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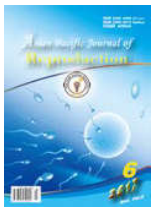

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Seasonal effect on physiological, reproductive and fertility profiles in breeding mithun bulls

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ABSTRACT

Objective: To analyse the seasonal effect on physiological parameters, reproductive profiles and *in vitro* fertility in breeding mithun bulls. **Methods:** A total of ten adult mithun bulls age of 5 to 6 years old with good body condition (score 5-6) were selected from ICAR-NRC on Mithun, Jharnapani, Nagaland, India. The seasons were categorised into winter, spring, summer and autumn seasons based on the meteorological data and sunshine hours. The physiological parameters, reproductive profiles and *in vitro* fertility parameters were assessed during different seasons in mithun under the semi-intensive system of management. **Results:** The statistical analysis revealed that these experimental parameters were differed significantly ($P<0.05$) among the seasons and in overall spring and winter seasons were more beneficial in mithun breeding programme, although, the breeding in mithun occurred throughout the year with variation. **Conclusions:** It is concluded that collection & preservation of mithun semen and artificial insemination in mithun species during the season of spring and winter has significant beneficial effect in terms of semen production, freezability and fertility for artificial breeding programme in mithun under the semi-intensive system.

1. Introduction

Mithun is a domestic free-range unique bovine primarily used for meat and is gift to the North Eastern Hilly states *viz.*, Arunachal Pradesh, Nagaland, Manipur and Mizoram of India. Measurement of testicular parameters has been used to assess the reproductive as well as the spermatogenic potentialities in post-pubertal breeding bulls[1-3]. Similarly measurement of parameters of scrotum is an important component in evaluation of breeding soundness, testicular growth, scrotal circumference, semen quality related attributes and endocrinological profiles of the breeding male in different livestock species[2,4-6]. Scrotal circumference (SC) is one of the simple, reliable and repeatable method to measure the testicular size and its consistency, which is highly positive correlated with testicular weight, endocrinological profiles, semen quality and *in vitro* & *in vivo* fertility parameters[2,7,8]. Further, SC is significantly correlated with body weight, age and seasons in the year[9] and also has significant positive relationship with semen volume and sperm output per ejaculate and fertility in livestock species[2]. Moreover, the testicular size and SC provide valuable information on physical and physiological maturity of the breeding bulls, its semen production potentiality and the birth weight of its offspring[10].

The testicle and scrotum are highly sensitive to changing of the environmental temperature which in turn leads to degenerative changes, characterised by decreasing of the testicular size, change in its consistency and ultimately leads to poor production of semen[11]. Moreover, the heat stress can also reduce the secretion of luteinizing hormone (LH) which is essential for sperm production especially in spermatogenesis[12]. The temperature of testicle in

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