Weight Variation Trends in Juvenile and Adult Male Pair Housed New Zealand White Rabbits (Oryctolagus cuniculus)

Lisa Burlington BS, LVT, LATG, Sarah Thurston BS, LAT, CLABP, Patrick Lester MS, DVM, DACLAM
Refinement and Enrichment Advancements Laboratory, Unit for Laboratory Animal Medicine

Background

- New Zealand White (NZW) rabbits (Oryctolagus cuniculus) are a social species, and per regulatory and welfare standards, should be housed in groups or pairs whenever possible.
- There is little information regarding pair housing male rabbits.
- In addition to aggression concerns with same-sex-housed male rabbits, there is also the possibility of food hoarding by the dominant rabbit, preventing the subordinate rabbit(s) access to necessary resources thus confounding longitudinal age-weight matched studies.
- To ensure that the socially housed rabbits in our large transgenic colony are receiving sufficient nourishment, we performed a preliminary evaluation of weight trends in addition to Body Condition Scores (BCS) of pair housed juvenile and adult male rabbits.
- It was hypothesized that stable pairs would have weights comparable to age matched single housed rabbits and the BCS would not vary more than 2 over a 5-BCS scale.

Materials & Methods

We compared the body weight and BCS of male, single and pair housed, age matched, NZW transgenic rabbits. Body weight(kg) was collected using a portable scale (Ultrababy Scale, My Weight, Phoenix AZ). BCS was assessed following the characteristics of the Rabbit Size-O-Meter (Pet Food Manufacturers' Association, London, UK). Fig.1. A ration of % cup LabDiet 5326 (LabDiet, St. Louis MO) chow and a handful of Western Timothy hay (Dietary Animal Health, Omaha, NE) was provided daily per rabbit. All rabbits were monitored daily for appetite and other health concerns. Pair housed rabbits were also assessed for behaviors indicating pair incompatibility. If pair housed rabbits varied by more than 1 BCS, were consistently losing weight, or varied more than 20% in body weight, this would qualify them for separation. All rabbits were housed in Allentown cages, and pair housed rabbits were provided double cages with the dividers removed (Allentown Inc., Allentown, NJ). Nontoxic Ketchum markers (Ketchum Manufacturing Co., Brooklyn, NY) were used to create distinguishing marks on pair housed rabbits to assist with individual identification. Data was analyzed using an unpaired, nonparametric, Mann-Whitney test with GraphPad Prism (GraphPad Software, San Diego, CA).

The study was divided into three groups:
- Juvenile males - 12 single and 18 pair housed rabbits assessed at 6 weeks of age (weaning), and 16 weeks of age (sexual maturity).
- 10 month old males - 4 single and 4 pair housed rabbits were assessed and compared at 6 weeks and 10 months of age.
- 12 month old males - 2 single and 4 pair housed rabbits assessed every three months over a 9-month period.

The study was divided into three groups:

- Juvenile males - 12 single and 18 pair housed rabbits assessed at 6 weeks of age (weaning), and 16 weeks of age (sexual maturity).
- 10 month old males - 4 single and 4 pair housed rabbits were assessed and compared at 6 weeks and 10 months of age.
- 12 month old males - 2 single and 4 pair housed rabbits assessed every three months over a 9-month period.

Study Results

**Lane Variations Trends in Juvenile and Adult Male Pair Housed New Zealand White Rabbits (Oryctolagus cuniculus)**

**Study Conclusions**

- Pair housing male rabbits does not lead to significant weight or body condition variation.
- There were no significant differences in weight between single and pair housed rabbits at 6 weeks, 16 weeks, 10 months or over 12-18 months of age.
- The BCS of single and pair housed rabbits ranged from 2-4. The majority of all rabbits were a BCS of 3.
- The body condition of the older rabbits had the most variation regardless of pair housing status. 5/6 of the 12-month old rabbits had a BCS of 2 (one single housed rabbit and two rabbits from the same pair).
- During the physical evaluations of the rabbits, 2 single housed males and 3 pair housed males were noted to have stereotypies and/or minor signs of aggressive behavior including urine staining and minor superficial lesions. These rabbits were placed on an increased enrichment program2 and the pair housed rabbits remained together. The conditions improved or resolved for all of the noted single housed rabbits and pair housed rabbits.

Discussion

'Social housing male NZW laboratory rabbits is a highly debated topic due to concern that social hierarchy may confound research results. Aggressive behaviors, including food hoarding by the dominant rabbit, may lead to improper weight distribution and pair housing status. A previous study using pair housed female NZW rabbits concluded feeding behavior, weight, and growth rates of dominant and subordinate rabbits were similar, indicating social hierarchy does not interfere with the health status. In this study we have shown that stable male pairs maintain and gain body weight and compression similarly to single housed male rabbits. To ensure healthy animals and prevent compromising research, it is important to set up a routine process to assess the behavior, weight and body condition of all NZW rabbits.'

References


Acknowledgements

- Dr. Eugene Cheung’s Laboratory and the Center for Advanced Models and Translational Sciences and Therapeutics for the generous use of their rabbit colony
- ULM Husbandry - Rabbit Social Housing Team

The Unit for Laboratory Animal Medicine is part of the University of Michigan Medical School which represents our research and academic stature.