As of Monday, November 20, 2017, this policy has been retired and transitioned into a guideline. All procedures and requirements remain in effect and can now be found in the **Guidelines on Mouse and Rat Breeding and Housing Management**.

Questions or concerns should be directed to your ULAM Faculty Veterinarian. If you don't know your ULAM Faculty Veterinarian, please send an inquiry to ulam-questions@umich.edu and your question will be routed appropriately.

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**Updated U-M Policy on Mouse and Rat Breeding and Cage Densities**

**Frequently Asked Questions**

Additional questions or concerns not answered here should be directed to your ULAM Faculty Veterinarian. If you don’t know your faculty veterinarian, please send an inquiry to ulam-questions@umich.edu and your question will be routed appropriately.

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**GENERAL FAQS**

**Why did the University make this policy change?**

The University of Michigan is committed to ensuring the continued health and well-being of all mice utilized in research at the University, and to remaining consistent with federal standards governing animal use activities.

The new policy seeks to prevent overcrowding conditions in breeding cages by requiring that research staff house no more than 2 adults and 1 litter (regardless of the number of pups in the litter) per standard mouse cage, unless appropriate scientific justification has been provided and approved by the Institutional Animal Care & Use Committee (IACUC).

Limiting breeding cage occupancy reduces the incidence of morbidity and mortality due to overcrowding. Overcrowding can also be a significant animal welfare issue and is inconsistent with practices outlined in the *Guide for the Care and Use of Laboratory Animals*.

Additionally, pair breeding provides many benefits to both laboratories and the animals under their care:

- Less likely to result in overcrowded cages, therefore minimizing the laboratory’s risk of non-compliance or being assessed a technician time fee.
• Causes minimal animal disturbances, which often leads to improved overall animal health and well-being
• Always clear which female produced which litter
• Lack of competing females allows for the greatest number of mice per female produced in the shortest amount of time

Why did the University make this policy change, continued?
Recently published studies, as well as in-house data, have found that pair breeding actually results in greater numbers of pups per female as compared to trio breeding. The complete journal article, *Two of a Kind or a Full House? Reproductive Suppression and Alloparenting in Laboratory Mice*, is available through PLoS ONE.

For more information about the many benefits of pair breeding versus trio breeding, please contact your ULAM Faculty Veterinarian.

What is the timeline for implementing the new policy?
In order to allow adequate time for staff training and compliance, the policy’s implementation will begin with a five-month grace period on December 1, 2016. During this time, no fees will be assessed for veterinary technician time to perform separations and no non-compliances recorded.

On May 1, 2017, the grace period will end. From that date forward, failure to adhere to the new processes and procedures outlined in the policy will result in fees for technician time and could lead to non-compliance notifications.

How do I avoid a possible non-compliance notification?
The easiest way to adjust to this policy change, with the least risk of non-compliance, is to house monogamous pairs (pair breeding) in a standard mouse cage.
What happens during the grace period?

- The updated Cage Density and Breeding Policy is in effect and should be followed.
- In accordance with the updated policy, cages found to be overcrowded will be flagged by husbandry for evaluation by the veterinary technician.
  - The veterinary technician will notify laboratory personnel of cages that need to be separated by a specified deadline. If the cage is not separated, the veterinary technician will perform the separation and encourage education via the Faculty Veterinarian.
- Repeated violations will result in required meetings with the Faculty Veterinarian for further education regarding the policy.
- During the grace period, lab members are strongly encouraged to attend one of the free Breeding Workshops offered by ULAM, take the online Breeding course, and/or meet with their Faculty Veterinarian to review breeding practices.

Will my lab be charged for weaning separations after the grace period?

No. Fees will only be assessed after the grace period for overcrowded cages that laboratory personnel fail to separate after notification from veterinary technicians. ULAM Husbandry will continue to perform standard weaning separations at no additional cost; these fees are included in ULAM Husbandry per-diem rates.

Is additional training available to learn about this new policy and any related procedures?

Several educational opportunities, including in-person workshops and online courses in MLearning, outlining proper compliance with the new policy will be made available to research staff throughout the grace period.

Additional details on upcoming training opportunities will be posted on the U-M Policy on Mouse and Rat Breeding and Cage Densities webpage as they become available.

Won’t this result in far more cages in the animal room?

The new policy should not produce more cages because, due to overcrowding, most trio cages are currently separated before weaning which already results in two separate cages that require weaning. If two pair cages are set up, this results in the same number of cages (see diagram below). Therefore, ULAM should have the supplies and space necessary to facilitate this change.
Where can I find additional information and resources?
Additional information and resources are available on the *U-M Policy on Mouse and Rat Breeding and Cage Densities* webpage. Updates will be communicated through the monthly Animal Care & Use Newsletter and, as necessary, in future email announcements. Reminder flyers will also be posted in animal care and use facilities across campus.
Who should I contact with additional questions or concerns?
Additional questions or concerns not answered here should be directed to your ULAM Faculty Veterinarian. If you don’t know your faculty veterinarian, please send an inquiry to ulam-questions@umich.edu and your question will be routed appropriately.

QUESTIONS ABOUT BREEDING

Will trio breeding still be allowed?
Trio or harem breeding (e.g., up to 4 or 5 adults in one cage where multiple females are bred to the same male) will still be allowed provided all but 1 pregnant female is removed from the cage such that only 1 litter is born in the cage; in other words, trio breeding is acceptable but trio birthing is not.

Please note that this breeding strategy requires the laboratory to take full responsibility for appropriate, timely litter separation of the pregnant females. Failure to do so will result in more than 1 litter being born in the cage, which will result in levying a fee for technician time to perform separation of litters to bring the cage into compliance, and a possible non-compliance notification once the grace period has expired (May 1, 2017).

What if I really do need trio breeding?
• As mentioned above, trio breeding (co-housing a male and multiple female mice) is still okay. Without scientific justification, “trio birthing” (i.e. more than 1 litter born per cage) is not. You can continue to trio breed, but your lab is now responsible for removing all but one pregnant female from the cage prior to the females giving birth.

• Contact your Faculty Veterinarian to review breeding records and to develop a plan to gather data, which will serve as your scientific justification for an exception to the policy. This data can be submitted in a protocol amendment to the IACUC.

What if I already have trio breeding approved in my protocol? Do I need to amend my protocol right now?
• Without scientific justification, “trio birthing” is no longer acceptable. Previously approved protocols are not exempt from this change and should discuss available options with their Faculty Veterinarian.
• If your lab is utilizing trio birthing for convenience or to conserve space, please amend your protocol now to remove trio birthing. If strains are poor producers and this breeding method is used to ensure production, please speak to your Faculty Veterinarian to review breeding records and to develop a plan to gather data to present to the IACUC for approval.

Can post-partum estrus breeding be used?
Post-partum estrus can still be used as long as the first litter is weaned prior to, or upon birth of, the second litter in order to prevent the presence of two litters in a cage (i.e., no extended weaning is allowed if post-partum estrus is used).

What if mice are poor breeders?
Research staff who have poor breeding lines and who wish to apply for scientific justification in order to support continued trio breeding (i.e., housing 3 adults and 2 litters in a standard cage) should first consult with their ULAM Faculty Veterinarian to assure that they have taken all necessary steps to optimize their breeding.

Are there metrics for standard mouse breeding?

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Litter Size</td>
<td>6 – 8 pups</td>
</tr>
<tr>
<td></td>
<td>18 – 21 days</td>
</tr>
<tr>
<td>Sexual Maturity</td>
<td>4 – 7 weeks</td>
</tr>
<tr>
<td>Female Breeder</td>
<td>1 year</td>
</tr>
<tr>
<td>Male Breeder</td>
<td>1.5 years</td>
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<tr>
<td>Life Span</td>
<td>1 – 3 years</td>
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<tr>
<td>Weaning Age</td>
<td>21 days old</td>
</tr>
</tbody>
</table>

What steps can I take to optimize my mouse breeding?
Information about steps your laboratory can take to optimize mouse breeding are available in the updated Guidelines for Documenting Scientific Justification for Exceeding Cage Densities. For more information, please consult with your ULAM Faculty Veterinarian.