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Spinnbarkeit value/elasticity of cervico-vaginal mucus in relation to fertility in crossbred cows and heifers

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Abstract
This study was carried out on cows (n=20) and heifers (n=20) belonging to the Dairy farm of College of Veterinary Science and Animal Husbandry, Mhow and clinical cases of progressive farmers brought for AI to the Teaching Veterinary Clinical Complex and at the doorstep of farmers in nearby villages. The cervico-vaginal mucus samples were collected from the animals at oestrus and were immediately used for physical parameter analysis. Physical profile revealed that the mean spinnbarkeit value of CVM was observed in conceived and non-conceived crossbred cows and heifers, with the difference being highly significant (P<0.01) in all the groups. Pregnancy was confirmed by rectal palpation after 2 months of insemination.

Keywords: Crossbred cows, heifers, oestrus, cervico-vaginal mucus (CVM), spinnbarkeit value

Introduction
The nature of cervical mucus has pronounced influence on the fertilizing capacity of the spermatozoa in female reproductive tract and its physical properties have direct relationship with the fertility status of the animals (Rangnekar *et al.*, 2002) [5]. Estrus, the most visible phase of the estrous cycle is characterized by various behavioral signs including discharge of cervico-vaginal mucus. Fertility of a dairy cow is the ability of the animal to conceive and maintain pregnancy if served at the appropriate time in relation to ovulation. Lack of determination of estrus sign lowers the bovine fertility resulting in significance economic loss to the dairy industry. This study was planned to determine the fertility with spinnbarkeit value of CVM in crossbred cows and heifers.

Materials and Methods
The study was carried out on crossbreed cows(n=20) and heifers (n=20) belonging to the Dairy Farm of College of Veterinary Science and Animal Husbandry, Mhow and clinical cases of progressive farmers brought for AI to the Teaching Veterinary Clinical Complex and at the doorstep of farmers in nearby villages. All the animals included in this study were apparently healthy, cycling having no palpable reproductive abnormality on two consecutive rectal palpations, 10 days apart and were negative to white side test to rule out subclinical endometritis and were divided into groups as 1A, 1B, 2A and 2B which is consists of 10 animals in each group. Pregnancy was confirmed by rectal palpation after 2 months of insemination. The cervico-vaginal mucus (CVM) samples were collected from the animals at estrus before AI and were immediately evaluated for spinnbarkeit value analysis. The data was analyzed as per the standard statistical method by employing student's 't' test for spinnbarkeit values (Snedecor and Cochran, 1994) [5].

Results and Discussion
The spinnbarkeit value of cervico-vaginal mucus (CVM) in conceived and non-conceived crossbred cows and heifers at oestrus are presented in Table 01.

The mean spinnbarkeit values of cervico-vaginal mucus in conceived crossbred cows and heifers were foundin different groups (1A, 1B, 2A and 2B) at oestrus as 14.42±0.48, 12.00±0.44, 14.75±0.59 and 12.16±0.30 cm, whereas, in non-conceived crossbred cows and heifers, these values were observed as 10.66±0.33, 7.75±0.25, 10.50±0.50 and 8.75±0.25 cm, respectively,with the difference being highly significant (P<0.01) in all the conceived and non-conceived groups (Table 01).

The mean spinnbarkeit values (14.60±0.37 cm) of cervico-vaginal mucus in conceived crossbred cows were very close to that reported in crossbred cows by Rangnekar *et al.* (2002) [5],

14.59±0.57 cm and Gavit (2010) [2], 14.61±0.33 cm in Rural crossbred cows, whereas, it was comparatively lower than those reported by Modi *et al*. (2011) [4], 15.30±0.51 cm in Kankrej cows, but it was comparatively higher than those values reported by Bennur *et al*. (2004) [1], 7.38±0.56 cm in cows; Jethva (2010) [3], 10.80±0.34 cm in Rural buffaloes; Sharma *et al*. (2013) [7], 11.10±0.33 cm in buffaloes; Verma *et al*. (2014) [9], 14.16±0.60 cm in Murrah buffaloes and Rathod (2016) [6], 14.24±0.78 cm in crossbred cows.

The mean spinnbarkeit values (10.60±0.24 cm) of cervico-vaginal mucus in non-conceived crossbred cows were lower as compared to those reported by Gavit (2010) [2], 12.16±0.48 cm in Rural crossbred cows; Sharma *et al*. (2013) [7], 11.00±0.12 cm in buffaloes and Rathod (2016) [6], 11.71±0.73 cm in crossbred cows, but it was comparatively higher than those reported by Rangnekar *et al*. (2002) [5], 9.83±0.30 cm in crossbred cows; Bennur *et al*. (2004) [1], 8.05±1.33 cm in cows; Jethva (2010) [3], 7.40±0.75 cm in Rural buffaloes and in Kankrej cows by Modi *et al*. (2011) [4], 8.0±0.32 cm.

The mean spinnbarkeit values (12.08±0.25 cm) of cervico-vaginal mucus in conceived crossbred heifers were lower as compared to that reported in crossbred cows by Rangnekar *et al*. (2002) [5], 14.59±0.57 cm and Rathod (2016) [6], 14.24±0.78 cm; Gavit (2010) [2], 14.61±0.33 cm in Rural crossbred cows; Modi *et al*. (2011) [4], 15.30±0.51 cm in Kankrej cows; Verma *et al*. (2014) [9], 14.16±0.60 cm in Murrah buffaloes. However, comparatively lower values were reported by Bennur *et al*. (2004) [1], 7.38±0.56 cm in cows; in rural buffalo heifers by Jethva (2010) [3], 10.77±0.43 cm and in buffaloes by Sharma *et al*. (2013) [7], 11.10±0.33 cm.

The mean spinnbarkeit values (8.25±0.25 cm) of cervico-vaginal mucus in non-conceived crossbred heifers were lower as compared to those reported in crossbred cows by Rangnekar *et al*. (2002) [5], 9.83±0.30 cm and Rathod (2016) [6], 11.71±0.73 cm; Gavit (2010) [2], 12.16±0.48 cm in Rural crossbred cows; Sharma *et al*. (2013) [7], 11.00±0.12 cm in buffaloes. However, comparatively lower values were reported by Bennur *et al*. (2004) [1], 8.05±1.33 cm in cows; Jethva (2010) [3], 6.92±0.70 cm in Rural buffalo heifers and in Kankrej cows by Modi *et al*. (2011) [4], 8.0±0.32 cm.

Table 1: Group wise mean (±SE) distribution of spinnbarkeit value of cervico-vaginal mucus in conceived and non-conceived crossbred cows and heifers

S. No.	Groups	Status	Percent	Spinnbarkeit value of CVM (Mean±SE)
1	1A(n=10)	Conceived	70.00(7)	14.42±0.48**
		Non-conceived	30.00(3)	10.66±0.33*
2	1B(n=10)	Conceived	60.00(6)	12.00±0.44**
		Non-conceived	40.00(4)	7.75±0.25*
3	2A(n=10)	Conceived	80.00(8)	14.75±0.59**
		Non-conceived	20.00(2)	10.50±0.50*
4	2B(n=10)	Conceived	60.00(6)	12.16±0.30**
		Non-conceived	40.00(4)	8.75±0.25*
5	CB cows (n=20)	Conceived	75.00(15)	14.60±0.37**
		Non-conceived	25.00(5)	10.60±0.24*
6	Heifers (n=20)	Conceived	60.00(12)	12.08±0.25**
		Non-conceived	40.00(8)	8.25±0.25*
7	Overall(n=40)	Conceived	67.50(27)	13.48±0.33**
		Non-conceived	32.50(13)	9.15±0.37*

Figures in parentheses indicate number of animals.
*The means bearing superscripts in column differ significantly ($P<0.05$) and ** ($P<0.01$).

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Conflict of Interest: All authors declare no conflict of interest.

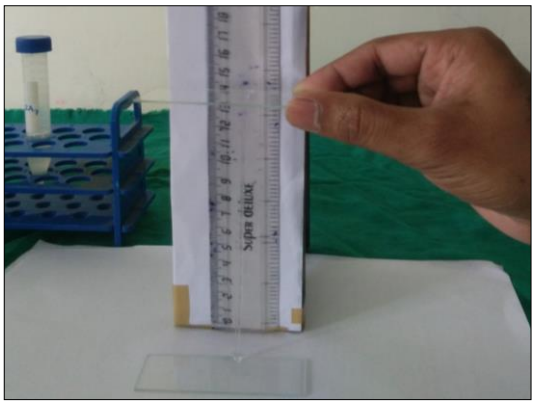

Plate 1: Modified device used to measure spinnbarkeit value (cm) of cervico-vaginal mucus

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