

## **A Preliminary Study of the Use of Hormones on the Reproductive Performance of some Breeds of Rabbits**

**B.D.P Soewandi and Y.C. Raharjo**

Indonesian Research Institute of Animal Production  
Jl. Raya Veteran III Ciawi-Bogor  
Corresponding email: bayu.dewantoro@gmail.com

**ABSTRACT:** Reproductive hormones are often used in the animal production, including in rabbits to increase the rate of production, e.g. in the AI practices. Rabbit is a prolific animal, yet its reproductive rate in Indonesia is slow. A preliminary study on reproductive performance of rabbits with or without injection of hCG was carried out at *Balai Penelitian Ternak*, Ciawi-Bogor in 2014. Five breeds of rabbits, i.e. Rex, Reza, Hybrid NZW Hyla and Hycole and NZWxLocal cross were treated with or without injection of 0.2 cc of hCG. Each treatment, depended on the breed, consisted of 15 – 57 individual replications. A randomized complete block design was applied with SPSS IBM 20. Measurement were made on changes of bodyweight of does and kits, receptivity and conception rate of the does, gestation period, litter size (LS) at birth, 21 days and 35 days, stillbirth and kit mortalities during lactation. Results indicated that the use of hormones significantly increased the oestrus rate (61-86% vs 26-29 %), receptivity and conception rate (48-56 % vs 17-36 %) in all treated breeds although the rate was different between breeds. The use of hormones also increased litter size at birth of Rex (7.0 vs 5.8), Reza (6.8 vs 5.8) and Hycole (8.2 vs 5.8). It's interesting to note that NZW x Local cross produced rather high LS at birth,  $8.9 \pm 2.2$  kits alive. Gestation period was not different among treatments, ranged from 31.4 – 32.5 days.

**Keywords:** hormone, reproduction, rabbit.

### **INTRODUCTION**

Rabbit is a potential livestock to be developed in Indonesia as it has a biologic and economic potency (Hutasuhut, 2005 and Raharjo, 2005). One of biologic potency of rabbit and has economic trait is their reproductive performance. Rabbit has high of litter size and fast in kidding interval of rabbit. In rabbit, litter size trait becomes one of reproduction performance that need to be increased because it has economic value (Bolet *et al*, 2007). Litter size is effected by ovulation rate which depends on LH (luteinizing hormone) level in blood (El-Darawany and Slam, 1996).

Reproductive hormones are often used in the animal production, including in rabbits to increase the rate of production, e.g. in the AI practices. Zagnolo *et al* (1996) had studied reproductive hormone was that hCG hormone. They used it undertook to elucidate the effects of GnRH analog on rabbit ovulation. Based on their research found that it was significantly decreased in ovulatory efficiency and an increase in degeneration rate of preimplantation efficiency. hCG, is one of GnRH (Gonadotrophin Relaxing Hormone) family, is hormone that is included in thyrotropic hormones group and it has principal function like LH. The effect of Hormones used were hCG and LH for induced of the ovulation (Bearden *et al.*, 2004, Bosco *et al.*, 2011 and William, 1974). Based on Bosco *et al* (2011) that rabbit ovulation is induced by coitus and LH and hCG can increase induced of ovulation in rabbit does. The purpose of this studies is a preliminary study to identify that effected hormones hCG to reproduction performance of more breeds rabbit does.

## MATERIAL AND METHOD

The research of a preliminary study on reproductive performance of rabbits with or without injection of hCG was carried out at Balai Penelitian Ternak, Ciawi-Bogor in 2014. Five breeds of rabbits, i.e. Rex, Reza, Hybrid NZW Hyla and Hycote and NZWxLocal cross were treated with or without injection of 0.2 cc of hCG at 2 days before mating. Each treatment, depended on the breed, consisted of 15 – 57 individual replications.

Statistic: A randomized complete block design was applied with SPSS IBM 20. Measurement were made on changes of body weight of does and kits, receptivity and conception rate of the does, gestation period, litter size (LS) at birth, 21 days and 35 days, still birth and kit mortalities during lactation.

## RESULT AND DISCUSSION

Table 1 and table 2 suggested that the effects of hCG hormone on more breed of does reproductive performances. The result of this studies was hCG that significantly effected estrus (E), percent of pregnant (PP), litter born alive (LBA), pregnant periode (PPr) and male receptivity (MR) traits in does. In the case, the hCG didn't effect to more traits like litter alive within 21 days (LA21) and litter alive within 35 days (LA35).

**Table 1.** The more breeds of does reproduction performances used hCG hormone

Characteristic	NL	Rex	Reza	Hycote	Hyla
N	15	22	18	27	18
Estrus	60	86	83	81	61
Mating	100	100	100	100	100
Percent of Pregnant	67	50	56	48	61
Litter Born Alive	8.9±2.2	7.0±2.2	6.9±3.6	8.2±3.5	7.6±4.1
Litter Born Died	1.2	2.5	2.1	0.4	0.2
Pregnant Peroide	31.4±1.01	31.7±1.2	32.3±0.5	31.2±0.6	31.9±1.2
Male Receptivity	93	68	61	81	89
Litter Alive within 21 days	4.4±1.3	4.0±0.6	4.2±0.8	4.2±1.4	4.0±1.6
Litter Died within 21 days	4.4	3.0	3.8	4.0	3.6
Litter Alive within 35 days	3.6±0.8	3.4±1.0	3.5±1.0	3.5±1.4	3.7±1.2
Litter Died within 35 days	0.9	0.6	0.7	0.7	0.3

FAO (1997) explained that female rabbit had no cycle and can stay in heat for several days running. hCG, which has the role like LH, has the function of promoting development of ovarian follicles (duration = 10 hour) and then of ovulation. According to the function hCG, it can cause LBA significantly for more does breeds. The hormone effected estrus because the hCG had principal action like LH. Bearden *et al* (2004) stated that the hCG, had chemical class was protein and came from placenta, like LH action.

According to Bosco *et al* (2011) that The estrogen levels present in circulation and the number of pre-ovulatory follicles could influence the pituitary sensitivity at minimum dose. The function of hCG like LH but hCG has a longer than LH, Bosco *et al* (2011) stated that although the pharmacological action of hCG and LH are similar, the pharmacokinetics and bioavailability of the hormones are

different because LH has a shorter half life than hCG, so it can effect the estrogen level in blood. The effect of estrogen level in blood can continue to the estrus in does. Estrus in does can be shown with vulva colour change. A significant number of does showing red and puple vulva were much numerous. The positive relationship between the intensity of the vulva colour and the male receptivity, fertility and prolificacy has been demonstrated (Maertens *et al*, 1983; Theau-Clement *et al* 1990; Bonanno *et al*, 1990; Maertens and Luzi, 1995 in Maertens *et al*, 1995).

**Table 2.** The more breeds of does reproduction performances without hCG hormone.

Characteristic	NL	Rex	Reza	Hycole	Hyla
N	30	39	51	24	57
Estrus	43	26	53	58	53
Mating	100	100	100	100	100
Percent of Pregnant	40	33	55	17	42
Litter Born Alive	6.6±0.7	5.9±2.9	5.0±2.3	5.8±1.5	7.2±2.9
Litter Born Died	2.0	0	1.5	0	0.7
Pregnant Peroide	32±1.28	32.5±1.0	32.6±1.0	32.3±1.0	32.1±1.0
Male Receptivity	53	49	49	54	46
Litter Alive within 21 days	4.8±0.8	4.2±1.1	4.0±1.8	4.3±1.3	4.2±1.7
Litter Died within 21 days	1.8	1.6	1.0	1.5	3
Litter Alive within 35 days	4.0±1.0	3.6±0.9	3.1±1.6	3.5±0.6	3.8±1.7
Litter Died within 35 days	1.5	0.7	0.9	0.8	0.4

The estrogen level effect in blood can continue to the estrus in does. Estrus in does can be shown with vulva colour change. A significant number of does showing red and puple vulva were much numerous. The positive relationship between the intensity of the vulva colour and the receptivity, fertility and prolificacy has been demonstrated (Maertens *et al*, 1983; Theau-Clement *et al*, 1990; Bonanno *et al*, 1990; Maertens and Luzi, 1995 in Maertens *et al*, 1995).

The research from El-Kalaway (1997) showed that mean rabbit weight at birth, 21 and 28 days of rabbit weight, daily gain from birth to 21 days and preweaning mortality percentages at different ages were not significantly affected by hormone treatment but milk production from does. Weaning of rabbit kids were effected by litter size at birth, mothering ability and milk production of does. According to Sartika and Dwiyanto (1995) stated that the growth of high litter size faster than low litter size because it was caused from traits of mothering ability. One of traits mothering ability was milk production. Based on FAO (1997), milk production depends on prolactin, a lactogenic hormone. Therefore, hCG can not effect of LA21 and LA35 because it was affected by prolactin hormone.

## CONCLUSION

In conclusion, this research provides on affected of hCG hormone, shows that hCG can increase reproduction productivity of does rabbit especially for estrus, male receptivity, percent of pregnant and litter size alive traits because the function of hCG like LH hormone in rabbit. Therefore, in this a preliminary study shows that hCG can be used to increased reproduction productivity in rabbit farm in Indonesia. However, hCG hormone can't effect to litter alive 21 and litter alive 35 trait.

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