

Guidelines for the Establishment and Use of Mouse Breeding Groups

This ARAC Guideline is intended to define the parameters for the establishment and maintenance of mouse breeding groups consisting of one male and up to four females. Mouse trio breeding groups (defined as one male and two adult females) have been used successfully at the NIH and other institutions for several decades, especially for strains that are difficult to propagate. The use of continuous trio breeding groups can result in a higher breeding efficiency by permitting breeding at the first post-partum estrus and facilitating pup survival through cross fostering. The Jackson Laboratory recommends mouse trio breeding groups, stating that “Most strains produce more progeny per cage if mated as trios because all adult cage mates generally help care for the young.”¹ Harem mating (defined as one adult male and 3 or 4 adult females) maximizes the progeny of an individual male but sacrifices the first post-partum estrus. Harem mating is an option for projects that require an intensive breeding program.

The discussion of rodent cage size and density in Chapter 3 of the 8th Edition of the *Guide for the Care and Use of Laboratory Animals (2011 Guide)* makes it clear that institutions should use the *2011 Guide's* space recommendations as a starting point for determining caging requirements. Furthermore, the *Guide* identifies examples of performance indices (page 55) to assess the adequacy of housing which include the animal(s) health, reproduction, growth, behavior, activity, and use of the space. Both the NIH Office of Laboratory Animal Welfare (OLAW) and the Association for Assessment and Accreditation of Laboratory Animal Care, International (AAALAC) have stated that mouse cages of the size commonly used in the United States may be appropriate for trio breeding groups. A mouse litter size can vary greatly depending on the age of the female or whether you are dealing with an inbred or outbred strain. The *Guide* requires that sufficient space be available for mothers and litters to allow pups to develop to weaning without detrimental effects for the mother or litter. Each program/facility's ACUC is responsible for the review and approval of a policy for mouse breeding groups that takes into account the number of adults, number of pups and age of various litters to ensure the adequacy of cage space.

Investigators who decide that trio breeding groups or harem mating would be a beneficial breeding strategy for their research must accept responsibility for any overcrowding in their colony and follow the following guidelines:

- 1) Trio breeding groups are best suited for the propagation of inbred, transgenic, or other strains of mice which generate small numbers of pups or are difficult to breed. Outbred crosses, hybrid crosses, intra-specific crosses or any other crosses that produce larger litters are best propagated by a monogamous (defined as one male and one female) breeding strategy.
- 2) Investigators using a breeding strategy that includes trio breeding groups must be aware that they have increased responsibilities to ensure “the adequacy of cage space” for all animals. These increased responsibilities include the prompt weaning of mature pups at twenty-one (21) days or less and the prompt separation of animals if the cage density becomes greater than that established by the facility or program. In addition, “difference in the age of the pups of different litters, growth rate, cage dimensions, and husbandry practices such as cage sanitation, etc.”² may require an Investigator's prompt attention and intervention.
- 3) When harem mating strategies are used, the investigator must see that pregnant females are removed and placed into another cage before parturition. There may be no litters born in cages where harem breeding is conducted.

References

¹Breeding Strategies for Maintaining Colonies of Laboratory Mice: A Jackson Laboratory Resource Manual. 2009. http://www.aaalac.org/accreditation/faq_landing.cfm#Ctrio

²Trio Breeding (AAALAC FAQ), 2012. http://www.aaalac.org/accreditation/faq_landing.cfm#Ctrio