PROCEEDINGS OF THE 11th WORLD RABBIT CONGRESS
Qingdao (China) - June 15-18, 2016
ISSN 2308-1910

Session
Ethology and Welfare

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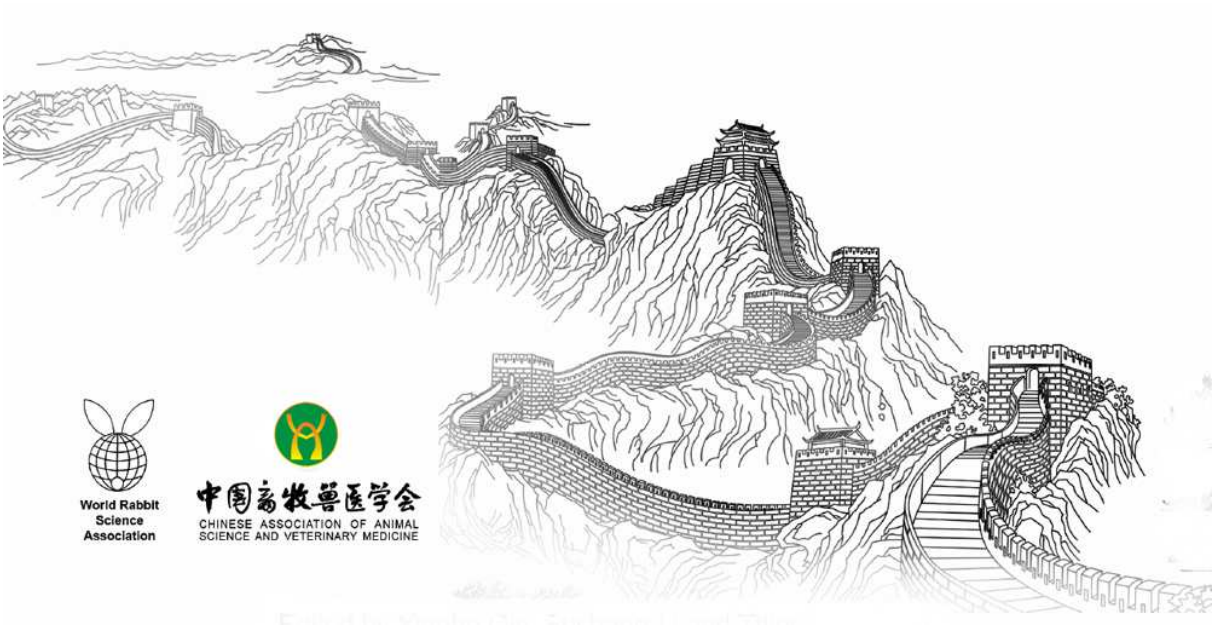
How to cite this paper :
Szendrő Zs., Matics Zs., Szabó R.T., Kustos K., Mikó A., Odermatt M., Gerencsér Zs., 2016 - Agressivity and its effect on lifespan of group housed rabbit does. Preliminary results*. Proceedings 11th World Rabbit Congress - June 15-18, 2016 - Qingdao - China, 719-722. + Poster*



AGRESSIVITY AND ITS EFFECT ON LIFESPAN OF GROUP HOUSED RABBIT DOES. PRELIMINARY RESULTS

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ABSTRACT

Aggressiveness is well known in different animal species, includes the European wild and domesticated rabbit. It is one of the main problem in group housing of rabbit does. The aim of the experiment was to investigate the frequency of aggressiveness in group housed does depending on the rank order and its effects on the lifespan of does. Four does and a buck were housed in a pen (7.7 m2). The ages of female rabbits were the same (homogenous, HOM), or one of them was almost 1 year old (heterogeneous, HET). 24-hour video recordings were taken during the first month after establishing the group, and the aggressive actions (fights) were counted. The lifespan (number of kindling and culling or death) was examined during a 200-day experimental period. The numbers of fights were 154 and 108 in groups HOM and HET, respectively. The dominant does had attacks against to the other does 77 times and the doe in the last position 5 times in HOM group, the same figures were 92 and 5 in HET group. The number of attacks by does in position 2 and 3 were 35 and 37 in HOM group and they were 7 and 4 in HET group, respectively. In HET group the older doe clearly occupied the first rank position, in HOM group more competitors fought for a better position, so the group stability was better in HET than in HOM group. Some differences were found in mortality of does in HOM and HET groups, however the number of rabbit does was very few to find any significance. It can be concluded that the aggressive behaviour is frequent in group housing systems which is contrary to welfare.

Key words: Rabbit does, aggressive behaviour, rank order, lifespan.

INTRODUCTION

Aggression is a common behaviour pattern in animal species. They often use aggressive behaviour to defend a resource, to compete for mates, to fend off predators or during foraging. It is common in wild and domesticated rabbits.
In wild rabbit does the aggressiveness starts at the beginning of breeding season, and the frequency of fighting declines after group stability (Southern, 1948; von Holst *et al*., 2002). Female and male of wild and group housed domesticated rabbits form independent linear ranking order, and often an older animal is in the dominant position of a group (Mykytowycz, 1958; Albonetti *et al*., 1990). Fighting between females is most pronounced at the outset of the reproductive season (von Holst *et al*., 2002). The reproductive success and lifespan of females depends on their social ranks (von Holst *et al*., 2002).

In group housing systems one of the main problems is the aggressiveness, fighting and injuries, which are contrary to welfare (Szendrő *et al*., 2016). In the experiments when the does were housed continuously together, the aggressive behaviour declined after establishing the social rank order, while in semi-group housing systems the aggressive behaviour and fighting intensified after each regrouping (Szendrő *et al*., 2016), however the productivity of does was much better in the latter case.

The aim of the investigation was to evaluate the aggressive behaviour and its effect on lifespan of group housed does.

MATERIALS AND METHODS

Animals and experimental design

The experiment was conducted at the KaposvárUniversity using maternal line (Pannon Ka) rabbit does of the Pannon Rabbit Breeding Program. Does at the same age (17 weeks, homogenous group, HOM) or different ages (three does were 17 weeks old and one doe was one year old; heterogeneous group, HET) were housed according to the recommendation of an animal protection group (Vier Pfoten). Four does and one buck were placed in each pen, with a basic area of 7.7m2. Within the pen, half part of the basic area was covered with straw, whereas the other part was made of plastic-mesh. Every pen was equipped with a large sized feeder, five nipple drinkers, hay rack, four wooden nest boxes and a plank tube for hiding. The temperature in the room was 15-17oC, and it was illuminated by natural light, and artificial lighting was used to achieve 16 h of light. Rabbits received a commercial pellet *ad libitum*. The does had free access to hay. Water was available *ad libitum* from nipple drinkers.

Video recording

Infra-red cameras were fixed above the pens. Continuous 24-hour video recording was made during the first month after grouping the rabbits. The fur of rabbits was marked differently to follow their behaviour. All aggressive behaviour (the attacker and attacked animals) were recorded.

Daily and hourly events and social rank order were evaluated. The connection between the social rank order and lifespan (number of kindling and culled or dead does) during 200 day period was also evaluated.

Statistical Analysis

Based on the data of observation we calculated the dominance score (number of initiated attacks divided by the total number of interactions). The dominance score was evaluated by crosstabs method with SPSS 10.0 software package.

RESULTS AND DISCUSSION

Number of aggressive interactions among does in HOM or HET groups during the first month after establishing of the groups are shown in Figure 1. It is not clear why aggressiveness was not observed in the first week in HOM group. Next week the number of fights increased to 22 on day 10, however later it was about 5 per day without a clear decreasing tendency. In HET group the peak of aggressiveness was on day 5, however generally it was less than 5 times per day.

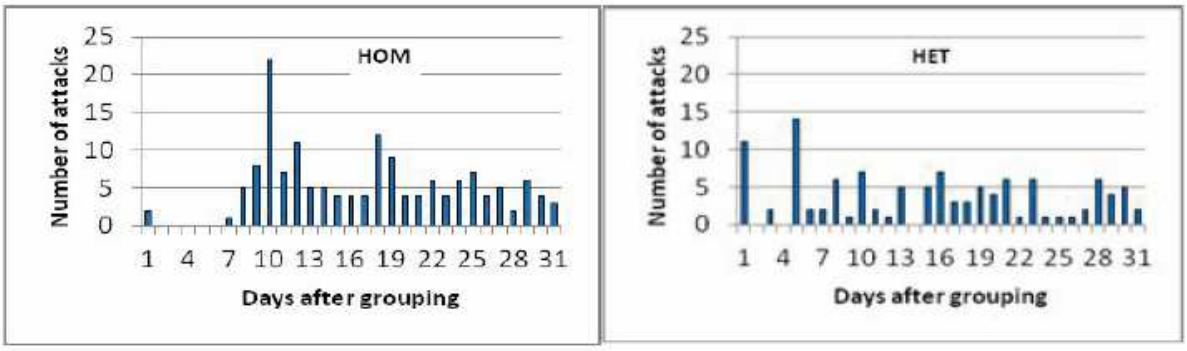

Figure 1: Number of attacks among does in HOM (homogenous) and HET (heterogeneous) groups during one month after establishing the groups

Agonistic behaviour among does mainly takes place in the first days after grouping of does (Albonetti *et al*., 1990). Regrouping of does after a 3-week isolation phase (individual housing), the aggressive behaviour and injuries are very frequent (Andrist *et al*., 2012, 2014; Rommers *et al*., 2014), however after some days the number of fights significantly decreased. In the present investigation the aggressive interactions were not prominently frequent after establishing the group, they decreased only slightly. Number of attacks was higher in HOM than in HET group, which could be in connection with instability of dominance hierarchy (Rödel *et al*., 2008).

Daily occurrence of fighting is shown in Figure 2. Higher frequencies of fights can be seen early morning after lights on in the HOM and HET groups, respectively. The resting period is near to noon with very low level of aggressiveness, and number of fights increased in the afternoon

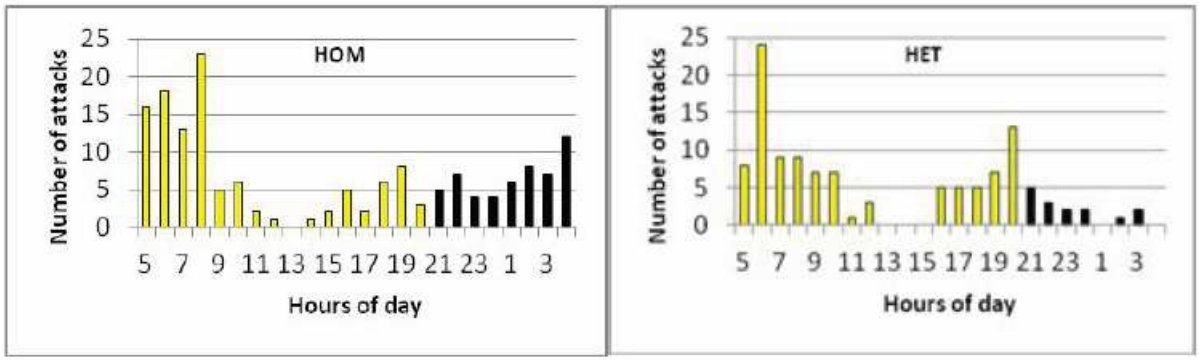

Figure 2: Daily occurrence of attacks in homogenous (HOM) and heterogeneous (HET) groups (daytime: yellow columns, night: black columns)

The dominance scores of Doe1, 2, 3 and 4 were the followings: 83%; 78%, 39% and 7% in HOM group and 96%, 58%, 11% and 7% in HET group, respectively. In the HOM group the difference of dominance scores was not significant between the Doe1 and 2 (P=0.480), but Doe3 and 4 differed significantly from each other and from Doe1 and 2 (P<0.001). In the HET group Doe1 and 2 differed significantly from each other (P<0.001), but the difference between Doe3 and 4 was not significant (P=0.460). The number of attacks was in close correlation with the position in the social rank order (Table 1). The dominant does had attacks against to the other does 77 and 92 times, and the doe in the last position attacked the other does 5 and 5 times in HOM and HET groups, respectively. The dominant doe was attacked by the subdominant does only 16 and 4 times in HOM and HET groups, respectively.

Table 1: Number of fights in homogenous and heterogeneous groups (attacker and attacked does) during a month after grouping

Attacked	Homogenous group (HOM)					Heterogeneous group (HET)				
	Attacker				**Total**	Attacker				**Total**
	Doe1	Doe2	Doe3	Doe4		Doe1	Doe2	Doe3	Doe4	
Doe1	-	6	7	3	**16**	-	0	1	3	**4**
Doe2	8	-	2	0	**10**	3	-	0	2	**5**
Doe3	51	4	-	2	**57**	30	2	-	0	**32**
Doe4	18	25	28	-	**71**	59	5	3	-	**67**
Total	**77**	**35**	**37**	**5**	**154**	**92**	**7**	**4**	**5**	**108**

According to Mykytowycz (1958) the social hierarchies are based on the fights among wild rabbits. Younger females usually occupy lower social rank positions than the older ones (von Holst, 1998). This is why in HET group the older and stronger doe clearly occupied the first rank position, and in HOM group more competitors fought for a better position, so the group stability was better in HET than in HOM group. Because of the aggressiveness the stress hormone level was three times higher in the group housed does than in the individually caged ones (Szendrő *et al*., 2013).

In the HOM group Doe1 had 2 litters, Doe3 and 4 had 1 litter each, and Doe2 did not have litter. All of the does died within 4 months after the group was established. In the HET group Doe1 had 1 litter, Doe2 had 3 litters with *post partum* fertilization, and Doe3 and 4 had 2 litters each with *post partum* fertilization. Only one doe (Doe4) died 3 months after the group was established. During the whole experiment period (200 days) all died does were of poor condition. Symptoms of diseases were not observed (Szendrő *et al., 2012).* It is known in wild rabbits that there is a connection between the position in the social rank order and the productivity (number of litters, newborn and weaned kits), and the lifespan of does (von Holst *et al*., 2002). The number of rabbit does in the present experiment was very few to find any clear tendency, however the higher mortality in HOM group is consistent with the observation of Rödel *et al*. (2008).

CONCLUSIONS

The results of this experiment confirmed, that the aggressive behaviour is a general problem in group-housing systems which is contrary to welfare.

ACKNOWLEDGEMENTS

The experiment was supported by the János Bolyai Research Scholarship (BO/00373/14/4) of the Hungarian Academy of Sciences, AGR_PIAC_13 and by the ANIHWA RABHO (Rabbit housing) project.

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AIM

The aim of the investigation was to evaluate the aggressive behaviour and its effect on lifespan of group housed does.

MATERIAL AND METHODS

Four does and one buck were placed to the pens with a basic area of 7.7 m^2. Half of the floor was covered with straw, and the other part was consisted of plastic-mesh.

Based on the age of does two different groups were formed:

- in the homogenous group (**HOM**) at the time of grouping each does were 17 weeks of age;
- in the heterogeneous group (**HET**) one doe was one year old and the others were 17 weeks old.

Using infrared cameras, 24-hour recordings were performed throughout the one-month experiment.

RESULTS

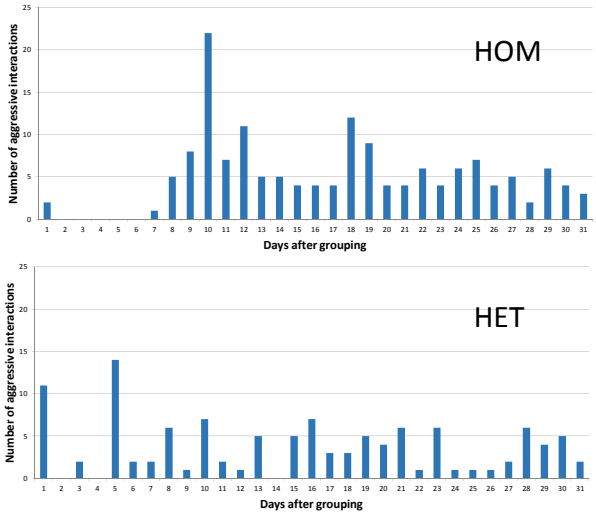

Figure 1: Number of attacks among does in HOM and HET groups during one month after establishing the groups

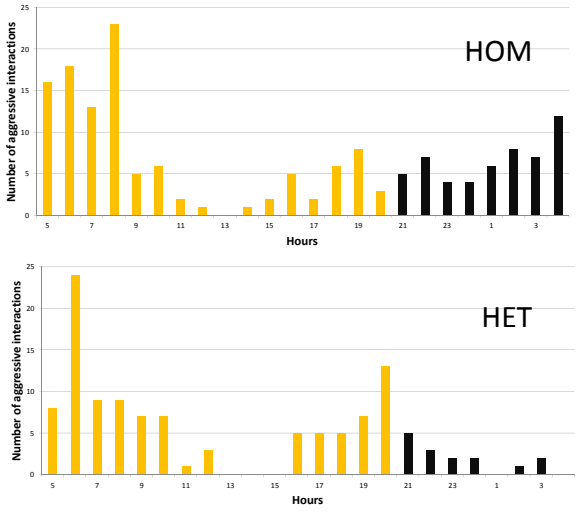

Figure 2: Daily occurrence of attacks in HOM and HET groups (daytime: yellow columns, night: black columns)

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CONCLUSION

The results of this experiment confirmed, that the aggressive behaviour is a general problem in group-housing systems which is contrary to welfare.