

## PREVALENCE OF DIFFERENT ETIOLOGICAL FACTORS RESPONSIBLE FOR CAUSING INFERTILITY IN BUFFALOES

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### ABSTRACT

A total of 777 buffaloes were examined in 73 clinical camps in different districts of Himachal Pradesh, India from March 2017 to March 2020. Out of 777 buffaloes, 523 (67.31%) buffaloes were found to have 618 different reproductive disorders after examining through clinico-gynaecological examination. Among 618 clinical conditions, 519 (83.98%) were of infertility due to different reproductive disorders and 99 (16.02%) were either pregnant/recently calved (73;11.81%) or were found normal cyclic (26; 4.21%). Out of 519 clinical conditions, 478 were of infertility (77.35%) or were of different miscellaneous reproductive disorders (41;6.63%). Among 519 infertility cases, 110 (17.80%) were repeat breeders, 368 (59.55%) were anestrus. In 110 repeat breeder conditions, 100 (16.18%), 1 (0.16%), 0 (0.0%) and 9 (1.46%) were of endometritis, cervical pathologies, fallopian tube defects and prolonged estrus, respectively. Out of 368 anestrus conditions, 16 (2.59%) were silent estrus and 352 (56.96%) were of inactive ovaries.

**Keywords:** Buffaloes, Clinical conditions, Infertility, Prevalence, Repeat breeding

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Infertility is considered as temporary loss of fertility which may lead to failure to produce a normal calf and may be because of managerial, functional, anatomical and infectious reasons. Life time performance of animals depends on the normal functioning of the reproductive organs and impaired functioning in the reproductive system will result in infertility and sterility in animals (Noakes *et al.*, 2019). Causes of infertility in buffaloes in Himachal Pradesh or even in India are functional (anestrus, cystic ovary, luteal deficiencies and ovulation defects), hereditary and congenital, nutritional deficiencies, acquired, infectious causes and miscellaneous causes (Thakur *et al.*, 2006). It is reported that 10-30 % of lactation yield may be affected by infertility and reproductive disorders. Culling rate per year in developed countries (3-6%) is because of these reasons (Erb and Martin 1980). The culling rate in buffaloes is less than cows due to less incidence of repeat breeding which varied between 0.70 to 30.0 per cent (Sarsawat and Purohit, 2016). Similarly this culling rate estimated in cattle varied from 18-40 per cent every year in India (ICAR report, 2002). However, in our neighboring country Pakistan, significantly ( $P < 0.05$ ) lower culling rates have been observed in cattle (23.0%) than buffaloes (77.0%) (Khan *et al.*, 2016). Buffaloes are considered to play important role in developing countries in term of maintaining a suitable food production system.

The production system of buffaloes remains low due to poor nutrition, management and breeding. Poor reproductive efficiency and prolonged inter-calving

interval are the two main reasons of poor breeding (Warriach *et al.*, 2015). Buffaloes become infertile when they are neither sterile nor fertile completely and are considered irregular for annual live calf production. However, infertility is a multifactor complex problem and among various factors, anestrus and repeat breeding have been identified as the main factors which are responsible for this malady (Parkinson, 2009). So keeping in view, a study was carried out through clinical camps in different districts of Himachal Pradesh to rule out various reasons of infertility in buffaloes.

### MATERIALS AND METHODS

The present study was carried out in different districts of Himachal Pradesh where buffalo rearing was carried out. A total of 73 clinical camps were organized in these districts where 777 buffaloes were examined, out of them 523 buffaloes were found affected with different reproductive disorders when examined through per-rectal examination. All the examined animals were placed in 618 different categories of various reproductive disorders and normal cyclic depending on per-rectal examination *viz.*, repeat breeders, anoestrus and other miscellaneous reasons of reproductive disorders. Buffaloes not conceiving in spite of three or more subsequent insemination were categorized into different categories of repeat breeding such as endometritis, cervical pathologies, fallopian tube defects and prolonged estrus etc. and the buffaloes which were not showing apparent signs of estrus even after maturity and calving upto 90 days of calving were placed in the different

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categories of anestrus such as inactive or smooth ovaries i.e. true anestrus or small genitalia and silent estrus. The miscellaneous category of reproductive disorder includes abortion and other disorders like pyometra, metritis, mummification, maceration, ovarian hypoplasia etc. and the buffaloes which were found pregnant and observed in estrus were placed in normal buffaloes group.

## RESULTS AND DISCUSSION

The prevalence of various etiological factors responsible for infertility in buffaloes of Himachal Pradesh is shown in Table 1. Perusal of the table indicated that among various etiological factors, the highest prevalence had been recorded for anestrus (59.55%) followed by repeat breeding (17.80%) and lowest prevalence (6.63%) was recorded for miscellaneous etiological factors. In repeat breeder, the highest prevalence of 16.18% had been recorded for endometritis followed by prolonged estrus (1.46%), cervical pathologies (0.16%) and no prevalence was recorded for fallopian tube defects. Similarly in anestrus animals, the highest prevalence of 56.96 per cent was recorded for inactive ovaries and 2.59 per cent prevalence was recorded for silent estrus by per-rectal method.

Modi *et al.* (2011) in a survey study recorded overall 12.56 per cent infertility problems in buffaloes. In survey study, among all the reproductive disorders, the incidence of endometritis had shown highest value of 48.79 per cent followed by true anestrus (20.84%), ovarian hypoplasia (13.19%), silent estrus (7.85%), small genitalia (7.57%) and least prevalence was recorded for unilateral salpingitis (0.62%), cervicitis (0.36%) and ovarobursal adhesions (0.04%). A Similar prevalence of 55.79, 7.57, 9.44, 3.23, 0.001, 0.20, 0.01 and 1.28 per cent was recorded for inactive ovaries, repeat breeder, silent estrus, small genitalia, ovarian hypoplasia, salpingitis, kinked cervix and cervicitis, respectively by Raju *et al.* (2007).

In Himachal Pradesh, the overall prevalence of repeat breeding in buffaloes recorded was 17.80 per cent which was almost similar to the prevalence (15.63%) recorded by Sharma and Karwani (2003) in buffaloes of Punjab. However, lower prevalence of repeat breeding were recorded in other states which were 4.03, 7.57, 5.0, 4.57, 8.82 and 10.64 per cent in Tamil Nadu (Selvaraju *et al.*, 2005), Bihar (Kumar *et al.*, 2011), Uttar Pradesh (Kumar and Singh, 2009), Haryana (Khan *et al.*, 2009), Andhra Pradesh (Raju *et al.*, 2007) and Gujarat (Siddiquee *et al.*, 2007), respectively.

The overall prevalence of endometritis was 16.18 per cent in buffaloes of different districts of Himachal Pradesh. The highest prevalence of endometritis was

recorded in buffaloes of district Mandi (38.33%) followed by district Bilaspur (15.79%) and Hamirpur (15.16%) and lowest prevalence was recorded in district Sirmour buffaloes (4.17%). However, an overall prevalence of endometritis (8.97%) in country recorded by Saxena *et al.* (2006) was lower than the overall prevalence recorded (16.18%) in our study which may be due to non-ethical practice being followed by untrained inseminators. Also a high incidence of 28.72 per cent was recorded by Prajapati *et al.* (2005). In Anand, Gujarat prevalence of 13.0 per cent was recorded by Hadiya *et al.* (2011). Similarly in Andhra Pradesh, a slightly higher prevalence (19.4%) was recorded by Raju *et al.* (2007).

Among cervical pathologies, low prevalence of 0.16 per cent was recorded in different clinical camps of different districts. Our results were in agreement with the results (0.36%) recorded by Modi *et al.* (2011). Almost a similar low prevalence of 1.29 per cent was recorded by Raju *et al.* (2007). However, Sah and Nakao (2006) recorded a very high prevalence of 25.0 per cent of cervical problems in buffaloes of Nepal. The overall prevalence of cervical problems was lower in buffaloes (0.16%) than in cows (5.08%) recorded by Kumar and Singh (2018) in cows of Himachal Pradesh which may be due to reason that in buffaloes, natural service is preferred than artificial insemination and thus chances of human errors are less in buffaloes in comparison to cows.

In present study, 56.96 per cent buffaloes were diagnosed with inactive ovaries (true anestrus/small genitalia/postpartum anestrus) conditions and only 2.59 per cent buffaloes were suffering with silent estrus. Similar results of anestrus were recorded in buffaloes of Punjab (38.98-55.5%; Singh *et al.*, 2006), Madhya Pradesh (53.15%; Pandit, 2004) and Karnataka (56.0%; Hussain, 1984). A lower prevalence of 29.5-41.4 (Bharkad and Markandeya, 2003), 27.32 (Patel *et al.*, 2007) and 9.09 (Selvaraju *et al.*, 2005) per cent were recorded in Maharashtra, Gujarat and Tamil Nadu, respectively. In buffaloes, the prevalence of anestrus was higher than cows which may be due to more heat stress in buffaloes as it may induce summer anestrus (Wilfenson and Meidan, 2000; Hedao *et al.*, 2008).

In current study, the prevalence of abortion recorded was 1.78 per cent which was almost similar to the prevalence (1.12%) recorded by Sharma (2018). Similarly, the prevalence of other miscellaneous reproductive disorders such as pyometra, fetal mummification, persistent hymen, metritis, ovarian hypoplasia etc. was 4.85 per cent which was much higher than the finding (1.06%) of Siddiquee *et al.* (2007). In other study by Patel *et al.* (2007), the prevalence due to miscellaneous reproductive disorders

**Table 1**  
**Prevalence of reproductive disorders in buffaloes observed during infertility camps**

Diagnosis	Districts												Himachal		
	Mandi		Kangra		Sirmour		Bilaspur		Hamirpur		Una				
	Number of infertility treatment camps														
	n=8		n=17		n=4		n=15		n=21		n=8		n=73*		
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
Repeat breeder	Endometritis	23	38.33	10	12.35	1	4.17	15	15.79	37	15.16	14	12.28	100	16.18
	Cervical fibrosis/ Kinked Cervix/ cervicitis	0	0.00	1	1.23	0	0.00	0	0.00	0	0.00	0	0.00	1	0.16
	Ovaro-bursal adhesions/ Salpingitis	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Prolonged Estrus	0	0.00	2	2.47	1	4.17	1	1.05	5	2.05	0	0.00	9	1.46
	Total	23	38.33	13	16.05	2	8.33	16	16.84	42	17.21	14	12.28	110	17.80
Anestrus	True/Post Partum/ Small Genitalia	24	40.00	34	41.98	19	79.17	58	61.05	129	52.87	88	77.19	352	56.96
	Silent estrus	2	3.33	6	7.41	0	0.00	4	4.21	2	0.82	2	1.75	16	2.59
	Total	26	43.33	40	49.38	19	79.17	62	65.26	131	53.69	90	78.95	368	59.55
Miscellaneous	Abortion	2	3.33	2	2.47	0	0.00	1	1.05	4	1.64	2	1.75	11	1.78
	Other	2	3.33	5	6.17	0	0.00	5	5.26	14	5.74	4	3.51	30	4.85
	Total	4	6.67	7	8.64	0	0.00	6	6.32	18	7.38	6	5.26	41	6.63
Normal	Pregnant/ Recently Calved	4	6.67	11	13.58	3	12.50	8	8.42	44	18.03	3	2.63	73	11.81
	Estrus/Normal Cyclic	3	5.00	10	12.35	0	0.00	3	3.16	9	3.69	1	0.88	26	4.21
	Total	7	11.67	21	25.93	3	12.50	11	11.58	53	21.72	4	3.51	99	16.02
Grand total	60	100	81	100.0	24	100.0	95	100.0	244	100	114	100.0	618**	100.0	

\*Total buffaloes examined = 777, buffaloes examined for reproductive disorders = 523, \*\*clinical conditions = 618

was 8.90 per cent due to metritis, 1.86 per cent due to pyometra and 0.12 per cent due to mummification in buffaloes. However, Raju *et al.* (2007) recorded a very low prevalence of 0.05 per cent in buffaloes due to other miscellaneous reproductive disorders. Modi *et al.* (2011) reported miscellaneous reproductive disorders in buffaloes that included mummification (0.01%), mucometra (0.05%), pyometra (0.22%), ovarian hypoplasia (13.19%) and maceration (0.01%).

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