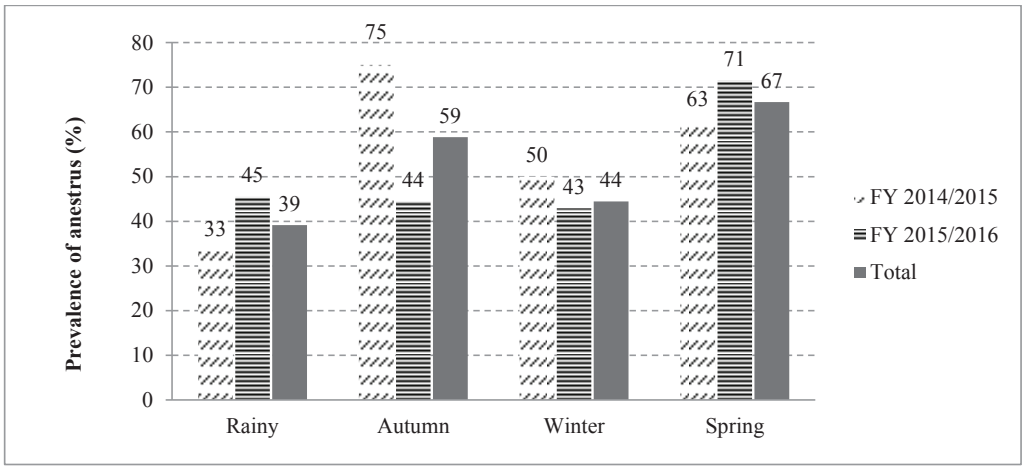

Figure 5. Season-wise prevalence of anestrus in cattle and buffaloes

Out of 593 cases of poultry (Table 3), the most frequently diagnosed disease was colibacillosis (154), followed by coccidiosis (111), mycotoxicity (95), IBD (58), CRD (36), salmonellosis (31), ND (25), Mareks Disease (16), and others including immunosuppression, heat stress, necrotic enteritis,

gout, helminthic infection and other non-specific cases. Prevalence of colibacillosis was the highest during winter (39%) and lowest during autumn (14%), while the mycotoxicity was most prevalent during autumn (23.3%) and rainy season (22%), and the IBD was most prevalent during hot spring season (15.3%).

Table 3. Season-wise distribution of poultry diseases during fiscal year 2014/2015 & 2015/2016. Values in parenthesis are percentage of total cases in that season.

Disease	Fiscal year 2014/2015				Fiscal year 2015/2016				Total				Overall Total
	Rainy	Autumn	Winter	Spring	Rainy	Autumn	Winter	Spring	Rainy	Autumn	Winter	Spring	
IBD	7 (9.0)	4 (8.9)	6 (10.7)	14 (24.6)	6 (4.9)	2 (4.9)	6 (8.0)	13 (10.8)	13 (6.5)	6 (7.0)	12 (9.2)	27 (15.3)	58
ND	2 (2.6)	2 (4.4)	2 (3.6)	2 (3.5)	7 (5.7)	1 (2.4)	5 (6.7)	4 (3.3)	9 (4.5)	3 (3.5)	7 (5.3)	6 (3.4)	25
Mareks disease	4 (5.1)	0 (0)	0 (0)	6 (10.5)	2 (1.6)	2 (4.9)	1 (1.3)	1 (0.8)	6 (3.0)	2 (2.3)	1 (0.8)	7 (4.0)	16
Colibacillosis	17 (21.8)	5 (11.1)	24 (42.9)	11 (19.3)	25 (20.5)	7 (17.1)	27 (36.0)	38 (31.7)	42 (21.0)	12 (14.0)	51 (38.9)	49 (27.7)	154
Salmonellosis	3 (3.8)	3 (6.7)	1 91.8)	4 (7.0)	10 (8.2)	1 (2.4)	3 (4.0)	6 (5.0)	13 (6.5)	4 (4.7)	4 (3.1)	10 (5.6)	31
CRD	4 (5.1)	5 (11.1)	3 (5.4)	1 (1.8)	6 (4.9)	2 (4.9)	3 (4.0)	12 (10.0)	10 95.0)	7 (8.1)	6 (4.6)	13 (7.3)	36
Coccidiosis	6 (7.7)	3 (6.7)	2 (3.6)	4 (7.0)	29 (23.8)	15 (36.6)	18 (24.0)	34 (28.3)	35 (17.5)	18 (20.9)	20 (15.3)	38 (21.5)	111
Mycotoxicity	24 (30.8)	10 (22.2)	4 (7.1)	10 (17.5)	20 (16.4)	10 (24.4)	10 (13.3)	7 (5.8)	44 (22.0)	20 (23.3)	14 (10.7)	17 (9.6)	95
Others*	11 (14.1)	13 (28.9)	14 (25.0)	5 (8.8)	17 (13.9)	1 (2.4)	2 (2.7)	5 (4.2)	28 (14.0)	14 (16.3)	16 (12.2)	10 (5.6)	68
Total	**78**	**45**	**56**	**57**	**122**	**41**	**75**	**120**	**200**	**86**	**131**	**177**	**593**

*Others included the cases of immunosuppression, heat stress, necrotic enteritis, gout, helminth infection and non-specific cases.

DISCUSSION

This study was conducted to determine the pattern of animal disease case flow at VTH of AFU during last two fiscal years. Although the number of cases brought to VTH during FY 2015/2016 has slightly increased compared to that during FY 2014/2015, the total number of cases during a period of two years in this study (1575) was quite lower than that reported about two decades ago (4310) by Gautam et al. (1999). During this two decades period, only the number of avian cases has slightly increased from 485 to 593, while the number of other species has drastically decreased. The proportion of broilers and layers cases (69% and 28%, respectively) during this two years period was almost similar to that reported during FY 2010/2011 i.e. BS 2067/68 (Joshi et al., 2013). However, the number of poultry cases during this two year period is also not satisfactory because almost the same number of cases (558) were brought during one year period in FY 2010/2011 (Joshi et al., 2013). One of the possible reasons behind decrease in the number of livestock cases might be due to increase in the number of private veterinary clinics (agrovets) at various places around the vicinity

of VTH so that the animal owners might have preferred to take their animals to nearby clinics rather than to bring to VTH. Another reason might be due to real decrease in health problems of livestock species due to improved management practices. However, in case of poultry, because of increase in the number of commercial poultry farms and also because the ease of bringing due to their small size, it is surprising not to increase the number of cases in recent years. Concerned authorities of AFU should take it seriously towards increasing the number of cases at VTH.

The highest numbers of cases were observed in March-April followed by June-July and May-June. This might be attributed to consequences the heat stress in the livestock species, for example highest prevalence of anestrus was observed during hot spring season. On the other hand, higher prevalence of mycotoxicity and coccidiosis in poultry during June-July might have contributed to be second highest number of cases in June-July. There were quite small numbers of medicinal cases, mastitis, gynecological and surgical cases. It is essential to increase the number of such cases in order to make veterinary students' exposure to practical skills. Concerned authorities should think on this aspect either to start ambulatory clinical service at nominal cost or run clinical practice classes at farmers' community.

Cases of fecal examination shared the highest proportion of cases brought to VTH. This was in agreement with the previous study that also reported the endoparasitic problem was the most frequent cases at VTH (Gautam et al, 1999). In the present study almost three-quarter of the fecal samples subjected to VTH were found to be positive for endoparasitic eggs with the highest prevalence of nematodes followed by trematodes and cestodes. Prevalence of parasitic infection was significantly higher during rainy season than during winter season. The major species found were *Strongylids*, *Strongyloides*, *Trichuris*, and *Paramphistomum* with a few cases of *Fasciola* and *Monezia*. This seasonal influence was in agreement with the findings of Thakuri & Mahato (1990) who reported that the highest prevalence of *Paramaphistomum* in cattle and buffaloes was recorded during the months of July and August, *Strongylids* and *Strongyloides* in July, August and September, and *Trichuris* and *Monezia* in June and July. Therefore, it can be speculated that if the animals are not drenched with anthelmintics before monsoon starts, such animals would be in risk of endoparasitic infection.

In the present study, there was a tendency that the prevalence of anestrus in cow and buffalo was higher during hot spring than during rainy season. As the most of the gynecological cases were of buffaloes, such an effect might be attributed due to seasonality effect of buffalo reproduction. This finding was in agreement with the previous studies that demonstrated the higher prevalence of anestrus in buffaloes during dry summer period (Devkota et al., 2012; Madan, 1998; Tailor et al., 1990). Although buffaloes are polyestrous animals, they exhibit a distinct seasonal variation in display of estrus, conception rate, and calving rate in Indian buffaloes having poor reproductive efficiency during summer as compared to winter months attributed to environmental factors (Madan, 1998; Tailor et al, 1990). In Chitwan, there becomes critical shortage of green grasses during hot spring (i.e. dry summer) season that contributes to under nutrition both in buffaloes and cows. During dry summer, under nutrition coupled with high ambient temperature has been implicated with anestrus condition in buffaloes (Devkota et al., 2012; Sah, 1988).

Chitwan is the hub of poultry in the nation; however, the poultry birds are facing the

problems of various diseases. In this context, the most frequently encountered diseases at VTH were colibacillosis followed by coccidiosis, mycotoxicity, IBD, CRD, salmonellosis, ND, Mareks Disease, and a very few cases of immunosuppression, heat stress, necrotic enteritis, gout, helminthic infection and other non-specific cases. These findings were similar to that reported by Joshi et al. (2013) who demonstrated that at VTH during FY 2010/2011, colibacillosis was the most frequently diagnosed disease followed by mycotoxicity, ND, IBD and coccidiosis. Pandey (2003) reported that major poultry diseases diagnosed at various clinics of Chitwan District including VTH were mixed infections followed by mycotoxicity, IBD, ND and colibacillosis. Similarly, the major poultry diseases registered at VTH during 1996 (BS 2053) and 1998 (BS 2055) were coccidiosis, IBD, ND, CRD, Mareks disease, ascariasis, aspergillosis, colibacillosis and necrotic enteritis (Gautam et al., 1999). It seems that the prevalence of viral diseases has been decreased to some extent due to rigorous vaccination of the poultry birds in recent years. However, the prevalence of bacterial diseases, coccidiosis and mycotoxicity seems to be increased in recent years. Since almost all the cases of poultry in the present as well as previous studies were diagnosed based on history and post-mortem findings only, such findings should be interpreted only from the perspective of tentative diagnosis.

There was an effect of season on the prevalence of some poultry diseases. Prevalence of colibacillosis was the highest during winter and lowest during autumn. It might be possible that during winter to maintain warm temperature, the poultry farmers might have closed all curtains making poor ventilation. Poor ventilation creates with high ammonia content inside the poultry house that predisposes the birds to colibacillosis (Annonymus, 2015). Generally mycotoxicity occurs during or after rainy season or after a new crop is harvested (Chauhan & Roy, 1996). Thus, in this study too, the mycotoxicity was most prevalent during rainy and autumn seasons. Joshi et al. (2013) also reported that the mycotoxicity had high prevalence during June-Aug period (i.e. rainy season). Similarly, IBD was most prevalent during hot spring season. Naresh et al., (2004) reported that the morbidity and cumulative mortality due to IBD were significantly higher during summer season than during winter and rainy seasons. Higher number of IBD during hot spring season could be due the effect of heat stress on birds because the temperature in Chitwan during hot summer may be higher than 35^{o}C.

In conclusion, although the number of cases brought to VTH during FY 2015/2016 has slightly increased compared to that during FY 2014/2015, this number is quite lower than that reported two decades ago. Parasitic infection in cow and buffalo, and the colibacillosis, coccidiosis and mycotoxicity in poultry were the most frequent cases brought at VTH. Parasitic infection and anestrus in large animals, and the colibacillosis, mycotoxicity and IBD in poultry had seasonal effect, thus, special measures might be taken for their prevention and control. Necessary actions need to be taken to uplift the diagnostic facilities, provide better services to the clients and increase the number of cases at VTH, Rampur.

CONCLUSION

Case flow in the VTH in recent years is decreasing drastically. Parasitic infection and anestrus in large animals, and the colibacillosis, mycotoxicity and IBD in poultry showed a clear seasonal variation, thus, special measures might be taken for their prevention and control.

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