

# GROUP HOUSING FOR MALE RABBITS

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**Abstract** - The aim of the study was to determine if the injuries and the aggressive behaviour in fattening groups with male rabbits are influenced by the factors age, group size and group composition. 23 male, 12 female and 20 mixed-sex groups of different sizes (4-70 animals) were examined for injuries between 60 and 80 days of age over a period of four years. The groups with a density of 5.2 to 8.2 animals per m<sup>2</sup> were divided into four categories (<10, 10-15, 16-30 and ≥40 animals). Results showed a significant ( $P < 0.01$ ) increase in number and severity of injuries in larger groups. In groups with 16-30 and ≥40 animals there were more animals with three and more injuries than in groups with <10 and 10-15 animals (20.7% and 20.5% vs. 5.6% and 6.8%). The aggressive behaviour and group movements caused by aggressive and sexual actions were recorded in 15 groups. The frequency of aggressive behaviour was higher in larger groups. Other factors must be studied to reduce the risk in the keeping of male fattening rabbits in groups.

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## INTRODUCTION

In the past few years, new housing systems have been developed for the breeding and fattening of rabbits in meat production because experience has shown that standard cage housing is not adequate to the animals' needs. The lacking possibilities for movement in cages, for example, lead to changes in locomotion regarding behavioural morphology and to skeletal changes, the lacking possibilities for activity lead to stereotypes and the absence of environmental structures results in panic reactions and restlessness (LEHMANN, 1984; LOEFFLER *et al.*, 1991; STAUFFACHER, 1992).

In order to keep rabbits in accordance to the animals' needs we think it essential to supply sufficient space and, on the other hand, not to keep young rabbits isolated. Wild rabbits are active and gregarious animals and studies of behaviour showed that in spite of domestication the behaviour of domestic rabbits still corresponds largely to the behaviour of wild rabbits (STODART & MYERS, 1964).

The new housing systems keep fattening rabbits in small or large groups on floors with straw or with grids. These group housing systems provide the fattening rabbits with sufficient possibilities for movement because the collective use of the overall surface offers more space relative to the single animal. The pens are equipped with possibilities for withdrawal and with activity objects and are divided into different areas.

The Swiss Order on Animal Protection (SOAP) of 1991 contains the following regulations concerning occupancy, group housing and minimum dimensions for the keeping of fattening rabbits:

Rabbits shall be provided daily with coarse roughage such as hay or straw and elements which they can gnaw shall always be available. Generally, young rabbits shall not be separated from each other for the first eight weeks of life. Cages shall have a darkened area where animals can retire. They should have the possibility for species-specific movement (e.g. hopping, jumping). Immature rabbits over 1.5 kg shall be provided with an overall cage surface including raised areas of 5000 cm<sup>2</sup> in minimum. For up to 40 animals the surface per animal shall be 1500 cm<sup>2</sup>, for more than 40 animals 1200 cm<sup>2</sup>. The minimum height of at least 35% of the total cage area shall be 50 cm.

Compared to the requirements of the SOAP, the standards for space requirements defined in the recommendations of the German group of the WRSA (1992), for example, are significantly lower.

For economic reasons larger groups are desirable because they need less surface and the equipment is less expensive. For female animals this housing system is unproblematic for the whole duration of the fattening period.

On the other hand, in the group housing of male fattening rabbits problems may occur as has been shown by experience and literature (PODBERSCEK *et al.*, 1991; LEHMANN, 1989; BIGLER & OESTER, 1994; VENUS, 1994): At the beginning of sexual maturity, aggressive conflicts involving biting, chasing and fighting may occur and lead to serious injuries (BIGLER & OESTER, 1994). This aggressive behaviour is often related to mounting and driving.

These conflicts, which are problematic with regard to animal welfare, vary in degree and are probably influenced by different factors. The prematurity of the strain, lighting, feeding, a lack of possibilities for escape and withdrawal, group size and group composition may be responsible for an early sexual development and the related aggressive behaviour.

Because group housing has positive effects on locomotion and occupancy and to a great extent on the social behaviour and because it is regarded as an alternative to cage housing, it should be attempted to overcome the problems concerning the fattening of male rabbits.

In our study we intended to clarify the effect of the group size on the frequency of injuries and on the aggressive and sexual behaviour.

## MATERIAL AND METHODS

During a period of four years, we observed a total of 55 groups of fattening rabbits of different group sizes. 23 of them were male groups, 12 were female groups and 20 were mixed-sex groups. The percentage of male animals in the mixed-sex groups varied between 33% and 56%. The animals under observation were German and French fattening hybrids.

The fattening rabbits were kept in pens without or with partial bedding, as they were used in practice at this time. In addition, a small number of groups were held in fattening cages, in floor pens or in wooden cages with bedding. The density in the different groups was 2.1 to 8.2 animals per m<sup>2</sup> with an total average of 6.2.

To evaluate the influence of group size on injuries, a total of 913 animals were examined for injuries caused by claws and biting, for bare spots in the fur and for various symptoms of disease. For all groups these check-ups took place at the latest possible date before slaughtering and for 23 groups there was an earlier additional examination around the 75th day of life. The injuries were recorded with additional remarks on their nature, number, size and location and were rated as follows:

- Minor injuries (unproblematic). These are small and superficial injuries that heal quickly and that disappear completely after a short time (e.g. superficial scratchiness, abrasions).
- Fairly serious injuries (problematic). They take longer to heal and are rated as relevant for evaluation even if the animals show no obvious reactions of pain.
- Serious injuries (very problematic). These are deep respectively. large and inflamed or purulent injuries that heal only badly; the animals often show reactions of pain (e.g. muscular injuries).

At the station for examination in Zollikofen and on a commercial rabbit farm 13 resp. 2 groups of different sizes were subject to behaviour observations. 4 groups were observed around the 75th and the 84th day of life on two successive days from 6.00-9.00h in the morning and from 18.00-20.00h in the evening. The other 11 groups were observed around the 75th and the 84th day of life on only one day during the same hours.

Data were collected on all events on the following parameters (BIGLER & OESTER, 1994): the aggressive behaviour patterns 'nudging' (strong thrusting and fur pulling of the consort), 'attacking/biting', 'fighting', the sexual behaviour patterns 'mounting' and 'mounting attempts', 'group movement caused by sexual and aggressive actions' (group movement was defined as the common moving away of several animals as a result of a sexual or aggressive action; observation categories were formed depending on the number of animals concerned: 3-5, 6-10, >10 animals).

To evaluate the examination results, the fattening groups were divided into four categories with <10, 10-15, 16-30 and ≥40 animals. The density of animals varied in the different categories between 3.4 and 6.0, 2.1 and 6.1, 2.1 and 7.3 respectively. 7.2 and 8.1 animals/m<sup>2</sup>.

The statistical program 'Statgraphics-plus' with analysis of variance for the injuries and Spearman rank correlations for the behaviour was used for the statistic evaluation.

## RESULTS

### Injuries

From 43 groups counting 715 animals held in both male and mixed-sex groups, 38.4% of all animals showed injuries (aged up to 91 days; 26.6% minor injuries, 8.7% medium and 3.1% serious injuries).

Figure 1 shows that from the 12 groups with less than 10 animals 75% of the animals had no injuries, 18% had minor and 7% had medium injuries. In groups of this size no serious injuries were detected. From the 11 groups with 10-15 animals 23% of the rabbits had minor, 4% medium and 2.5% serious injuries. From the 9 groups with 16-30 animals 28% of the rabbits showed minor, 7% medium and 5% serious injuries. The 11 groups of the category with the highest number of animals ( $\geq 40$  animals) showed also the highest number of injured animals: 38% of the animals had minor injuries, 16% medium and 5% serious injuries. Larger group sizes were therefore related to an increase in the number of injured animals in both male and mixed-sex groups. The share of medium and serious injuries was also higher. The influence of group size on injuries was confirmed by variance analysis ( $P < 0.01$ ).

The categories with 16-30 and  $\geq 40$  animals showed more animals with three or more injuries than the categories with  $< 10$  and 10-15 animals (20.7% and 20.5% vs. 5.6% and 6.8%). All in all, the increase in group size also results in a higher number of injuries per animal.

In the groups with  $< 10$  animals the injuries were often located on the trunk (50%) and in the head area (34%) and less often in the anogenital area (16%). The category with 10-15 animals showed similar results with a slightly higher percentage of injuries on the trunk. The category with 16-30 animals showed some more injuries in the anogenital area (29%). More than half of the injuries in the large groups were located in the anogenital area (58%) and about the same number on the head and the trunk.

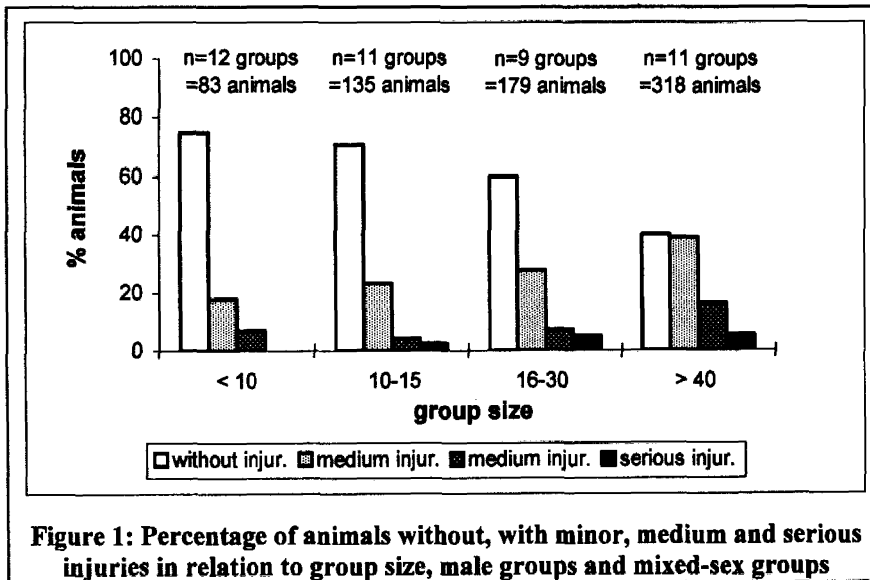


Figure 1: Percentage of animals without, with minor, medium and serious injuries in relation to group size, male groups and mixed-sex groups

Further factors that were examined for their influence on the occurrence of injuries were age and group composition:

From the 24 groups that were examined two times, one third of the groups with up to 15 animals counted a higher, one third an equal and one third a lower number of injured animals between the 70th and the 80th day of life. From the 13 groups with between 15 and 45 animals ten groups showed a higher total of injured animals after about ten days and the number of animals with medium and serious injuries had also increased.

Regarding group composition it became obvious that the frequency and the seriousness of injuries in purely female groups was significantly lower than in groups with males (variance analysis;  $P < 0.05$ ). In purely female groups (group size 7-65 animals) only 20% of the animals were injured. There were no serious injuries and only few animals had medium injuries (2%). Between the male and the mixed-sex groups no difference was noted in relation to the frequency of injuries.

### Aggressive behaviour

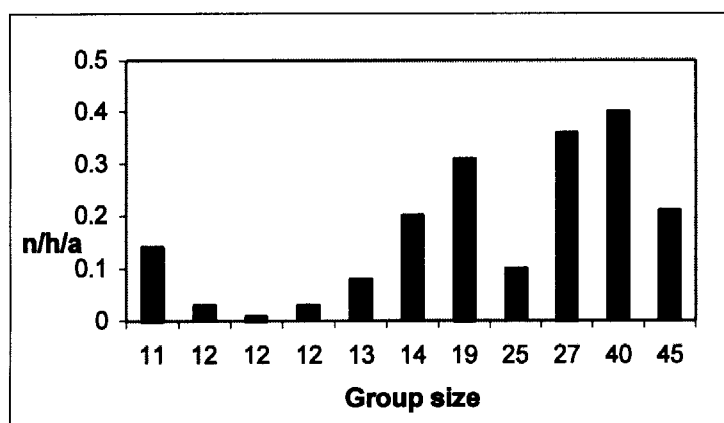
The 15 groups under observation (male and mixed-sex groups) showed a higher frequency of aggressive encounters per hour in relation to an increase in group size (Spearman;  $P < 0.01$ ).

In the 11 mixed-sex groups also the frequency of aggressive encounters per hour and per animal was higher with increasing group size (Spearman;  $P < 0.05$ ).

There were groups with a very high resp. very low number of conflicts.

12 out of a total of 15 groups displayed an increase in the frequency of aggressive behaviour from the age of 75 to 84 days.

In all group sizes most of the aggressive encounters consisted of one attack and involved only two animals. In the small groups this kind of aggressive behaviour counted more than 90% of all encounters and was more frequent than in the medium and large size groups with 74% resp. 65% of the encounters. With increasing



**Figure 2: Number of aggressive behaviour per hour and per animal in relation to group size in mixed-sex groups**

aggressive behaviour of the animals were less frequently recorded in the small groups than in the groups of medium or large size.

Mainly males were behaving aggressively towards other males or females. Although females attacked other females, they hardly ever attacked males.

## DISCUSSION

Group size has an influence on the nature of injuries, even if, because of the high variance, between some group sizes there was no difference. Between the category with  $\geq 40$  animals and the smallest two categories there is a clear difference in the frequency of injuries, though. The figures of the groups with 16-30 animals are also distinctly higher than those of the groups with less animals.

Although in large groups the danger of numerous and serious injuries is higher, group size is not the only cause as there are also large groups where the frequency of injuries is low and small groups where it is high. It can be supposed that there are other factors with higher impacts in larger groups, such as individuality, stocking density, housing systems with different shelters and possibilities for avoiding each other, lighting, etc.

The examination of the group composition factor shows that in respect to injuries female groups contrast positively with the mixed-sex and the male groups. The few and only minor injuries are no problem in practice. Contrary to our expectations, there was no difference between male and mixed-sex groups.

The frequency of aggressive behaviour increases with larger group sizes: in groups with 10-15 animals aggressive encounters occur less often than in groups with 16-30 and  $\geq 40$  animals. Larger groups do not only have more active animals that 'make trouble' and more aggressive actions because there are simply more animals, but the whole social hierarchy seems to be endangered. Along with increasing group sizes the conflicts become more serious and more complicated. Instead of taking place only between two animals, as they normally do, they expand into several successive attacks involving several animals. The animals probably 'lose control in stressful situations', which leads to undirected aggressive behaviour. Under these spatial and social conditions the animals are obviously only partially able to establish a stable social hierarchy (LEHMANN, 1989).

According to VENUS (1994) the density should not have influence on the frequency of aggressive behaviour.

Group movements caused by sexual and aggressive actions showed similar features in relation to group size: increasing group sizes resulted in a higher number of group movements. In larger groups more animals are involved in these actions than in small groups. Social conflicts or sexual behaviour patterns often seem to spread to other group members in larger groups.

## CONCLUSIONS

If we take the same limits for the assessment of animal welfare as in BIGLER & OESTER (1994), where the percentage of the animals with medium and serious injuries had to be  $< 10\%$ , the frequency of injuries of one third of the 12 smallest groups (up to 9 animals) has to be rated as too high. This applies also to 18% of the

rabbits in groups with 10-15 animals (n=11), to 56% of the rabbits in groups with 16-30 animals (n=9) and to 64% of the animals of the largest groups (n=11). Therefore, the group size with 10-15 animals shows the best result.

It is impossible to completely avoid aggressive conflicts in the group housing of male fattening rabbits. Their aggressiveness is relatively high, a fact that is also known for wild rabbits. The restricted provision of space in fattening systems prevents the animals from fleeing over long distances and from avoiding encounters as they do in their natural environment. Nevertheless, group housing under the presented conditions should be promoted because compared to cage housing it offers many advantages to the fattening rabbits. We are convinced that in spite of the difficulties founded on the rabbits' biology group housing is possible. Therefore, the objective must be to keep the risk of the occurrence of injuries caused by aggressive conflicts and relevant to evaluation as low as possible. The measures that have to be taken and the risk of injuries that is acceptable are still unclear.

Different approaches to further measures could be the slaughtering at an earlier age (11 weeks), because in Switzerland and in Germany rabbits are sold with a relatively high slaughtering weight, an optimum enrichment of the pens or the retardation of sexual maturity.

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**Gruppenhaltung männlicher Mastkaninchen** - Ziel der Untersuchung war festzustellen, ob und wie stark das aggressive Verhalten und die Verletzungshäufigkeit in Mastkaninchengruppen mit Männchen durch die Faktoren Gruppengröße, Alter und Gruppenzusammensetzung beeinflusst werden. Über einen Zeitraum von vier Jahren wurden 23 Männchen-, 12 Weibchengruppen und 20 gemischtgeschlechtliche Gruppen unterschiedlicher Größe (4-70 Tiere) auf Verletzungen hin kontrolliert. Die Gruppen mit einer Besatzdichte von 5.2-8.2 Tiere pro m<sup>2</sup> wurden in vier Größekategorien unterteilt (<10, 10-15, 16-30 and ≥40 Tiere). In 15 Gruppen wurde das aggressive und sexuelle Verhalten sowie Gruppenbewegungen aufgrund aggressiver und sexueller Aktionen erhoben.

Mit zunehmender Gruppengröße stieg der Anteil der verletzten Tiere in den Gruppen mit Männchen signifikant an (P<0.01). Die Häufigkeit der mittleren und schweren Verletzungen nahm entsprechend zu. Die Häufigkeit aggressiven Verhaltens war in größeren Gruppen höher. Damit die Gruppenhaltung der Männchen in der Praxis möglich ist, müssen die weiteren Faktoren ermittelt werden, die es erlauben, das Risiko von Verletzungen möglichst gering zu halten.

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