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REPRODUCTIVE PERFORMANCE OF BUCKS WITH VARIOUS BEHAVIORAL TYPES IN NEW ZEALAND WHITE AND TERMOND WHITE RABBITS

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ABSTRACT

The aim of the study was to compare the reproductive performance of Termond White (TW) and New Zealand White (NZ) bucks with various behavioral types. The empathic and novel-object tests were implemented to determine the patterns in rabbit reactions: -Aggressive, -Tame and -Timid. The comparison of bucks' behavior with mating duration and fertility rate did not evidence significant relations. Further studies will be necessary before integrating behavior tests in rabbit bucks breeding programs.

Key words: Termond White rabbit; New Zealand White rabbit; behavioral test; reproductive performance

INTRODUCTION

The early report of the relation between behavior and productivity in animals was given by Hafez (1969). In rabbits, the demand for a better understanding of behavioral patterns in sustainable management was subsequently communicated by many Authors (Gacek, 1982, 2000; Bielański, 2000; Verga, 2000; Zając, 2005; Bartazzoli and Rivalori, 2008). The aim of the study was to estimate the reproductive efficiency of Termond White and New Zealand White bucks, expressing various behavioral types.

MATERIALS AND METHODS

Animals and experimental design

A total of 84 bucks (min. 6 months of age) of New Zealand White (NZ, n=42) and Termond white (TW, n=42) breeds were used in the study. Animals were kept in separate cages with constant supply of feed (17% of crude protein, 18% of crude fiber) and water. All experimental bucks were initially tested for their behavior and on the basis of these results, rabbits expressing distinct, unequivocal temperament types were mated with does and selected reproductive performance indices were calculated.
The following behavioral tests were performed:
A) empathic test (Gacek, 1999), determining the reactivity (from timid to aggressive behavior) for a red ribbon tied on a knot of a flexible rod, inserted through the grid mesh into the cage at the rabbit's eye level. We observed various types of behavior, that can be categorized as follows: 1. fearful - escaping in panic from the object, 2. avoidance - fleeing and freezing in the opposite side of the cage, closing eyes when the object approached, 3. indifference - no reaction even when object touched the body, 4. curiosity - approaching and contacting (sniffing, rubbing, biting) the object, 5. aggression - immediate attack towards the object (highly stretched body posture, snorting and snubbing).

B) novel-object test, previously used on rabbits to determine coping strategy in response to stressing factor (Verver *et al.,* 2009). The red cup was inserted to the cage and the dominating behaviors of the animal were recorded during each of the following 5 minutes.

The basis for the subsequent selection were the following behaviors of bucks: 1. rapid escape to the opposite side of the cage, 2. no reaction for the object, 3. sniffing the object without substantial movements, 4. rubbing and sniffing the object, 5. biting and moving the object.
For all experimental bucks (n=84) both tests were performed.

Results of both tests showed high repeatability, thus allowed to distinguish 3 sets of unequivocal behavioral patterns. From each breed, 10 bucks with most explicit types of behavioral reactions were selected: Aggressive, Tame and Timid.

Annual reproductive efficiency of each selected buck was recorded and evaluated using a) the elapsed time of mating (mounting and thrusting with ejaculation, Hoffman *et al.,* 2009); b) manual abdominal palpation on the 14th day after mating (Niedźwiadek, 1982), reflecting the efficiency of mating.

Statistical Analysis

The mating time and the results of the abdominal palpation (fertility rate) are presented in Table 1 as means. The significance of differences in mating time was calculated by Duncan's multiple range test and a chi square test was performed for fertility rate (Statgraphics Plus).

RESULTS AND DISCUSSION

Aggressive NZ bucks showed the shortest mating duration but not the highest fertility rate (Table 1). Tameness of bucks results in a high fertility rate regardless of the breed, but differences were not significant.

Table 1: Mating parameters for Termond white (TW) and New Zealand White (NZ) bucks with various behavior types

	Mating time (s)		Fertility rate (%)	
	TW (n=42)	NZ (n=42)	TW (n=42)	NZ (n=42)
Timid	26.8	30.4	68.4	54.2
Tame	14.3	18.4	71.6	75.6
Agressive	19.7	13.2	74.2	66.0

All differences were statistically not significant

It should be noted, however, that the specific behavioral style or type may be rather context specific, than a consistent pattern (Rödel *et al.,* 2006) in reaction to possible stressors.
Overall, our results showed that TW bucks showed high fertility rate (68-74%) regardless of the behavioral type, and NZ bucks tended to higher fertility for the Tame behavioral pattern (76%), but differences were not significant.
Moreover, it seems likely that the increase of tame character in the herd of sexually active bucks could result in a substantial shortening of the mating time in both breeds, but differences were not significant.

CONCLUSION

In our experimental conditions, we did not success in demonstrating that reproductive efficiency could differ when bucks express various behavioral types. Further studies will be necessary before integrating behavior tests in rabbit bucks breeding programs.

REFERENCES

Bartazzoli A., Rivalori S. 2008. Economic sustainability of rabbit farming innovations. *In: Proc. 9th World Rabbit Congress, 2008 June, Verona, Italy, 1509-1514.*

Bielański P. 2000. Wpływ warunków środowiskowych na wzrost królików niektórych ras i ich użytkowość rzeźną. *Rocz. Nauk. Zoot. 27(1), 375-508 (in Polish).*

Gacek L. 1982. Rozród królików w aspekcie etologicznym. *Hod. Drob. Inw., 2, 4-6 (in Polish).*

Gacek L. 1999. The proposal of a new behavioral test for the Polar fox. Empathic test. *Scientifur, 23(3), 201-205.*

Gacek L. 2000. Etologia królika w warunkach fermy przemysłowej. *Biuletyn Informacyjny IZ, 3, 81-90 (in Polish).*

Hafez E.S.E. 1969. Behaviour of domestic animals. *Harcourt Publishers, London.*

Hoffman K.L., Martínez-Alvarez E., Rueda-Moralez R.I. 2009. The inhibition of female rabbit sexual behavior by progesterone: Progesterone receptor-dependent and-independent effects. *Horm. Behav., 55, 84-92.*

Niedźwiadek S. 1982. Zasady hodowli królików. *PWRiL, Warsaw, Poland (in polish).*

Rödel H.G., Monclús R., von Holst D. 2006. Behavioral styles in European rabbits: Social interactions and responses to experimental stressors. *Physiol. Behav., 89, 180-188.*

Verga M. 2000. Intensive rabbit breeding and welfare: development of research, trends and applications. *In: Proc. 7th World Rabbit Congress, 2000 July, Valencia, Spain, Vol. B, 491-511.*

Zając J. 2005. Ocena efektywności produkcji żywca króliczego na podstawie wybranych cech użytkowych zwierząt w okresie odchowu. *Rocz. Nauk. Zoot., 32(1), 61-68 (in Polish).*

Verver C.M., van Amerongen G., van den Bos R., Hendriksen C.F.M. 2009. Handling effects on body weight and behaviour of group-housed male rabbits in laboratory setting. *Appl. Anim. Behav. Sci., 117, 93-102.*