

THE EFFICACY OF TEASER BUCK INTRODUCTION AND HUMAN CHORIONIC GONADOTROPHIN (hCG) IN THE INDUCTION OF OVULATION TO ENHANCE RECEPTIVITY AND FERTILITY IN RABBITS (*Oryctolagus cuniculus*) IN BAUCHI.

*NYAM, P.P. ¹BUTSWAT, I.S.R., ²NAIBI, S., AND ³KALLA D.J.U.

¹College of Education, Dept. of Agric Education, Gindiri, ²Nation Open University of Nigeria [NOUN] Jos Centre; ³Abubakar Tafawa Balawa University, Bauchi, Animal Production Programme.

*Corresponding Author: e-mail: philipnyam@yahoo.com

ABSTRACT

This study was designed to evaluate the efficacy of teaser bucks introduction and human chorionic gonadotrophin (hCG) in the induction ovulation to enhance receptivity and conception rates in rabbits at the Teaching and Research farm of the Abubakar Tafawa Balawa University Bauchi. A total of (n=60) rabbit does and (n=10) male bucks were subjected into this trial. New Zealand white and their reciprocal crosses (n=30) and 30 local breeds, three stimulation protocols (hCG), teaser buck stimulation and natural method as control) were used. All the data generated were subjected to an analysis of variance. It was revealed that no significant differences ($P>0.05$) were observed between breeds in receptivity for the treatments. However, Conception rates were significant ($P<0.05$) in favour of the improved breeds and those treated with hCG. In conclusion, the use of teasers bucks, hCG based protocols during non-breeding season allows seasonal patterns of reproductive anoestrus to come on estrus, and allow receptivity and subsequently the insemination and pregnancy in rabbits that would otherwise be non-productive.

Key words: Teaser bucks, hCG; Ovulation, Receptivity, Fertility and Rabbits

INTRODUCTION

The knowledge of the physiological aspects that control the reproductive function of the rabbit does is rapidly expanding (Boiti, 2004) and the entire sequence is under hormonal control or bio-stimulation. Rabbits do not have a well-defined estrus cycle and they are often, erroneously considered to be permanently in estrus.

The introduction of the male, if pre-conditioned by a period of isolation from rams, teasing, induces and synchronizes estrus (Pearce and Oldham, 1988). Nyam *et al.* (2013) observed that several protocols of estrus and ovulation synchronization have been developed, and rabbit responds well to the exogenous administration of hCG hormone and artificial insemination is possible at a pre-established time. Therefore, the present study was designed to evaluate the efficacy of buck introduction and human chorionic gonadotrophin (hCG) in the induction of ovulation to enhance receptivity and fertility in rabbits does.

MATERIALS AND METHODS

The experiment was conducted at the Research and Teaching farm of the Abubakar Tafawa Balawa University, Bauchi. The research unit is located at altitude 690.2m above sea level and at latitude 10° 17' N and longitude 8° 49' E. The climate, soil and vegetation are described by Nyam *et al.* (2013). The trial was carried out on two breeds of rabbits, Improved and Local, and 3

Stimulation protocols (hCG, teaser buck stimulation and natural method as control). The Improved breeds were predominantly New Zealand white and their reciprocal crosses. The data were generated from 60 rabbits does that were assigned randomly and 10 bucks; 5 each of improved and local breeds with body weight average of 1.951kg and the bucks weighing averagely 2.726kg and with an average age of 26weeks. The rabbits were kept individually in flat cages measuring 0.56 x 4.0 metres equipped with plastic water and feed troughs. All cages were equally kept in a naturally ventilated building in a shed roofed with asbestos having windows to enhance ventilation. The feed was supplemented by serving them *Tridax procumbent*, *Amaranthus spp.*, Cabbage. Before the commencement of the trial, the rabbits were kept for three weeks to adapt to the local environment. The experiment was design as 2x3x10 factorial design with 2 breeds, 3 treatments (hCG, teaser buck and natural method) and 10 replications. The bucks were first trained. Evaluation for receptivity sexual receptivity is judge by scoring the colour of the vulva, reddish valve being highest, pink, dark red and white being the least in terms of receptivity (Theau-Clement and Roustau, 1991). Does were restrained by a Research Assistant individually in a supine position and the status of the vulva is certified for receptivity based on colour and turgidity.

Statistical Analysis

Data generated were subjected to an analysis of variance (ANOVA) according to the generalized linear model procedure contained in the statistical package for social science (SPSS, 2006).

RESULTS AND DISCUSSION

The overall results depicted in table 1 showed that the highest receptivity was recorded in improved breed. Population treated with hCG (54.4%) was the lowest found in the local breeds exposed to teaser bucks (39.9%). The highest conception rate (85.7) ($P < 0.05$) in improved breeds treated with hCG as the lowest was observed in the natural method in the local breeds (64.0%). Kindling rate of 84.2% was similarly found in hCG improved breeds being the highest and 62.2% was the lowest in natural mating of the local breeds in all the 3 treatments, the largest litter size (6.5^a) was observed in improved breeds treated with hCG and the local of natural method (control) have 4.0^b ($p < 0.05$). The receptivity rate in this study for the hCG, teaser bucks and natural mating were not significant ($P > 0.05$). Gravance (1994) in a study reported superovulation, and 87% receptivity to mating within 48 hours of treatment with 25IU of pregnant mare's serum gonadotrophin (PMSG) and is consonance with the work of (Khalifa *et al.*, 1989). Favourable conception rates ($P < 0.05$) in all the treatments groups were achieved at doses equal to 25mg per doe of hCG as well as for the teaser bucks and natural method. The conception rates in this study showed that it was higher than those recorded by other authors (Gbore *et al.*, 2007). The difference might be due to the effect of superovulation treatment that was used in this study. The response to superovulation treatment depends not only on the type of hormone and method of administration but also differs between rabbit breeds. Improved breeds of rabbits treated with hCG had 84.2% with the least found in the local breed of the natural method (62.2%). The non-significant difference could probably be due to the quality of diet and good management given to the local of breeds and poor adaptation to the immediate environment by the improved breeds. Ajan *et al.* (2005) in their study reported high conception rates between 50-100% for rabbits fed with maize milling waste based diet. Also, Szendro *et al.* (2005) and Raborjo *et al.*, 1986) reported high conception rates of 67 to 100% for New Zealand white rabbits, but the report in this study is within the range reported by (Zahraddeen, 2006).

The litter size obtained in this study ($P < 0.05$) indicated that a steady trend to lesser values from improved to the local breeds treated. The improve breeds were more fertile with large litter size than the other treatments in the trial. The significantly higher number of rabbits per litter in this experiment is in agreement with the findings by Perrier *et al.* (2000) but opposes to the conclusion drawn by Quintela *et al.* (2004). This might be due to difference in hormonal response by breeds and management, and maximum ovulation response to this effect is associated with exposure, to the full range of socio-sexual cues (Pearce and Oldham, 1988).

Summary and conclusion

In general, it maybe stated that rabbits respond well to all forms of bio stimulation either by pharmacological preparations at pre-established time, and repeated short-time exposure of rabbit does to teaser bucks. The study projected evidence that these protocols are reliable methods of inducing receptivity, conception and kindling rates in rabbit does. The results obtained indicated that hCG is valuable among the other treatments in increasing conception rates and fertility. Therefore, it can be concluded that male sexual behavior may enhance the response of does where inhibitory effects of parity and sexual experience exist and hormonal protocols are essential tools in modern day drive toward improving biotechnology practices.

REFERENCES

- Boiti, C. (2004). Underlying Physiological mechanisms controlling the reproductive axis of rabbits does. Proc. 8th World Rabbit Congr. Puebla, Mexico, Vol. 1: 186-206.
- Gravance, C.G. (1994). Effect of single combined dose of pregnant mares serum gonadotrophin and human chorionic gonadotrophin on ovulation rates in young rabbits. *Anim. Reprod Sci* 34:299-305.
- Khalifa, R.M., Mady, M.E. and El-Alamy, M. A. (1989). Effect of PMSG on sexual receptivity on low reproductive female rabbits. *Journal of Appl. Rabbit Res.* 12: 329-340.
- Nyam, P.P., Butswat, I.S.R. Naibi, S.A. and Kalla D.J.U. (2013) Biotechnology techniques for enhancing receptivity and conception rate in rabbits (*Oryctolagus cuniculus*). Procs. 28th Nigerian society for animal production 17- 20th March 2013 pp513-5.
- Pearce, G.P., and Oldham, C.M., (1988). Importance of non-olfactory Stimuli in

- mediating ram induced ovulation in the ewe. *Journal of Reprod. Fertil.* **84**:333-339.
- Perrier, 2000.G., Theau-dement, M., Jouanno, M. and Drobet, J.P. (2002). Reduction of GnRH dose and inseminated rabbit does reproductive performance. In: *7th World Rabbit Congress Valcena, Spain*
- Quintela, L.A., Pena, A.I. Vega, M.D., Gullon, J., Prieto, C. Barrio, M., Becerra, J.J.; Maseda, F. Herradon, P.G. (2004). Ovulation induction in rabbit does Submitted to artificial insemination by addition of buserelin to the seminal close. *Reprod. Nurtr. Dev.* **44**: 79-88.
- SPSS (2006). Statistical Package for social Science, general linear model procedure. Standard Version. Iowa U.S.A.
- Szendro, Z. S., Matrics, Z.S, Gereceser, Gyonia, M.,- Nemeth E., and Radnai, I. (2005). Effect of lighting and bio stimulation on the performance of rabbits does. 2. Effect of nursing. *17th Hungarian Cont. on Rabbit production Hungary* 79-82.
- Theau-Clement, M. and Roustan, A. (1991). A Study on relationship between receptivity and lactation in the does and their influence on reproductive performance. *Journal. App. Rabbits Res.***15**: 412-421.
- Zahraddeen, D, Butswat., I.S.R and Mbap, S.T. (2006) Ejaculate Characteristics and artificial insemination in rabbits (*Oryctolagus cuniculus*) following induction using teaser bucks *JORMAL* **3(1)**;12-20.

Fig 2: Conception Rates (%) of Improved and local breeds

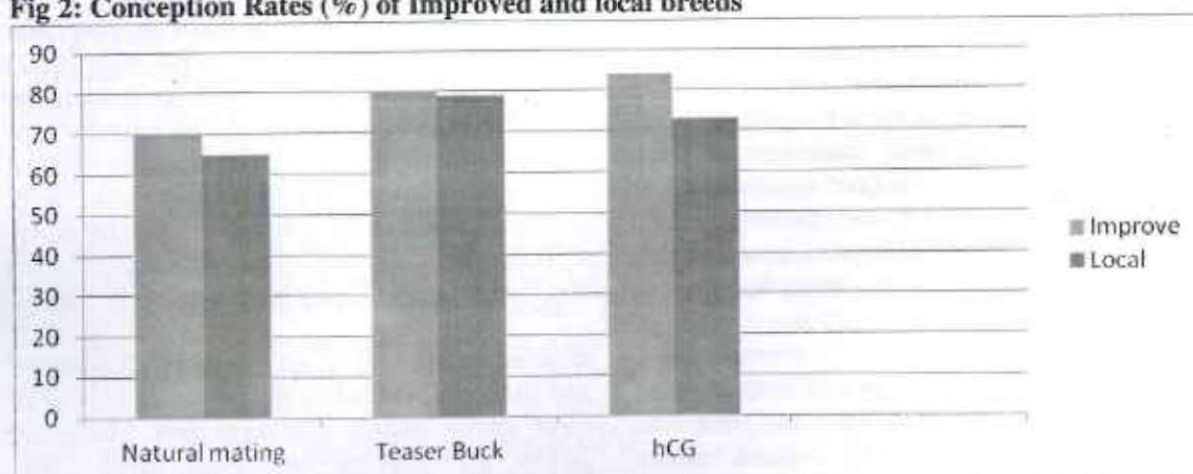


Table 1. Induction of Receptivity and Conception rates following induction of ovulation in two Breeds of rabbit

	Teaser Buck		hCG		Natural Mating	
	Improved	Local	Improved	Local	Improved	Local
No. of does per treatment	10.00	10.00	10.00	10.00	10.00	10.00
No. Insemination/Mating	1.00	1.00	1.00	1.00	1.00	1.00
Sexual Receptivity rate(%)	43.4	39.8	54.4	42.45	45.4	42.9
Conception Rate(%)	78.9b	77.8b	85.7b	75.0ab	72.0ab	64.0a
Litter Size	5.0a	4.0b	6.5a	6.0a	4.5ab	4.0b

P<0.05; P< 0.01. a, b means in the same row within a subset having different superscripts are significantly different