CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Numerous studies have shown that variation exists in the fertility of males within the same breed. It is also known that, for the same animal, the fertilizing potential of semen does not remain constant throughout the year. The determination of the factors that affect the quality of semen and the extent of the effect is of vital importance. It is interesting to note that an increase in abnormal sperm cells, and a reduction in fertility in exotic breeds in the tropics as a result of high ambient temperatures is often reported.

In goats, as in many other species, the quality of semen is influenced by the age of the animal. The initial ejaculate contains a great number of abnormal cells but large differences exist between and within breeds. The abnormalities consist for the most part of head malformations, which indicate incomplete spermatogenic activity and incomplete epididymal maturation. Semen quality also depends on daylight length, the environment and the potential to fertilize is subjected to similar external factors. A young male is not necessarily a good sire and the use of such sires often results in a lower prolificacy rate.

It is also known that the sexual activity of male goats are subject to seasonal variations,while the extent of this effect varies from breed to breed. These variations can be due to a number of defects of the reproductive system, particularly the quality of semen and its fertilizing capacity. The most critical environmental factors in this regard are daylight length and temperature. Adverse environmental conditions directly affect the head piece of the spermatozoa, which often results in an increase in the proportion of pyriform heads, damaged acrosomes, and tailless spermatozoa. In bucks exposed to heat treatment, a fall in fertility appears as early as a few days post-treatment and the extent of the effect depends on the duration of the treatment. Large variation exists between breeds in both the sperm morphology and fertilizing ability of semen in spring and autumn.

From a practical point of view, this means that fertile bucks with high semen quality should be selected in spring and autumn in order to achieve high conception rates. A limitation in this regard would be the need to determine precisely which buck to select in the non-breeding season. It was previously reported that the morphological picture of semen from a buck is fairly repeatable from one year to the next. The highest prevalence of semen abnormalities tend to occur every year at about the same time. Exposure of the scrotum alone or of the whole animal to high temperature always results in changes in the morphological profile of the sperm, but considerable variations also occur between individuals in the extent of the effect.

Based on this trial, the following conclusion can be drawn with regards to the effects of season on semen production within the two goat breeds. Since semen production changes with temperature, humidity, daylight length, nutrition and the extent of these effects, the indigenous bucks were found to adapt better to all the adverse factors in the tropics. The results also indicate a constant production of semen throughout the year in the indigenous goats. This is confirmed by the fact that the sperm concentration remained constant in the indigenous goats. This phenomenon renders indigenous goats more usable than the Gorno Altai in the tropical environments-with the Gorno Altai producing a varying quantity of semen. As the number of live spermatozoa per ejaculate is important, it affects fertility. In winter and during the beginning of spring there is a large production of spermatozoa in Gorno Altai, compared to the indigenous goats. This gives a clear indication that the Gorno Altai respond well to seasonal cues. There was no increase in the number of dead spermatozoa in the two breeds, but there was a tendency between goats in the fluctuating numbers of dead sperms over seasons-with marked fluctuations in the Gorno Altai. The results also show a sharp decrease in the number of dead sperm for the Gorno Altai during the mid-summer season. Such a phenomenon is due to the time of sexual quiescence in the exotic breeds, during which their sexual vigour is reduced to zero. These fluctuations also indicate that although exotic breeds produce large amounts of spermatozoa in the winter season, their use is limited to that specific season. Hence, these bucks cannot be utilized for semen collection during the non-breeding seasons at an

artificial insemination station. It has also been found that, in the tropics, the exotic breeds produce a large proportion of dead sperm cells in the non-breeding season.

It is concluded that the use of exotic buck breed for semen collection in an artificial insemination programme is limited to a certain season of the year primarily when it is cooler in the tropics. The indigenous breeds are fertile throughout the year. Semen production and fertility can also be assessed with the use of a scrotal circumference size as an indicator in animals. In a selection process of the best animals, indigenous goats maintained a consistent scrotal circumference size during the year, while the exotic breeds showed a decrease or fluctuation in scrotal circumference over the entire period. This correlated with consistent sperm concentrations in the indigenous and fluctuating sperm concentration in the Gorno Altai.. It is evident that the morphological evaluation of spermatozoa is, to date, the most accurate test available to evaluate the quality of semen. Based on this study, it is concluded that the semen from indigenous goat breeds could be used throughout the year for artificial insemination programmes whereas the use of the Gorno Altai should be limited to their natural breeding seasons. This will result in the collection and freezing of the highest quality semen in both breeds.