

Research Paper

Prevalence of Reproductive Disorders in Dairy Buffaloes of Sudoor Paschim Province (SPP), Nepal

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ABSTRACT

Buffalo (*Bubalus bubalis*), also called black gold is an important species of husbandry animal in Nepal. Its multi utility roles in agriculture economy goes beyond providing milk, meat, manure, and draught power in many developing countries including Nepal. Buffalo farming is picking up commercial trend but issues, increasing cost of inputs, increasing resistance and troubleshooting of infective agents remains major hurdles to economic returns. A cross-sectional study using structured questionnaire survey was conducted to determine the incidence of reproductive disorders in dairy buffaloes and its associated risk factors in Sudoor Paschim Province (SPP) of Nepal from November 2020 to February 2021. Out of 389 dairy buffaloes under investigation, 220 (56.56%) had encountered at least one of the reproductive disorders. The major reproductive disorders reported in the present study included repeat breeding (24.94%), followed by cervico-vaginal prolapse (8.23%), retention of placenta (6.68%), uterine prolapse (5.40%), dystocia (4.63%), abortion (2.83%), uterine torsion (2.57%) and still birth (1.29%). Overall, it is suggested that improvement in management system, breeding system, accurate heat detection, balanced feeding, and hygienic condition should be done to minimize the reproductive health disorders in buffaloes of Sudoor Paschim Province.

Keywords: Buffalo, Prevalence, Reproductive disorders, Sudoor Paschim province

Agriculture and animal husbandry for a village farmer is a backbone in the rural community of Nepal. About 25.68% of the people of the country are in animal husbandry practices, such as cow, bee keeping, poultry, fisheries, pig, goat, swine, and ostrich farming (Mahato *et al.* 2015). Nepal is a land where livestock an integral part of the way of life. Agriculture remains the main occupation dropping rapidly but still covers around 65% population, livestock covers 32% of agricultural Gross Domestic Product (GDP) and about 11.5% of total country GDP (Bhatta *et al.* 2018). According to Ministry of Finance 2018/19 the total number of buffaloes population in Nepal is about 5.150 million and growth rate is -0.6. About 5.16 million people

are directly and indirectly engaged in farming and buffalo milk production is 13,72,905 metric ton by fiscal year 2017 (MoLD, 2017).

Animal reproduction is directly related to production. The buffalo (*Bubalus bubalis*) is also known as "Black Gold". South Asia contributes more than 95% of the total buffalo milk produced (Javaid *et al.* 2009). Buffalo is a major livestock for milk, meat, draught pack purpose, hides, bones and for manure. It plays an important role in agricultural

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economy of Nepal. In spite of its multi utility use, unlike the national animal cow reproductive problems in buffaloes is one of the major problems reported from Nepal. One major aspect that can be observed in the buffalo farming is that it is highly prone to reproductive problem and unavailability of quality veterinary service, which in turn affects the profitability of buffalo production particularly at the level of small farms. Remoteness from the major cities, the rugged terrains of the mountains, lack of all weather accessible motorways makes SPP one of the underdeveloped province of Nepal. Agriculture being the major profession, buffalo raising is way of life here and this study aims to find the reason of reproductive problems of buffaloes in the SPP and thus help to improve the reproductive health.

MATERIALS AND METHODS

Experimental site

The research was conducted in SPP, one of the seven provinces of Nepal. It covers an area of 19,874 km² (7,673.395 sq mi). It borders Karnali Province and Lumbini Province in the east and on the west and south by India and north by China and Karnali Province.

Sample size calculation

The sample size was determined by appropriate sample size determination tools by taking 50% prevalence, 5% precision and 95% confidence interval using the following formula (Cochran, 1997):

$$N = \frac{(1.96^2)(P_{exp})(1 - P_{exp})}{d^2}$$

Where,

N is the sample size, P_{exp} is the expected prevalence, and d is the desire precision.

All together 389 sample were used for the study.

Methods and techniques of data analysis

Openepi and Microsoft Excel 2016 was used for qualitative and quantitative data. The descriptive statistics was used to describe the respondent's socioeconomic characteristics such as age, breed, lactation, farming system, herd health and breeding

practice. Data collection was done in winter season from November 2020 to February 2021. Herd health, and problem was assessed and identified by direct visit and question answer with buffalo farmers.

RESULTS AND DISCUSSION

Animal husbandry activities of the respondents

Out of total 389 animals examined in this study, most of the animals belong to the age group of 3-5 years 63.75%; the rest 31.11%, and 5.14% belonging to the age group of 6-8 years, and >9 years, respectively, 86.12% were local and the rest 13.88% were crossbreed, majority of them were in 1-2 lactation (81.23%), 3-4 lactation (17.22%), and (1.54%) of animals were >8 lactation, 81.23% and 17.22% were breed by Natural Insemination (NI) and Artificial Insemination (AI), respectively, whereas 1.29% were bred by both AI and natural mating by bulls, farming system of animals intensive were 46.27% and semi-intensive 53.73% was found, herd health of the animal was categorized as excellent 6.17%, good 91.00%, and 2.83% poor.

Table 1: Animal husbandry activities of the respondents as documented by field survey of SPP

Parameters	Frequency (Nos.)	Percent (%)
Age of animal		
3-5 years	248	63.75
6-8 years	121	31.11
>9 years	20	5.14
Breed		
Local	335	86.12
Cross	54	13.88
Lactation		
1-2	316	81.23
3-4	67	17.22
>5	6	1.54
Breeding methods		
Natural	316	81.23
Artificial	68	17.48
Both	5	1.29
Farming System		
Intensive	180	46.27
Semi-intensive	209	53.73
Herd health		
Excellent	24	6.17
Good	354	91.00
Poor	11	2.83



Major reproductive disorders identified

Out of 389 animals examined, 41.90% were affected by either one or more reproductive disorders (Table 3). The major reproductive disorders identified in the study area were uterine torsion 2.57%, cervico-vaginal prolapse 8.23%, uterine prolapse 5.40%, dystocia 4.63%, Retention of Placenta (ROP) 6.68%, Repeat Breeding (RB) 24.94%, abortion 2.83%, and still birth 1.29% as summarized in Table 3.

Table 2: Overall prevalence of reproductive disorders in dairy buffaloes as observed from filed investigation of SPP

Status of animal	Frequency (Nos.)	Percent (%)
Buffalo with RDs	163	41.90
Buffalo without RDs	226	58.10
Total	389	100

Table 3: Prevalence of major reproductive disorders encountered in the study area of the SPP

Type of disorder	Frequency (Nos)	Percent (%)
Uterine torsion	10	2.57
Cervico-vaginal prolapse	32	8.23
Uterine prolapse	21	5.40
Dystocia	18	4.63
Dystocia	26	6.68
ROP	97	24.94
Repeat breeding	11	2.83
Abortion	5	1.29
Still birth		
Total	220	56.56

Out of the total examined dairy buffaloes, n= 389 (56.56%) were found to be affected with at least one of the reproductive health problems, which means the overall finding showed that nearly two in three buffaloes were observed with clinically manifested reproductive disorders. Prevalence in this study is higher than that of studies conducted by Verma *et al.* (2018), Rabbani *et al.* (2009), and Singh *et al.* (2019) who reported overall prevalence of 27.68%, 46.18%, and 34.36% of major reproductive problems, respectively. The prevalence of major reproductive disorders reported in this study agrees which was 54.57% (Modi *et al.* 2011). Variation in prevalence may be due to environmental factors, breed of animals, parameters included in this study, sample size, and variation in management system that is applied to different dairy farms.

Uterine torsion

The overall prevalence of uterine torsion in buffaloes was 2.57%, which is supported by Rabbani *et al.* (2009) was 2.39%. The higher prevalence was shown by Durrani and Kamal (2009) was 7.2%.

Cervico-vaginal prolapse

The overall prevalence of cervico-vaginal prolapse in buffaloes was 8.23%, which is higher than Ahmed and Zaher (2008), Kumar and Singh (2009), Pande *et al.* (2014), and Fareed *et al.* (2016) 1.03%, 4.07%, 0.21%, and 5%, respectively.

Uterine prolapse

In this study, overall prevalence of uterine prolapse in buffaloes was 5.40%, which is higher than that reported by Ahmed and Zaher (2008) and Pande *et al.* (2014) which was 1.03% and 1.87%.

Dystocia

This study shows the dystocia in buffaloes was 4.63%, which is lower than Gizaw *et al.* (2007), Maurya (2008), Durrani and Kamal, (2009), and Fareed *et al.* (2016) was 6.95%, 4.45%, 9.80%, and 14% respectively and higher than Rabbani *et al.* (2009) was 2.06% and Singh *et al.* (2019) was 2.80%.

Retention of placenta (ROP)

This study shows the ROP in buffaloes was 6.68%, which is similar to Kumar *et al.* (2010) 6.77%. This result is higher than Kunbhar *et al.* (2011), Rabbani *et al.* (2009), Singh *et al.* (2019) was 4.61%, 2.58%, and 0.3% respectively and higher than Gizaw *et al.* (2007), Khan *et al.* (2011), Fareed *et al.* (2016), Singh *et al.* (2019) was 12.91%, 12.80%, 8%, and 9.8% respectively.

Repeat Breeding (RB)

The overall prevalence of repeat breeding in buffaloes was 24.94%, which is similar to Maurya (2008) 23.89%. This result is higher than Jyothis *et al.* (2003), Gizaw *et al.* (2007), Siddiquee *et al.* (2007), Ahmed and Zaher (2008), Durrani and Kamal, (2009), Kumar and Singh (2009), Kumari (2009), Rabbani *et al.* (2009), Ahmed *et al.* (2010), Tak (2010), Kumar *et al.* (2011), Khan *et al.* (2011), Gupta *et al.* (2015), Khan *et al.* (2016), Verma *et al.* (2018), and

Singh *et al.* (2019) was 0.32%, 8.91%, 10.64%, 4.60%, 0.70%, 5.40%, 11.03%, 15.69%, 4.34%, 1.93%, 8.82%, 10.62%, 11.56%, 8.9%, 4.37%, and 12.3% respectively and lower than Fareed *et al.* (2016) 32%, Khan *et al.* (2016) 33.04%, and Singh *et al.* (2019) 35.7%.

Abortion

In this study, overall prevalence of abortion in buffaloes was 2.83%, which is similar to Gizaw *et al.* (2007) was 2.23%. The result is lower than Durrani and Kamal (2009), Rabbani *et al.* (2009), Khan *et al.* (2011), and Singh *et al.* (2019) was 3.3%, 5.99%, 7.1%, and 6.2% respectively. The result is higher than Siddiquee *et al.* (2007) 1.06%, Verma *et al.* (2018) 0.78 and Singh *et al.* (2019) 18.1%.

Still birth

In this study, overall prevalence of abortion in buffaloes was 1.29%, which is similar to that reported by Singh *et al.* (2019) 1.11%, and higher than Maurya (2008) i.e. 0.99% and Prasad and Prasad (1998) which was 0.09%.

Associated risk factors with reproductive health problems of dairy buffaloes

In the present study, the prevalence of the reproductive problems was higher in local buffaloes 43.88% than in cross buffaloes 29.62% (Table 4).

Age had statistically significant effect on uterine torsion. There was higher prevalence of uterine

torsion 5.79.% in the age group of 6-8 years than 3-5 years 1.21%, and >9 years 0.00% (Table 6). Higher prevalence of uterine torsion in buffalo is due to big length of broad ligament in buffaloes which makes pregnant uterus less stable (Kumar *et al.* 2020).

The prevalence of reproductive disorders is more in 3-5 years (58.87%) than that of 6-8 years (56.20%), and >9 years (30.00%).

Breed had statistically significant effect on repeat breeding. Prevalence of repeat breeding was significantly higher in local breed buffalo 27.16% than in cross breed 11.11% buffaloes (Table 6). High prevalence of repeat breeding in the study was due to lack of nutrition, improper insemination and timing of AI, silent estrus and poor semen quality (Tolosa *et al.* 2021).

However, the prevalence of the reproductive problems is slightly higher in local buffaloes 59.10% than in cross breed buffaloes 40.74%. The lower incidence of the reproductive problems in crossbred buffaloes is suggestive of better care, with better feeding and health care than the indigenous buffaloes.

Prevalence of reproductive disorders in lactation of buffaloes was 57.59%, 51.49 %, and 33.33%, in 1-2 years, 3-4 years, and > 5 years respectively. However, lactation had statistical significance ($p < 0.05$) with respect to uterine prolapse with higher prevalence in (33.33%) > 5 years, (6.01%) in 1-2 years, and (0.00%) in 3-4 years (Table 7).

Table 4: Associated risk factors with reproductive health problems of dairy buffaloes

Factors	Variables	Total no. of examined	Total no. of affected	Percent (%)	Chisquare	p-value (p<0.05)
Age of animal	3-5 years	248	102	41.13	1.49	0.47
	6-8 years	121	56	46.28		
	>9 years	20	5	25.00		
Breed	Local	335	147	43.88	1.71	0.19
	Cross	54	16	29.62		
Lactation	1-2	316	132	41.77	0.10	0.95
	3-4	67	29	43.28		
	>5	6	2	33.33		
Breeding methods	Natural	316	126	39.87	0.17	0.55
	Artificial	68	34	50.00		
	Both	5	3	60.00		
Farming system	Intensive	180	66	36.67	1.55	0.21
	Semi-intensive	209	97	46.41		
Herd health	Excellent	24	10	41.67	0.06	0.96
	Good	354	141	41.81		
	Poor	11	5	45.45		

**Table 5:** Association of prevalence rate of major reproductive problems with age of the buffaloes as observed for field study at SPP

Type of disorder	3-5 years (n= 248)		6-8 years (n= 121)		>9 years (n= 20)		Level of significance (p<0.05)
	F	%	f	%	f	%	
Uterine torsion	3	1.21	7	5.79	0	0.00	0.02*
Cervico-vaginal prolapse	22	8.87	10	8.26	0	0.00	0.38
Uterine prolapse	14	5.65	6	4.96	1	5.00	0.96
Dystocia	10	4.03	8	6.61	0	0.00	0.32
ROP	19	7.66	7	5.79	0	0.00	0.37
Repeat breeding	68	27.42	26	21.49	3	15.00	0.26
Abortion	7	2.82	3	2.48	1	5.00	0.82
Still birth	3	1.21	1	0.83	1	5.00	0.30
Total	146	58.87	68	56.20	6	30.00	

*= statistically significant (p<0.05), n= number of observations, and f= frequency of observations.

Table 6: Association of prevalence rate of major reproductive problems with breed of the buffaloes

Type of disorder	Local (n= 335)		Cross bred (n= 54)		Level of significance (p<0.05)
	F	%	f	%	
Uterine torsion	9	2.69	1	1.85	0.71
Cervico-vaginal prolapse	26	7.76	6	11.11	0.40
Uterine prolapse	19	5.67	2	3.70	0.55
Dystocia	15	4.48	3	5.56	0.72
ROP	24	7.16	2	3.70	0.34
Repeat breeding	91	27.16	6	11.11	0.01*
Abortion	9	2.69	2	3.70	0.67
Still birth	5	1.49	0	0.00	0.36
Total	198	59.10	22	40.74	

*= statistically significant (p<0.05), n= number of observations, and f= frequency of observations.

Table 7: Association of prevalence rate of major reproductive problems with lactation of the buffaloes

Type of disorder	1-2 (n= 316)		3-4 (n= 67)		>5 (n= 6)		Level of significance (p<0.05)
	f	%	F	%	f	%	
Uterine torsion	7	2.22	3	4.48	0	0.00	0.52
Cervico-vaginal prolapse	26	8.23	6	8.96	0	0.00	0.74
Uterine prolapse	19	6.01	0	0.00	2	33.33	0.00*
Dystocia	12	3.80	6	8.96	0	0.00	0.16
ROP	22	6.96	4	5.97	0	0.00	0.76
Repeat breeding	83	26.27	14	20.90	0	0.00	0.23
Abortion	9	2.85	2	2.99	0	0.00	0.91
Still birth	4	1.27	1	1.49	0	0.00	0.95
Total	182	57.59	36	51.49	2	33.33	

*= statistically significant (p<0.05), n= number of observations, and f= frequency of observations.

The prevalence of reproductive disorders in semi-intensive management system 61.48% was higher than that in semi-intensive management system 47.78%. However, farming system had statistically significant with respect to dystocia, which was higher in semi-intensive 6.70% than intensive 2.22% (Table 8).

Breeding system had only statistically significant effect on cervicovaginal prolapse. Prevalence of cervicovaginal prolapse was significantly higher in both (40.00%) than AI (14.71%), and NS (6.33%) (Table 9).

The prevalence of reproductive disorders was higher in buffaloes that were bred by AI (58.82%) than those that were bred by both NS and AI (100.00%), and NS (55.38%). The high prevalence of reproductive disorders in buffaloes bred by NI might be the effect of transmission of venereal disease, which may lead to endometritis, RB, stillbirth, abortion, etc. In AI,

better care was taken at semen processing centres to produce good quality semen and the incidence is further low in both AI and NI mating systems because of better performance of bulls to detect the estrous cycle for better conception rate avoiding RB, anestrus, etc. The high prevalence of reproductive disorders in buffaloes in breeding system by AI than NI might be due to improper and inexperienced person doing AI, which may lead to reproductive problems in buffaloes. This could be due to the size and sex of the calf and breeding season of the year (Ayana and Gudeta, 2015).

However, the herd health of the animals was statistically significant ($p < 0.05$) with respect to uterine torsion with higher prevalence in poor 18.18% than excellent 4.17% and good 1.98% herd health of animals, respectively and significant in retention of placenta was higher in poor 36.36% than good 6.21% and excellent 0.00% (Table 10).

Table 8: Association of prevalence rate of major reproductive problems with farming system of the buffaloes

Type of disorder	Intensive (n= 180)		Semi-intensive (n= 209)		Level of significance ($p < 0.05$)
	F	%	f	%	
Uterine torsion	5	2.78	5	2.39	0.81
Cervico-vaginal prolapse	11	6.11	21	10.05	0.15
Uterine prolapse	10	5.56	11	5.26	0.89
Dystocia	4	2.22	14	6.70	0.03*
ROP	9	5.00	17	5.50	0.21
Repeat breeding	40	22.22	57	27.27	0.25
Abortion	4	2.22	7	3.35	0.50
Still birth	3	1.67	2	0.96	0.53
Total	86	47.78	134	61.48	

*= statistically significant ($p < 0.05$), n= number of observations, and f= frequency of observations.

Table 9: Association of prevalence rate of major reproductive problems with breeding system of the buffaloes

Type of disorder	Natural (n= 316)		Artificial (n= 68)		Both (n= 5)		Level of significance ($p < 0.05$)
	f	%	f	%	f	%	
Uterine torsion	9	2.85	1	1.47	0	0.00	0.75
Cervico-vaginal prolapse	20	6.33	10	14.71	2	40.00	0.00*
Uterine prolapse	19	6.01	2	2.94	0	0.00	0.51
Dystocia	13	4.11	5	7.35	0	0.00	0.45
ROP	23	7.28	3	4.41	0	0.00	0.57
Repeat breeding	77	24.37	17	25.00	3	60.00	0.18
Abortion	10	3.16	1	1.47	0	0.00	0.69
Still birth	4	1.27	1	1.47	0	0.00	0.95
Total	175	55.38	40	58.82	5	100	

*= statistically significant ($p < 0.05$), n= number of observations, and f= frequency of observations.

**Table 10:** Association of prevalence rate of major reproductive problems with herd health of the buffaloes from SPP

Type of disorder	Excellent (n= 24)		Good (n=354)		Poor (n= 11)		Level of significance (p<0.05)
	F	%	f	%	F	%	
Uterine torsion	1	4.17	7	1.98	2	18.18	0.00*
Cervico-vaginal prolapse	3	12.50	29	8.19	0	0.00	0.45
Uterine prolapse	1	4.17	20	5.65	0	0.00	0.68
Dystocia	3	12.50	15	4.24	0	0.00	0.13
ROP	0	0.00	22	6.21	4	36.36	0.00*
Repeat breeding	4	16.67	89	25.14	4	36.36	0.43
Abortion	0	0.00	11	3.11	0	0.00	0.57
Still birth	0	0.00	5	1.41	0	0.00	0.77
Total	12	50.00	198	55.93	10	90.91	

* = statistically significant ($p < 0.05$), N= number of observations, and F= frequency of observations.

The incidence of reproductive problems was higher in buffaloes that were in poor herd 90.91% followed by good 55.93%, and excellent 50.00%. This may be due to variation in the hygienic condition and burden of pathogen and different environmental condition (Tolosa *et al.* 2021).

Awareness of bovine TB in SPP was 17.22%, and 82.45% were unaware. Joshi (2015) found that 76% respondents were not aware of TB in Kanchanpur district, Kelly *et al.* (2018) found 22% were aware and 45% were unaware about bovine TB in Chitwan, Gorkha and Tanahun district of Nepal. Pandey *et al.* (2012), found that 9% were aware about TB can be a zoonotic one in western Chitwan.

Lack of awareness, poverty, illiteracy are the major factors to increase zoonotic disease in Nepal. Awareness, formal education, informal broadcasting media have made effort to educate the farmers from livestock associated zoonotic disease and its significances to control bovine TB in human and animal (Pandey, 2012; Joshi, 2015; Kelly *et al.* 2018).

Awareness of one health concept was 1.03% and unaware was 98.97%. One health is a collective effort to achieve optimum health for human, animal, and environment (Acharya *et al.* 2019).

Table 11: Awareness of zoonotic diseases and One health

Health assessing	Aware (No.)	Unaware (No.)	Percent (%)
Zoonotic disease	67	322	17.22
One health	4	385	1.03

Out of 200 household sample, (n=59) 29.50% farmers were facing feed and forage problem, (n=37) 18.50% breeding, (n=35) 17.50% marketing, (n=33) 16.50% disease and medicine, (n=32) 16.50% breed, and (n=29) 14.50% health services this is the main factor in low production and reproductive under performance in buffaloes of SPP. Local breed, delaying in sexual maturity, community forest, minimal veterinarian and on time medicine unavailability, lack of disease diagnosis tools and equipment's, lack of breeding methods, poor herd health are major factor in low production and reproductive under performance in buffaloes.

Poor herd health, methods of insemination were the most prompting factor for reproductive problem (Ayisheshim *et al.* 2017). The lower prevalence of ROP was due to lower percentage of dystocia and management alteration especially feeding and sanitation (Hadush *et al.* 2013). Management system specially feeding and sanitation changes can be taken as sources of differences in the prevalence rate of abortion (Beredu and Biruk, 2019). The main reason for the poor performance of livestock in developing countries is the seasonal inadequacy of feed and forage. Poor management systems in farm animals is directly related to poor production performance (Lawal-Adebowale, 2012).

Supplementation of feed and forage increased milk production. Good health care, good management system and feeding, is the crucial factor for better performance of the animals (Lawal-Adebowale, 2012). Attention in nutrition (protein, vitamins and micro minerals) and feeding practices improve

reproductive performance of cattle (Bhatta et al. 2020).

CONCLUSION

This survey and herd assessment study finds serious prevalence of reproductive disorders in buffaloes from SSP. Results of this study revealed it to be more than one out of two with highest prevalence of repeat breeding followed by cervico-vaginal prolapse, retention of placenta, uterine prolapse, dystocia, abortion, uterine torsion and still birth respectively.

Lack of feeds and forage, good breed, grazing land, lack of scientific housing system, breeding method, proper disease diagnosis, health services, management system, medicine availability in time were the major problems in buffaloes farming. Supplementation of feed and forage, good health care, good management system, attention in nutrition and feeding practices improve reproductive performance and production in buffaloes.

Since the animals are in close proximity with humans the risk of disease spillover is high. Lack of awareness, poverty, illiteracy are the major factors to increase zoonotic disease in Nepal. Awareness, formal education, informal broadcasting media have made effort to educate the farmers from livestock associated zoonotic disease and its significances. Only prevalence of reproductive disorders in buffaloes were studied in this study.

REFERENCES

- Acharya, K.P., Karki, S., Shrestha, K., and Kaphle, K. 2019. One health approach in Nepal: Scope, opportunities and challenges. *One Health*, 8: 1-4.
- Acharya, K.P., Niroula, P., Kaphle, K. and Dhakal, C. 2016. Bovine tuberculosis among Buffaloes in Dadeldhura and associated risk factors for human transmission. 12th Nepal National Veterinary Conference. June, 2016. Kathmandu, Nepal.
- Ahmed, W.M. and Zaher, K.S. 2008. A field contribution on the relation between reproductive disorders and bovine viral diarrhoea virus infection in buffalo-cows. *American-Eurasian J. Agric. and Environ. Sci.*, 3(5): 736-742.
- Ahmed, W.M., El-khadrawy, H.H., Emtenan, M.H., Ali, A.H. and Shalaby, S.A. 2010. Clinical perspective of repeat breeding syndrome in buffaloes. *J. of Am. Sci.*, 6(11): 661-666.
- Ayisheshim, A., Abegaz, S. and Mohammed, A. 2017. Study on the major dairy cows reproductive problems in and around Gondar Town. *Northwest Ethiopia. J. Vet. Sci. Technol.*, 484.
- Beredu, Y. and Biruk, A. 2019. Reproductive disorders in dairy cattle; Retrospective study in Asella Town, Central Ethiopia. *Dairy and Vet. Sci. J.*, 9(4): 555-567.
- Bhatta, B.R. and Kaphle, K. 2020. Nutrition and reproductive underperformance of cattle in Nepal: A short review. *Indian J. Med. and Anim. Husbandry*, 5(1): 83-86.
- Bhatta, B.R., Kaphle, K. and Yadav, K.K. 2018. Situation of livestock production and its products in Nepal. *Archives of Vet. Sci. and Medic.*, 1(1): 1-8.
- Cochran, W. 1997. Sampling Techniques. 3rd edn, (Eds) Wiley, J. and Sons. New York, NY, USA, pp. 1-442.
- Durrani, A.Z. and Kamal, N. 2009. Prevalence of genital tract problems in clinical cases of various calves. *British Vet. J.*, 138: 233-240.
- Fareed, S.K., Memon, K.H., Kachiwal, F.A.K., Azhar, S., Brula, M.I., Hasan, M., Ali, M. and Khan, T.A. 2017. Prevalence and economic losses of reproductive disorders and mastitis in buffaloes at Karachi, Pakistan. *Indian J. Anim. Res.*, 51: 1130-1133.
- Gizaw, Y., Belcena, M. and Abayneh, T. 2007. Major reproductive health problems in smallholder dairy production in and around Nazareth town, Central Ethiopia. *The Int. J. Vet. Med.*, 1(3): 1-8.
- Hadush, A., Abdella, A. and Regassa, F. 2013. Major peripartum and postpartum reproductive problems of dairy cattle in Central Ethiopia. *J. Vet. Medic. and Anim. Health*, 5(4): 118-123.
- Javid, S.B., Gadahi, J.A., Khaskeli, M., Bhutto, M.B., Kumbher, S. and Panhwar, A.H. 2009. Physical and chemical quality of market milk sold at Tandojam, Pakistan. *Pak. Vet. J.*, 29(1): 27-31.
- Joshi, D.D., Heidmann, P., Joshi, Y.P., Bhattarai, B., Gaire, T.N., Silwal, A. and Dhakal, A. 2012. One health (OH) program formulation to control any emerging and re-emerging zoonotic diseases in Nepal: perspectives of tuberculosis. In: Proceedings on 10th National Veterinary Conference of Nepal Veterinary Association (VETCON-2012). March, 2012. Kathmandu, Nepal, pp. 3-10.
- Kelly, T.R., Bunn, D.A., Joshi, N.P., Grooms, D., Devkota, D., Devkota, N.R., Paudel, L.N., Roug, A., Wolking, D.J. and Mazet, J.A.K. 2018. Awareness and practices relating to zoonotic diseases among smallholder farmers in Nepal. *EcoHealth*, pp. 1-14.
- Khan, H.M., Bhakat, M., Mohanty, T.K., Raina, V.S. and Gupta, A.K. 2011. Effect of non-genetic factors on reproductive disorders in murrah buffaloes. *Buffalo Bulletin*, 30(2): 120-125.
- Khan, M.A., Mushtaq, M.H., Khan, A.M., Ahmad, A. and Nawaz, M. 2016. Incidence of repeat breeding in cattle and buffaloes of Pakistan. *Veterinaria*, 4: 18-20.
- Kumar, P. R., Rajanna, R. and Sunitha, R. 2020. Uterine torsion in bovines. *Int. J. Curr. Microb. and Appl. Sci.*, 9(6): 2774-2780.



- Kumar, R. and Singh, R. 2009. Incidence of repeat breeding in buffaloes under rural conditions. *Indian J. Anim. Sci.*, **79**(4): 442-444.
- Kumar, R. and Singh, R. 2009. Incidence of utero-vaginal prolapse among the buffaloes under field conditions of Western Uttar Pradesh. *Indian J. Anim. Sci.*, **79**(8): 847-849.
- Kumar, R., Singh, R., Singh, Y.P. and Singh, N. 2010. Retention of placenta in buffaloes and its management through locally available resources. In: proceedings of the 9th world buffalo congress. April, 2010. Buenos Aires, Argentina, pp. 805-808.
- Kunbhar, H.K., Memon, A.U. and Shah, S.I. 2011. Incidence of placental retention in Kundhi Buffalo around Tandojam, Pakistan. *Pak. J. Life Soc. Sci.*, **9**(1): 21-23.
- Lawal-Adebowale, O.A. 2012. Dynamics of ruminant livestock management in the context of the Nigerian agricultural system. *Livestock Prod.*, **4**: 61-80.
- Mahato, S.N., Kollachapti, M.N., Nirmal, B.K., Bhattarai, N. and Sapkota, K.R. 2015. Assessment of the Productive Parameters and Performance of Progenies of Jersey and Its Crosses Under Farmers Managed Field Condition of the Selected Districts of Central and Western Development Regions of Nepal. *Nepalese Journal of Animal Science*, pp. 40-55.
- Maurya, S.K. 2008. Nutritional Status and Reproductive Performance of Cattle and Buffaloes in Rural Areas of Sultanpur District of UP. Ph.D. Thesis. V.B.S Purvanchal University, Department of Animal Husbandry and Dairying. Jaunpur, UP, India, pp. 125.
- MoLD. 2017. Livestock Statistics of Nepal 2017. Ministry of Livestock Development, Planning, Monitoring and Evaluation Division. Singha Durbar, Kathmandu, Nepal, pp. 37.
- Pande, N., Agrawal, R.G., Agrawal, R., Shrivastava, O.P., and Jain, S.K. 2014. Prevalence of periparturient reproductive disorder and calving pattern in buffaloes. *Indian J.*, **15**(2): 205-207.
- Pandey, G., Dhakal, S., Sadaula, A., KC, G., Subedi, S., Pandey, K.R. and Dhakal. I.P. 2012. Status of tuberculosis in bovine animals raised by tuberculosis infected patients in Western Chitwan, Nepal. *Int. J. Infect. Microbiol.*, **1**(2): 47-53.
- Rabbani, R. A., Ahmad, I., Lodhi, L.A., Ahmad, N., and Muhammad, G. 2009. Prevalence of various reproductive disorders and economic losses caused by genital prolapse in buffaloes. *Pak. Vet. J.*, **30**(1): 44-48.
- Siddiquee, G.M., Shukla, M.K. and Kanwar, N. 2007. Incidence of reproductive disorders in bovines of North Gujrat. *J. Bombay Vet. College*, **15**(2): 119-121.
- Singh, P., Sodhi, S.S., Dash, S.K., Kaur, S., Malhotra, P. and Dhindsa, S.S. 2019. Study of incidence of reproductive disorders in Murrah buffaloes in relation to non- genetic factors through an animal model. *J. Anim. Res.*, **9**(5): 633-644.
- Tak, A.M. 2010. Udder health-care practices followed by dairy farmers: An exploratory study in NDRI adopted villages. M.V.Sc Thesis, National Dairying Research Institute Deemed University, Karnal, India, pp. 157.
- Tolosa, F., Misrak, N., and Yitbarek, H. 2021. Assessment of Major Reproductive Disorders in Dairy Cattle in and around Bale Robe, Oromia Regional State, Ethiopia. *Veterinary Medicine International*, pp. 1-8.
- Verma, S.K., Srivastava, S., Saurabh., Verma, S.K. and Sharma, P. 2018. Incidence of major reproductive disorders of buffaloes in Agroclimatic zone of Eastern Uttar Pradesh. *Int. J. Chem. Stud.*, **6**(3): 3018-3022.

