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BRIEF COMMUNICATION

SUPEROVULATION RESPONSE OF UPGRADED INDIGENOUS PHILIPPINE GOAT (*Capra hircus*)

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Superovulation as a means of producing an economically feasible number of embryos is practiced widely. Some of the advantages of this technique are increasing the number of progeny from genetically superior females and the frequency of particular genetic characteristic within existing population.

Lately, many techniques of superovulation in sheep and goat have been described^{5,13,14,15,17}. However, differences in the stages and quality of the embryos collected from the superovulated donor exist and are affected by variables such as breed, hormone and drug treatments, management and environmental influence. DONALDSON (1984)³ and LOONEY (1986)⁹ observed that the fertilization rate of superovulated cows ranged from 60 to 80%. Furthermore, only 80% of the embryos collected from these cows could be classified as either fair or excellent in quality. It is the purpose of this study to describe the superovulation response of the upgraded indigenous goat (*Capra hircus*). These does are the F₁ crosses resulting from the mating of either Anglo-nubian or Saanen buck with indigenous Philippine goat.

Intravaginal progesterone sponges were inserted in 5 cycling upgraded indigenous Philippine does (Fig. 1) for 12 consecutive days. One day before the progesterone sponge removal, the animals were injected with Follicle Stimulating Hormone (FSH; Antrin, Denkaiseiyaku Co. Ltd.) intravenously twice a day for 4 days at a gradually decreasing dose, giving a total dose of 25 mg per doe¹⁵. Estrus started on the last day of FSH treatment. Mating was carried out with either Anglo-nubian or Saanen buck on the first and second days of estrus. Five days post mating, the embryos were surgically collected (Fig. 2).

Prior to surgery, the does were fasted for 24 hours. Surgical anesthesia was

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achieved by using Xylazine HCl (Rompun ; Bayer) intravenously. The ovary, oviduct and uterus were exteriorized aseptically through a mid-ventral approach.

A small incision, 2 to 3 cm anterior from the body of the uterus was made to facilitate the insertion of a gauge 8 balloon catheter into the uterine lumen¹⁾. After the balloon was inflated and fixed in the uterine lumen, the embryos were flushed using Dulbecco's phosphate buffered saline (PBS) supplemented with 2 mg bovine serum albumin per ml. The recovered flushing medium was examined under a stereomicroscope. The embryos were transferred immediately into culture dish containing PBS supplemented with 10% calf serum for examination.

Table 1 summarized the results of the recovery of embryos. The number of ovulations was based on the presence of corpus luteum and was observed in goat Nos. 1, 2 and 4. The recovery rates of the embryos in these goats were 88.9, 46.2 and 8.3%, respectively. Goat Nos. 3 and 5 did not respond to treatment at all. The embryos collected from the donors showed a wide variation in quality and stages of development (Table 2), indicating differences in ovarian response among the does. The stages of the embryos ranged from 3–4 cells to early blastocyst. A noticeable decline in the recovery rate of embryos may be attributed to the flushing procedures used.

All the embryos collected were vitrified using a mixture of glycerol and propylene glycol (1,2-propanediol) in PBS with 10% calf serum¹⁰⁾ and were stored in liquid nitrogen for future use.

The differences in the quality and stages of embryo obtained in this study could be due to a high dose of FSH and breed of donor. The presence of too much Luteinizing Hormone (LH) in FSH could cause the premature ovulation and/or luteinization of FSH-stimulated follicle. It agrees with the hypothesis that the larger the dose of FSH, the greater would be the variability of response^{2,4,7,8)}. Similarly, the use of FSH caused premature activation of the oocyte with associated abnormal protein synthesis in ewe^{11,12)}.

This detrimental effect of FSH can be lessened by the use of a Gonadotropin Releasing Hormone (GnRH) near the onset of estrus. In cow, the number of good quality embryos increased after supplemental GnRH treatment^{16,18)}. The use of either pure FSH or controlled FSH-LH mixture is necessary to maintain oocyte maturation until the LH surge takes over⁶⁾. MOOR et al. (1984)¹¹⁾ suggested that priming the ovary before superovulation might be a practical and beneficial procedure. However, the specific dose and time of administration of gonadotropins have yet to be understood.

Some studies indicated that the ovulation rate of the donor is influenced by the breed. NUTI (1987)¹⁴⁾ observed that Alpine and Nubian dairy goats showed high degree of variability in ovarian response after FSH treatment. Whereas, Saanen and Angora dairy goats yielded 29.3 and 5.3 corpora lutea, respectively when treated with

a total of 21 mg FSH-P within 4 days. Hence, this study suggested that breed may influence the ovarian response in superovulated goats.

A suitable superovulation scheme for the upgraded indigenous Philippine goat would be the main interest in future studies since it would be an efficient method of herd improvement in terms of animal production.

REFERENCES

- 1) BAKER, A. A. (1978): Techniques of surgical and non-surgical ova collection of superovulated cows. *Vet. Rec.*, **103**, 558–562
- 2) CALLESEN, H., GREVE, T. & HYTILL, P. (1978): Premature ovulations in superovulated cattle. *Theriogenology.*, **28**, 155–166
- 3) DONALDSON, L. E. (1984): Embryo production in superovulated cows: transferable embryos correlated with total embryo. *Theriogenology.*, **21**, 517–524
- 4) FOLLEY, S. J. & MALPRESS, F. H. (1944): The response of the bovine ovary to pregnant mare serum and horse pituitary extract. *Proc. R. Soc. B.*, **132**, 164–188
- 5) FOOTE, R. H. (1986): Superovulation practices and related research. Proc. 5th Ann. Convention, AETA, 2–15
- 6) FOOTE, R. H. & ELLINGTON, J. E. (1988): Is a superovulated oocyte normal. *Theriogenology.*, **29**, 111–123
- 7) GORDON, I. (1975): Problems and prospects in cattle egg transfer. *Irish Vet. J.*, **29**, 21–30
- 8) GORDON, I., WILLIAMS, G. & EDWARDS, J. (1962): The use of serum gonadotropin in the induction of twin pregnancy in the cow. *J. Agric. Sci Camb.*, **59**, 143–198
- 9) LOONEY, C. R. (1986): Superovulation in beef females. Proc. 5th convention, AETA, 16–29
- 10) MASSIP, A., VAN DER ZWALMEN, P. & ECTORS, F. (1987): Recent progress in cryopreservation of cattle embryos. *Theriogenology.*, **27**, 69–79
- 11) MOOR, R. M., KRUIP, Th. A. M. & GREEN, D. (1984): Intraovarian control of folliculogenesis; limits to superovulation. *Theriogenology.*, **21**, 103–116
- 12) MOOR, R. M., OSBORN, J. C. & CROSBY, I. M. (1985): Gonadotropin-induced abnormalities in sheep oocytes after superovulation. *J. Reprod. Fert.*, **74**, 167–172
- 13) MOORE, N. W. (1982): Egg transfer in sheep and goat. In: *Mammalian Egg Transfer* Ed. Adams, C. E., Boca Raton: CRC Press Inc., 126–131
- 14) NUTI, L. C. (1987): Superovulation and recovery of zygotes from nubian and alpine dairy goats. *Theriogenology.*, **28**, 481–488
- 15) SADLER, R. (1986): Embryo transfer procedures in goat. *Asian Livestock.*, **21** (11), 144–150
- 16) SAVAGE, N. C., HOWELL, W. & MAPLETOFT, R. J. (1987): Superovulation in the cow using estradiol 17B or GnRH in conjunction with FSH-P. *Theriogenology.*, **27**, 383–394
- 17) TERVIT, H. R. (1986): Embryo transfer in goat. *Asian Livestock.*, **21** (8), 89–90
- 18) WUBISHET, A., GRAVES, C. N., SPAHR, S. L., KESLER, D. J. & FAVERO, R. J. (1986): Effects of GnRH treatment on superovulatory response of dairy cows. *Theriogenology.*, **25**, 423–427

TABLE 1 The results of superovulation using FSH in upgraded indigenous Philippine goat (*Capra hircus*).

Goat No.	Breed	No. of ovulations		No. of embryos recovered		Percentage embryo recovery
		Left ovary	Right ovary	Left uterus	Right uterus	
1	Saanen × Indigenous goat	4	5	4	4	88.9
2	Anglo-nubian × Indigenous goat	8	5	2	4	46.2
3	Anglo-nubian × Indigenous goat	—	—	—	—	—
4	Anglo-nubian × Indigenous goat	5	7	0	1	8.3
5	Anglo-nubian × Indigenous goat	—	—	—	—	—

(—) : Goat Nos.3 and 5 did not respond to treatment

TABLE 2 Variations in the ovarian response to FSH.

Goat No.	No. of embryos recovered	Stage of embryo			
		3-4 cells	8-16 cells	compacted morula	early blastocyst
1	8	2	5	1	—
2	6	1	—	3	2
4	1	1	—	—	—

(—) : No embryo recovered at this particular stage

EXPLANATION OF PLATES

- Fig. 1 The insertion of an intravaginal progesterone sponge in an (Anglo-nubian×Indigenous Philippine goat) F₁.
- Fig. 2 Surgical flushing of embryos through an incision about 2–3 cm anterior from the body of the uterus.
- Fig. 3 Embryos from a (Saanen×Indigenous Philippine goat) F₁ (Goat No.1) showing the “thorny” characteristic of its zona pellucida. Compacted morula (CM), 8–16 cells.
- Fig. 4 An embryo from the same animal (Goat No.1) at the 4-cell stage.
- Fig. 5 Embryos from an (Anglo-nubian×Indigenous Philippine goat) F₁ showing a distinct zona pellucida. Two early blastocysts (EB), compacted morula (CM) and 3–4 cell embryo (extreme left).
- Fig. 6 An embryo recovered from goat No.4 at 3–4 cell stage with irregular cells showing signs of degeneration as characterized by the accumulation of lipid droplets.

