



# USDA'S ANIMAL WELFARE INFORMATION CENTER (AWIC)

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United States Department of Agriculture  
(USDA), Agriculture Research Service (ARS),  
National Agricultural Library (NAL)

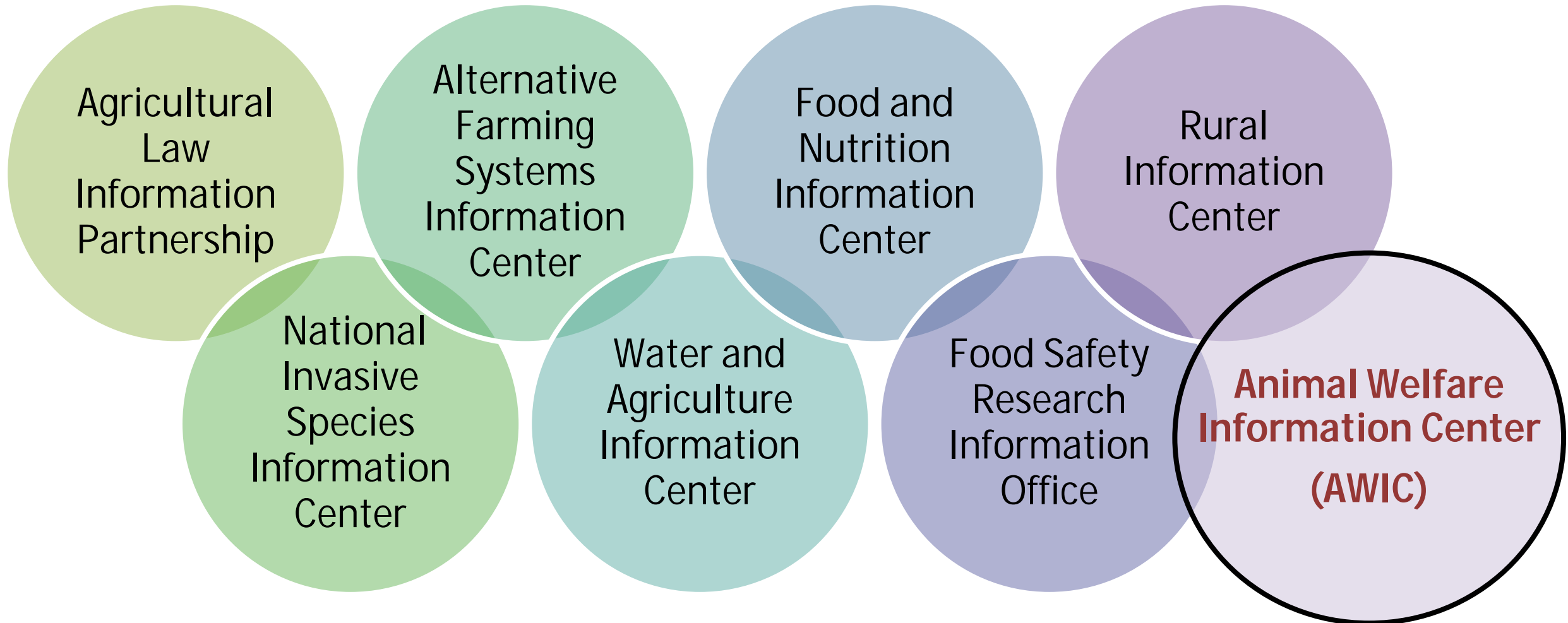




# National Agricultural Library: Our Mission

**“To facilitate the creation of agricultural knowledge through the acquisition, curation, and dissemination of the information needed to solve agricultural challenges today and in the future.”**

# NAL Information Centers



# AWA Defines Service at NAL

(7 U.S.C. 2142, Sec. 13, Subsection e)

*The Secretary shall establish an information service at the National Agricultural Library. Such service shall, in cooperation with the National Library of Medicine, provide information—*

1. pertinent to employee training;
2. which could **prevent unintended duplication** of animal experimentation as determined by the needs of the research facility; and
3. on improved methods of animal experimentation which could--
  - (a) **reduce or replace animal use**; and
  - (b) **minimize pain and distress to animals**, such as anesthetic and analgesic procedures.



# AWIC WEBSITE

<https://www.nal.usda.gov/programs/awic>

### Animal Welfare Information Center (AWIC)

**About AWIC**

The Animal Welfare Information Center (AWIC) was established in 1999 as part of the U.S. Department of Agriculture's National Agricultural Library (NAL) in Beltsville, Maryland. As a library website, AWIC provides information, products and services related to the regulations and use of animals in research, testing, and training as described in the Animal Welfare Act.

**Key Products and Services**

**Animal Welfare Act Historical Digital Collection (AWAHD)**

The AWAHD contains publications related to the Animal Welfare Act and includes legislative history, regulatory history, and AWIC publications.

**Workshops on Meeting the Requirements of the Animal Welfare Act**

AWIC offers virtual and in-person workshops focused on the Animal Welfare Act and its requirements, AWIC alternatives, and more.

**3Rs Alternatives Literature Search Support**

AWIC provides free alternative literature searching services, as well as consultation and best practices for performing an alternative literature search.

### Animal Welfare Act

The Animal Welfare Act (AWA) was signed into law on August 24, 1966. It is the only federal law in the United States that regulates the treatment of animals in research, teaching, testing, exhibition, transport, and by dealers. The AWA is enforced by USDA, APHIS, Animal Care.

The AWA has been amended numerous times since its original passage in 1966. The [Animal Welfare Information Center \(AWIC\)](#) was mandated under the 1993 AWA amendment, "Improved Standards for Laboratory Animals Act." Therefore, as part of AWIC's mission, we provide information on the AWA to help people understand the law and its requirements.

**Animal Welfare Act History Digital Collection (AWAHD)**

The AWAHD contains U.S. Government publications related to the AWA that fall into three categories: legislative history, regulatory history, and AWIC publications. Select the 4 resources by the right to read the original Act and some of its amendments.

[Read Other Publications in Our Collection](#)

**Animal Welfare Act Timeline**

Not sure where to start in our digital collection? Here's a quick overview of the AWA and its amendments! Take a look at our [AWA Timeline](#)! It highlights the amendments to the Act over time and shares a brief summary of how the law changed with each amendment. You can also view a [table summary of the timeline](#).

### Housing, Care and Welfare of Animals

**What is Animal Welfare?**

Animal welfare refers to how an animal copes with its environment. To assess an animal's well-being, you must consider multiple factors such as its biological functioning (i.e. health), emotional state, and its ability to express natural behaviors. It's important to provide animals with positive welfare to support their mental and physical needs and increase their quality of life.

**Animal Welfare in Federal Regulations**

To meet the requirements of the [Animal Welfare Act \(AWA\)](#), the regulated community (any person(s) working with animals in research, teaching, and testing) must provide animals with adequate housing, nutrition, water, handling, sanitation, protection, and veterinary care (7 U.S.C. § 2132(a)(1)(3)(D)). The [Animal Welfare Information Center \(AWIC\)](#) is mandated under the AWA to provide information that helps the regulated community meet these requirements. The information below provides guidance regarding housing, care and welfare regulations for various species used in research, teaching, and testing.

**Related Topics**

These pages provide more detailed information about animal care and welfare.







### 3Rs Alternatives: Technologies and Approaches

"3Rs alternatives" refers to the **Reduction, Refinement, and Replacement** of animals used in research, testing, and education. The 3Rs concept was developed over 50 years ago by two scientists, Drs. William Russell and Rex Burch. It is first described in their published book, *Principles of Humane Experimental Technique*®. Russell and Burch advocated new scientific approaches that would minimize the pain and distress of research animals via 3Rs methods.

**The 3Rs Alternatives**

- **Replacement** refers to technologies or approaches that directly replace or avoid the use of animals in experiments by incorporating [non-animal methods](#) where they would otherwise have been used. Replacement can be broken down into two categories: Full/Absolute and Partial/Relative.
  - Full/Absolute Replacement: Avoids the use of any animals. Examples may include the use of human volunteers, training manikins, tissues and cells, mathematical and computer models, and established cell lines.
  - Partial/Relative Replacement: Animals are still used to provide tissue, cells and/or organs but experiments are conducted in vitro (tissue culture, tissue slices, etc.). Partial replacement can also include the use of animals that have been slaughtered for meat or euthanized due to other purposes.

- About AWIC
- Laws and Guidelines
- Training
- Alternatives Literature Searching

1



3Rs Alternatives: Technologies and Approaches

Alternatives in Education:  
Veterinary Medicine

Experimental Design

Funding Opportunities

2



Mandatory and Regulatory Testing

Allergic Contact  
Dermatitis Testing

Biologics and Vaccine  
Testing

3



Ecotoxicity Testing  
Eye Safety Testing

[Home](#) » [Information Centers](#) » [Animal Welfare Information Center](#) » [3Rs Alternatives: Technologies and Approaches](#) » [Mandatory and Regulatory Testing](#) » Ecotoxicity Testing

# Ecotoxicity Testing

**Ecotoxicity Testing and the 3Rs Alternatives.** Ecotoxicology is the study of how environmental pollution affects ecological entities, i.e. populations, communities or ecosystems. Government agencies regulate new chemical products and pollution from industry and agriculture, mandating toxicity tests to determine how substances effect the environment. Organizations are prioritizing the development and validation of ecotoxicity testing methods that avoid using living animals. These alternative testing methods include in vitro tests such as cell lines, bioassays, and microfluidic (“organ-on-a-chip”) devices; in silico/computer modeling and databases of animal testing data for chemical compounds; as well as in chemico analysis. Other ecotoxicity tests considered as replacement methods utilize lower organisms such as pond snails, fish embryos, or algae.

## [New Approach Methodologies in Ecotoxicology Bibliography \(Updated May 2022\) \( PDF | 366 KB \)](#)

USDA. NAL. Animal Welfare Information Center (AWIC).

AWIC compiled a bibliography of scholarly literature from 2010 to 2022 on new approach methodologies (NAMs) used in Ecotoxicology.

### Search for Scientific Literature on 3Rs approaches to Toxicity Testing

The following resources contain scientific literature about reduction, refinement or replacement (3Rs alternatives) in ecotoxicity testing.

- [PubMed](#)
- [Google Scholar](#)

### **Organizations working to validate alternative methods for Ecotoxicity Testing**

#### [Toxicity Testing in the 21st Century – A Vision and a Strategy](#)

The National Research Council was asked by the U.S. Environmental Protection Agency to review the state of the science and create a far-reaching vision for the future of toxicity testing. Developing, improving, and validating new laboratory tools could improve our ability to understand the hazards and risks posed by chemicals. This would lead to more informed environmental regulations and dramatically reduce the need for animal testing because the new tests would be based on human cells and cell components.

#### [EURL ECVAM: Accepted Alternative Methods for Toxicity Testing](#)

The European Union Reference Laboratory for alternatives to animal testing (EURL) ECVAM has contributed to the [validation of the test methods](#). The validation of other test methods has been undertaken by ICATM (International Cooperation on Alternative Test Methods) partners.

#### [ICE: Integrated Chemical Environment, National Toxicology Program Interagency Center for the Evaluation of Alternative Toxicological Methods \(NICEATM\)](#)

Successful computational toxicology projects depend on high-quality data that are freely available and formatted for use in computational workflows. The [Integrated Chemical Environment](#) (ICE) addresses the data needs frequently expressed by NICEATM stakeholders. Launched in March 2017, ICE provides curated data from NICEATM, its partners, and other resources, as well as tools to facilitate the safety assessment of chemicals.

#### [Interagency Coordinating Committee on the Validation of Alternative Methods \(ICCVAM\)](#)

ICCVAM is a permanent committee of the [National Institute of Environmental Health Sciences](#) and is composed of representatives from sixteen federal regulatory and research agencies, including USDA. One of the goals of ICCVAM is to reduce, refine, or replace the use of animals in toxicological and safety testing where feasible.

#### [NICEATM: Accepted Alternative Methods](#)

The NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) is an NTP office focused on the development and evaluation of alternatives to animal use for chemical safety testing. The topics in this section provide information about approaches used to replace, reduce, or refine animal use while ensuring that the toxic potential of substances is appropriately characterized.

# NAMs in Ecotoxicology Bibliography

- Citations from peer-reviewed literature for various new approach methodologies (NAMs) used in Ecotoxicology
- 2010 to May 2022
- Compiled by AWIC

[https://www.nal.usda.gov/sites/default/files/page-files/Ecotoxicology\\_Bibliography\\_May\\_2022\\_0.pdf](https://www.nal.usda.gov/sites/default/files/page-files/Ecotoxicology_Bibliography_May_2022_0.pdf)

## New Approach Methodologies in Ecotoxicology Bibliography

*Compiled by: USDA, NAL, Animal Welfare Information Center*

**Description:** This bibliography provides citations regarding new approach methodologies (NAMs) used in the field of Ecotoxicology. NAMs are non-animal technologies and approaches used for chemical hazard, exposure and risk assessment testing such as in vitro assays, computational models, cell-based models, and organs-on-chips. The bibliography covers peer-reviewed literature published between 2010 and May 2022. It was compiled by Elizabeth Tobey, a librarian with USDA National Agricultural Library's (NAL) Animal Welfare Information Center (AWIC).

Abreu, S., Jesus, F., Domingues, I., Baptista, F., Pereira, J., Serpa, D., Soares, A., Martins, R., & Silva, M. (2022). Automated Counting of Daphnid Neonates, Artemia Nauplii, and Zebrafish Eggs: A Proof of Concept. *Environmental Toxicology and Chemistry*, 1-8.

<https://doi.org/10.1002/etc.5323>

Ahmed, S., Moni, D., Sonawane, K., Paek, K., & Shohael, A. (2021). A comprehensive in silico exploration of pharmacological properties, bioactivities and COX-2 inhibitory potential of eleutheroside B from *Eleutherococcus senticosus* (Rupr. & Maxim.) Maxim. *Journal of*





# AWIC Workshop

- Laws and Guidelines +
- Training +
- Alternatives Literature -  
Searching
- Workshop
- Sample Searches
- Databases
- Publishing Guidelines
- 3Rs Alternatives: +  
Technologies and Approaches
- Housing, Care and Welfare +
- Institutional Animal Care and +  
Use Committees
- Routine Procedures
- Organizations

## AWIC Workshop & Trainings

### Meeting the Information Requirements of the Animal Welfare Act

This in-person workshop is intended for the regulated community (any personnel working with animals in research, testing, or education) and is typically held at the National Agricultural Library (NAL) in Beltsville, Maryland. However, due to COVID-19, AWIC is offering this workshop through a virtual platform.

#### About the Workshop

The regulations of the AWA require that all research involving animals be conducted by Institutional Animal Care and Use Committees (IACUCs) with documentation demonstrating that the use of animals is necessary and that the use of animals will not cause momentary pain or distress to the animals. An alternative is any procedure, technique, or replacement of animals that will not duplicate previous experiments. The objectives of the workshop are to provide information on the requirements of the AWA and to discuss the role of IACUCs in the research process.

March 9,  
2022  
(virtual)

May 11,  
2022  
(virtual)

October  
19, 2022  
(virtual)

To Register: <https://go.usa.gov/xMPVd>

# AWIC Online Workshop

To Register: <http://bit.ly/2ZLkAtd>



## Online Animal Welfare Workshop

This online version of the workshop provides an interactive environment where participants can learn about conducting literature searches, the history of animal welfare law and the specific responsibilities of researchers and IACUCs.

Combining the expertise of the AWIC staff and the flexibility of self-paced learning, the online workshop meets the needs of researchers, librarians and IACUC members nationwide.

## What You'll Cover

- A historical overview of the Animal Welfare Act (AWA), and regulations
- What is meant by the Information requirements of the Animal Welfare Act (AWA).
- 3Rs Alternatives of Reduction, Refinement, and Replacement
- Databases and resources available to access scientific literature
- A systematic approach to accessing information and creating effective literature search strategies.

# Customizable Trainings

Freely provided upon request

**Information Requirements of the AWA**

**History of the Animal Welfare Act**

**3Rs Alternatives/Resources**

**Conducting a Literature Search**

**Animal Welfare Information Center (AWIC)**

# Reference & Literature Search Assistance

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AWIC assists patrons with searching literature and provides customizable training opportunities.

<https://go.usa.gov/xtKYj>


Need Assistance?  
Complete a request [form!](#)

[https://www.nal.usda.gov/legacy/sites/default/files/alt\\_lit\\_search\\_form.pdf](https://www.nal.usda.gov/legacy/sites/default/files/alt_lit_search_form.pdf)




**National Agricultural Library**  
 United States Department of Agriculture

**AWIC Helps You PREPARE For Better Science**



Featured photo by: Gettyimages

Current concerns about reproducibility in preclinical research make it even more important to plan animal studies properly. Sometimes, finding this high-quality information can be difficult, but AWIC can help with identifying the right resources! AWIC provides information on [searching published literature](#) and resources that can assist with [experimental design](#).

Among these resources are the [PREPARE guidelines](#), created by [Norecopa](#). The PREPARE guidelines are a two-page checklist, containing essential topics that scientists should consider when planning experiments. These guidelines are useful to those looking for the latest resources on how to conduct better science, optimize animal welfare, and improve the reproducibility and translatability of animal research.


Visit the [AWIC website](#) for the latest resources on 3Rs information and technology, or [contact us](#) for additional support.

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**Training and Conferences**

**Scientists Center for Animal Welfare (SCAW)**  
 December 7, 2020 - December 8, 2020


**Meeting the Information Requirements of the Animal Welfare Act**  
 March 24, 2021 - March 25, 2021



Stay plugged in to AWIC updates!  
**SUBSCRIBE**


**National Agricultural Library**  
 United States Department of Agriculture

**Pets Reduce Animal Use in Research**



Center for Image-Guided Animal Therapy

On International Women's Day on March 8<sup>th</sup>, the Animal Welfare Information Center is women scientists conducting research into the development and use of 3Rs


Recent experiments at the Johns Hopkins University's Center for Image-Guided make use of pets with pre-existing diseases. This method reduces the number of animals required. With the information collected, [Dr. Dara Kratchman](#), V.M.D., Ph.D. animal imaging protocols applicable to both humans and pets. You can watch on Dr. Kratchman and other women scientists who presented their research at 3Rs Symposium in June 2020.

About CIGAT and other reduction methods in research, visit AWIC's [7th Annual 3Rs page](#) or [contact AWIC](#).

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**Training and Conferences**

**Meeting the Information Requirements of the Animal Welfare Act**  
 March 25, 2021 (Virtual)



Stay plugged in to AWIC updates!  
**SUBSCRIBE**

# AWIC Newsletter



New 3Rs research



Literature searching tips



3Rs conferences/trainings



AWIC products and resources

<https://bit.ly/3fpSydL>

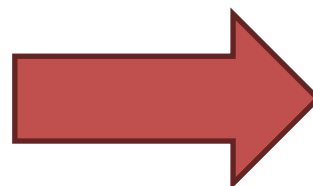
# Animal Welfare Act History Digital Collection



The AWAHD Page

[https://naldc.nal.usda.gov/animal\\_welfare](https://naldc.nal.usda.gov/animal_welfare)

Not sure where to start?  
Begin by going to the  
[Interactive Timeline](#)



# Animal Use Alternatives Terminology

- Enhance controlled vocabulary in the NALT\* for the 3Rs.
- Improve discoverability of publications on animal use alternatives.
- Improve access to peer-reviewed publications on animal use alternatives.



**\*National Agricultural Library Agricultural Thesaurus (NALT)**  
<https://agclass.nal.usda.gov/agt.shtml>

# 3Rs Hedges

- Pre-determined, developed and validated search strategies
- Used to find information on a specific topic
- Improve discoverability of publications on alternative alternatives

## Pigtailed Macaques

"pig tailed macaque\*" OR "Pigtailed macaque\*" OR "Pig tail macaque\*" OR "Pigtail macaque\*" OR "pig tailed monkey\*" OR "Pigtailed monkey\*" OR "Pig tail monkey\*" OR "Pigtail monkey\*" OR "Macaca nemestrina" OR "M nemestrina" OR "Macaca nemestrina leonina" OR "Macaca nemestrina pagensis" OR "Macaca leonina" OR "M leonina" OR "Macaca nemestrina sibiru" OR "Macaca siberu"

## Housing

(Housing OR enclosure\* OR cage\* OR "animal house" OR "animal housing" OR "laboratory animal facility" OR "zoo exhibit\*") AND ("social housing" OR "pair housing" OR "socially-house\*" OR "housed individually" OR "group housing" OR "group-house\*" OR "group house\*" OR "social isolation" OR "social interaction" OR socialization OR socialization OR "single housing" OR "housing condition" OR "social housing condition\*" OR "cage divider\*" OR fighting OR housing OR "conflict management" OR "social stability" OR "group behavior\*" OR "group behaviour\*" OR "collective behavior\*" OR "collective behaviour\*" OR "behavioral management" OR "behavioural management" OR "pair bond\*" OR "group formation" OR "group dynamics" OR "group size" OR "group composition" OR "colony management" OR colony OR colonies OR "social management" OR "agonistic behavior\*" OR "agonistic behaviour\*" OR "social dominance" OR "social environment")



# Contacting AWIC

<https://www.nal.usda.gov/programs/awic>

Tel (AWIC): (301) 504-6212

E-mail: [awic@usda.gov](mailto:awic@usda.gov)

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