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Effect of shearing of hair in summer on production of rabbit does

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ABSTRACT

The aim of the study was to examine the effect of shearing the does' hair before artificial insemination on their performance in summer. Decreasing the effect of heat stress and increasing of receptivity at the time of AI were expected. Primi- and multiparous Pannon White meat type does were divided into two groups. One half of the animals (n=80) was sheared (back and both sides of the body) 2 days before the insemination, the other half (non-treated) was the control group (n=96). Shearing of the does in summer had a positive effect on the daily milk production (227 and 215 g/day, in the sheared and control groups, respectively), and on the litter weight at 35 days of age. Shearing had no effect on litter size but the litter weight was higher by 6, 4 and 9% at 21 (2499 and 2376 g, NS), at 28 (3525 and 3386 g, NS) and at 35 days of age (5816 and 5318 g, P<0.05). Shearing the rabbit does 2 days before AI as a biostimulation method was judged non-effective. The fertility (67.5 and 67.5%), the litter size, total (9.13 and 8.95) and alive (8.57 and 8.26) was the same in the sheared and control groups. It was concluded that the shearing of rabbit does on hot temperature could be an effective method against the heat stress but it is not recommended using it as a biostimulation method.
(Keywords: rabbits does, shearing, biostimulation, milk production)

ÖSSZEFOGLALÁS

A szőrzet lenyírásának hatása az anyanyulak termelésére, nyáron
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A kísérlet célja annak vizsgálata, hogy a szőrzet termékenyítés előtti lenyírása, hogyan befolyásolja az anyanyulak termelését, nyáron. A hőstressz hatásának csökkenését és a receptivitás javulását várták az inszeminálás időpontjában. Először és már többször fialt Pannon fehér hústípusú, normál szőrzetű anyanyulakat két csoportba osztották. Az anyanyulak egyik felét (n=80) az inszeminálás előtt két nappal megnyírták (a szőrt a háton és a két oldalon távolították el). A nem nyírt nyulak (n=96) képezték a kontrollcsoportot. A nyári nyírás hatására megnőtt az anyanyulak tejtermelése (227 és 215 g/nap, sorrendben a nyírt és a kontrollcsoportban) és nagyobb lett a 35 napos nyulak testsúlya. A nyírás nem befolyásolta az alomlétszámot, de a nyírt csoportban 6, 4 és 9%-kal nőtt a 21 napos (2499 és 2376 g, NS), a 28 napos (3525 és 3386 g, NS) és a 35 napos alomsúly (5816 és 5318 g, P<0,05). Az inszeminálás előtt 2 nappal végzett nyírásnak nem volt biostimulációs hatása: a vemhesülési arány (67,5 és 67,5%), az összes született (9,18 és 8,95) és az élve született

nyulak száma (8,57 és 8,26) nem különbözött szignifikánsan a két csoport között. Az eredmények alapján megállapították, hogy melegben a szőr lenyírása alkalmas módszer a hőstressz csökkentésére, de biostimulációs módszerként nem javasolható.
(Kulcsszavak: anyanyulak, nyírás, biostimuláció, tejtermelés)

INTRODUCTION

The negative effect of heat stress causes serious problems in numerous countries of hot climate. Even in countries in the Middle European region, the hot summer has a large production reducing effect, mainly in rabbitry without air conditioning. Several experimental data show the negative effect of high temperature on the feed intake and on milk production of rabbit does (*Raffai and Papp*, 1984; *Pascual et al.*, 1996; *Szendrő et al.*, 1999). Rabbits possess only a few sweat-glands, but also the relatively thick fur inhibits heat loss. This lead to the idea (*Finzi et al.*, 1992) to study the effects of shearing, on bucks. The feed intake of sheared rabbits increased significantly, though neither the quantity nor the quality of semen was affected.

The possibility to stimulate the oestrus without PMSG treatment is widely investigated (*Theau-Clement*, 2000; *Bonanno et al*., 2004; *Eiben et al.*, 2004; *Matics et al.,* 2004). Numerous, so-called „biostimulation methods" have been tested (e.g. dam-litter) separation, alteration of nursing method, change of cage, light stimulation, buck's effect, flushing). It was thus hypothesized that, especially on hot climates, the shearing of does before insemination may have double effects. It may reduce the negative effects of heat stress, the heat loss of does can be improved this way, but on the other hand it may also have oestrus-stimulating effects.

MATERIALS AND METHODS

The experiment was carried out at the University of Kaposvár, on Pannon White meat type rabbits, in the summer (in July). The building was not air conditioned, therefore, the inner temperature reached, or even exceeded the temperature of 30 °C, especially in hot afternoons. The daily lighting was 16 hours.

Rabbits were housed in one-floor cages. A commercial rabbit feed was fed (DE: 10.3 MJ/kg, crude protein: 16.5%, crude fibre: 15.5%) *ad libitum*. Water was provided from nipple drinkers *ad libitum*.

Does were first inseminated at the age of 16.5 weeks. Insemination was performed 10 days after kindling. For the induction of ovulation, 1.5 µg GnRH analogue (D-phe6-GnRH, Ovurelin inj. ad us. Vet., Reanal®) was injected at the time of insemination.

Does of different ages (taking the number of kindlings into account) were randomly divided into two subgroups. The first group was set as control (n=96), while in the other group (n=80) the hair was sheared two days before the insemination on the back and on the sides to 2.5 mm length, by means of a shearing equipment used for angora rabbits.

The litter size and litter weight at the shearing was counted and measured on days 21, 28 and 35. The lactation curve was plotted from the before- and after-suckling body weight difference of the does as measured on lactation days 4, 8, 9, 10, 11, 15, 18, 22, 25 and 28. To detect any, possibly negative effect of shearing, in the period of shearing and insemination the milk production was measured daily.

Before, and 14, 28, 35, 42, 49 and 56 days after the shearing the hair length was measured (on the back and by the right thigh on the side), to get information on the growth of the hair.

To describe the biostimulative effects of shearing, the success of fertilization, the rate of conception and the litter size total and alive was evaluated.

Data obtained were evaluated by analysis of variance, chi^2 method, using the SPSS 10.0 for Windows software package.

RESULTS AND DISCUSSION

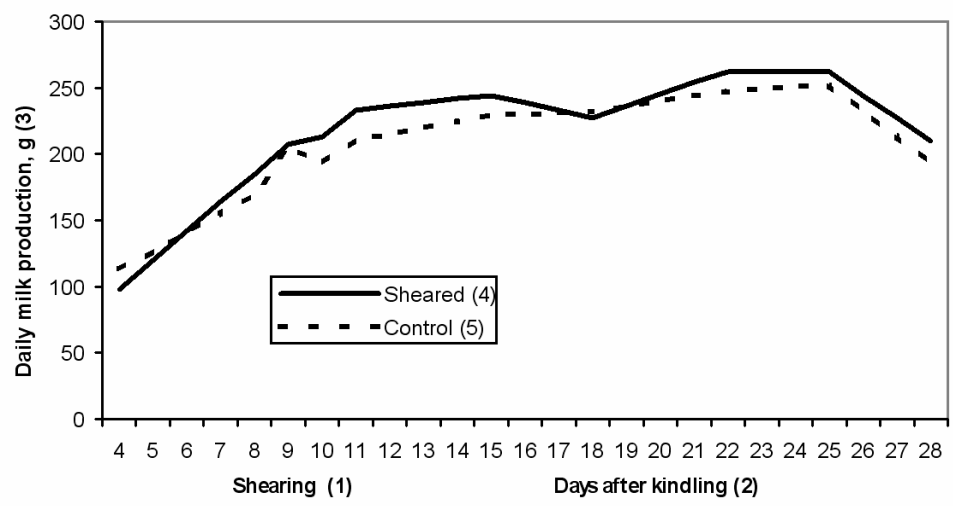
The effect of shearing on the performance

The shearing of lactating does in the summer may reduce the negative effect of heat stress, that can lead to an improved milk supply of the actual litter. This may increase both the litter size and the litter weight. This was proven by *Eiben et al.* (1996) on angora rabbits.

The milk production from the 8th day after the shearing indicates that shearing itself did not influence the actual milk production badly (*Figure 1*). Though the shearing event of 20 minutes could possibly mean some stress for the does, this was less important, since it did not even reduce the milk production on the day of shearing.

Figure 1

Lactation curve of control and sheared does



1. ábra: A kontroll és a nyírt nyulak laktációs görbéje

Nyírás(1), Fialás utáni napok(2), Napi tejtermelés(3), Nyírt(4), Kontroll(5)

Figure 1 also demonstrates a slightly higher running lactation curve in the sheared group after the 8th day of shearing. The mean milk production between the 8th and 28th days was 227 and 215 g in the sheared and control group, respectively; this means a 6% higher milk production as a consequence of shearing. The raising of milk yield after shearing could be associated with the higher feed intake. A close connection was demonstrated between feed consumption and milk production by *Szendrő et al.* (1999).

Shearing did not significantly affect the litter size of the actual litters (*Table 1*), as expected. Those suckling rabbits were born before the shearing, and since mortality generally peaks in the days after kindling, serious changes of the litter number were not expected after the 8th day.

Table 1

Effect of shearing on the litter size and litter weight

Traits (5)	Group (1)				Prob.
	Sheared (2)		Control (3)		
	n	Mean ± se (4)	n	Mean ± se (4)	
Litter size (6)					
at 21 days (7)	45	7.42 ± 0.13	47	7.53 ± 0.20	NS
at 28 days (8)	45	7.42 ± 0.15	47	7.45 ± 0.21	NS
at 35 days (9)	27	7.19 ± 0.17	27	6.89 ± 0.25	NS
Litter weight, g (10)					
at 21 days (7)	45	2499 ± 69	47	2376 ± 78	NS
at 28 days (8)	45	3525 ± 94	47	3386 ± 82	NS
at 35 days (9)	27	5816 ± 98	27	5318 ± 179	*

* P<0.05

2. táblázat: A nyírás hatása az alomlétszámra és az alomsúlyra

Csoport(1), Nyírt(2), Kontroll(3), Átlag±se (4), Tulajdonságok(5), Alomlétszám(6), 21 napos(7), 28 napos(8), 35 napos(9), Alomsúly, g(10)

The litter weight at the age of 21, 28 and 35 days was higher in the sheared group by 6, 4 and 9%, respectively (*Table 1*). The difference was significant (P<0.05) at the age of 35 days. According to the results the litter weight increased in parallel with the doe milk production, indicating that the surplus milk was effectively utilized.

Biostimulative effect of shearing

The shearing two days before insemination may have biostimulative effects. The catching of rabbits and the shearing procedure of 20–25 minutes, as well as the abolishment of heat stress and the increasing feed intake (*Finzi et al.*, 1992) may also separately positively influence the oestrus, conception and litter size.

In spite the expectations the conception rate of the two groups was totally identical; similarly, no difference was found in the litter size (*Table 2*). The difference (2 and 4%) found in the litter size total and alive was not statistically provable. The summer heat and the heat stress primarily increases the embrional mortality; it can thus be supposed that the slight difference between groups, with little better results in the sheared group, is attributable to the shearing. It is also possible that only two days were not enough to stimulate the oestrus.

The hair of 2.5 mm started to grow immediately; 2, 4, 6, and 8 days after the shearing the hair length was 7.5, 12.3, 19.9 and 25.2 mm (*Figure 2*). After 8 weeks the hair length nearly reached the initial length of 30 mm. The heat reducing effect of the hair shearing shows therefore a continuously decreasing tendency. At 3 and 6 weeks after the shearing 10 and 20 mm of hair is covering the body.

Table 2

Biostimulation effect of shearing on fertility and litter size

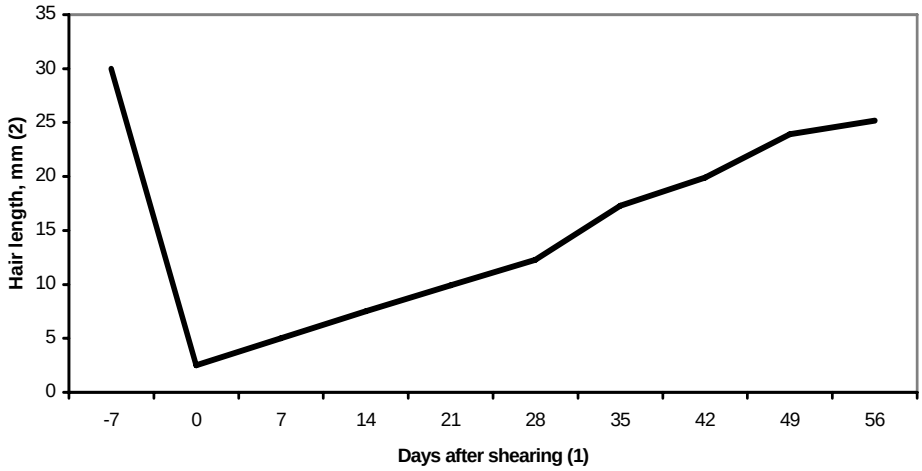
Traits (5)	Group (1)				Prob.
	Sheared (2)		Control (3)		
	n	Mean ± se (4)	n	Mean ± se (4)	
Fertility, % (6)	80	67.5	96	67.7	NS
Litter size (7)					
Total (8)	54	9.13 ± 0.38	65	8.95 ± 0.37	NS
Alive (9)	54	8.57 ± 0.38	65	8.26 ± 0.38	NS

2. táblázat: A nyírás biostimulációs hatása a vemhesülési arányra és az alomlétszámra

Csoport(1), Nyírt(2), Kontroll(3), Átlag±se (4), Tulajdonságok(5), Vemhesülési arány(6), Alomlétszám(7), Összes(8), Élve(9)

Figure 2

Hair growth after shearing



2. ábra: A szőr növekedése a nyírás után

Nyírás utáni napok(1), Szőrhossz, mm(2)

CONCLUSIONS

Based on this experiment it can be concluded that at hot climates (in the summer) hair shearing can reduce the negative effects of heat stress. Since shearing two days before insemination did not have any biostimulative effect, shearing can be performed independently of the timepoint of insemination. As does were sheared 8 days after the kindling, its positive effect on milk production could be detected only from this point on.

This indicates earlier shearing in case of this method, which can be performed even just after kindling. Milk production showed no decrease either on the days or after the shearing, therefore, the shearing event does not mean high stress. However, shearing by means of either a shearing machine or with any other method is of relatively high work demand (20 minutes for one rabbit), consequently, this method is rather recommended for smaller rabbit stocks.

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