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Assessment of reproductive parameters in female Dwarf goat (*Capra hircus*) on the basis of progesterone profiles

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Abstract

A study was undertaken to look into the reproductive performance of female Dwarf goats reared under traditional conditions at NIAB Farm, Faisalabad, Pakistan. The serum progesterone profile was used to monitor various reproductive parameters (length of postpartum period, resumption of cyclicity, gestation period, prepartum period, parturition) in two lots of goats. Litter size, birth weight of kids and kidding interval were also observed. Most of the animals conceived within 15–59 days of postpartum period. All the does conceived at first or second estrus. During gestation period, higher levels of progesterone were maintained with wide variations falling in the range of 3–13 ng ml^{-1}. However, a few days before parturition a decline was noticed at 6 ± 0.9 days and it reached to the basal level of 0.1 ng ml^{-1} after the completion of parturition process. The length of gestation period was found to be 145.8 ± 5 days in the first lot and 145.2 ± 4 days in the second lot. A very short kidding interval (203.7 ± 46 days) and considerably bigger litter size (1.8 ± 0.8) was observed. All the parturitions were normal and a considerable weight gain (8.2 ± 0.3 kg) of mothers was recorded during pregnancy. The initial birth weight of kids was averaged as 2.1 ± 0.5 kg in the first and 1.6 ± 0.2 kg in the second lot. It was concluded that Dwarf goat has short gestation length, postpartum period and kidding interval along with multiple births being common. Due to these factors, its reproductive efficiency can be exploited for efficient goat meat production.

Keywords: Goat; Progesterone; Estrous cycle; Gestation; Postpartum

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1. Introduction

There are 61.9 million goats estimated during 2005–2006 in Pakistan and the goat meat production in the country at present is 782.1 thousand tonnes (*Source*: Ministry of Food, Agriculture & Livestock, Government of Pakistan). There are 34 goat breeds in the country, mostly kept by smallholders for whom these are important for survival (Devendra et al., 2000). In Pakistan, there is a preference for goat meat than sheep, cow and buffalo (Jindal, 1984). The Dwarf goat is one of the popular breeds of goats reared in Pakistan (Ishaq, 1983). It is a Bengal breed, flourished excellently in this region and therefore, patronized and promoted for commercial farming. Farmers prefer it over other breeds because it is a non-seasonal breeder. Body weight of adult males at 1 year of age is 23.0 ± 3.0 kg, whereas females of the same age weigh 13.9 ± 1.5 kg (NIAB Farm Data, 1992). It is an early maturing breed and has high prolificacy with 3 kidding in 2 years (Khan et al., 1982; Khanum et al., 2000). Due to these characteristics, this breed may play an important role in the country's economy. In the present scenario of bird flu disease of poultry, goat production has become an attractive alternative livestock enterprise. Still there is a shortage of goat meat to satisfy the demand in the country.

Since Dwarf goats are prolific and non-seasonal, it may be that they have some traits in their reproductive cycle that make them distinct from other goat breeds. Concerned with the economic viability of goat enterprise, it is necessary to evaluate the reproductive and productive potential of this breed (Pakistani Dwarf goat) and a thorough knowledge of its reproduction physiology is essential. Limited and incomplete studies exist on the reproductive parameters to help improve herd management (Khan et al., 1982; Ishaq, 1983). In particular, there is as yet no information on the endocrine profiles of this breed. From the point of view of production, determination of the concentration of circulatory progesterone can aid in the correct assessment of reproductive status of ewes and does (Mukasa-Mugarwa et al., 1992). Progesterone assay has proved particularly valuable in assessing the fertility situation in herds in addition to farmers' observation and veterinary care (Karg, 1981).

This paper provides basic information on the reproductive traits of female Dwarf goat, based on monitoring of progesterone profile over a complete reproduction cycle (from parturition to parturition). It is hoped that the information generated will be used to develop a package for profitable goat farming.

2. Materials and methods

Studies were performed with two lots of goats. The first lot contained eight postpartal goats (G1–G8) and the second consisted of six does. The experiment with second lot was performed afterwards in order to substantiate some of the results of the first study. Goats were of varying ages (1–4 years) and weights (13.9–20.0 kg). Both the lots were reared at NIAB Farm under traditional grazing conditions. Different fodders such as various types of grasses, *Medicago sativa*, *Trifolium alexandrium*, etc., were available at the farm in different seasons for free grazing. Animals were also provided with crop residues. A buck was introduced for heat detection. Body weights of the animals of first lot were recorded weekly at a fixed time before the animals were allowed for free grazing. Circumstances related to animal experimentation met the International Guiding Principals for Biomedical Research Involving Animals as issued by the Council for the International Organizations of Medical Sciences (CIOMS).

In the first lot, the blood sampling was carried out on alternate day from one parturition to the completion of the next for 280 days. In the second lot, daily blood sampling was carried out