Animal Testing Annual Report 2023

Introduction

Wageningen University & Research conducts scientific animal research to find answers to important issues relating to human and animal health and sustainable food production in which animal welfare has an important place, and in which biodiversity and healthy ecosystems can be preserved. To answer our research questions, an increasing variety of animal-free methods are available, including computer models, sensor technology and complex cell systems (also called organoids).
Despite all the advances in the development of these alternatives, animal testing is still sometimes required. The term animal testing means research involving animals that causes a certain degree of discomfort and for which a licence under the Experiments on Animals Act (Wod) is required. Animal experiments are thus a part of scientific animal research, by which we mean all research carried out using animals.
In cases where animal testing is used, Wageningen University & Research (WUR) conducts experiments with the utmost respect for animals and animal welfare and only if no alternative is available that would produce the required result without using animals.
As a signatory to the Code for Transparency in Animal Testing, WUR feels it is important to be transparent about the use of laboratory animals in our research and to take our accountability for this. That is the reason for publishing our annual report on animal testing 2023.

Compared to previous years, this report is a slimmed-down version. In this report, we choose to focus on the annual figures and their interpretation. Obviously, information about the licensing process prior to animal testing, the type of animal testing conducted at WUR, alternatives to animal testing and our guidelines and ambitions is still available. This can be found in the 'Animal testing dossier' on the WUR website: Animal Testing - WUR.

Contents

Click to go to a section.

2 **Figures on animal testing**

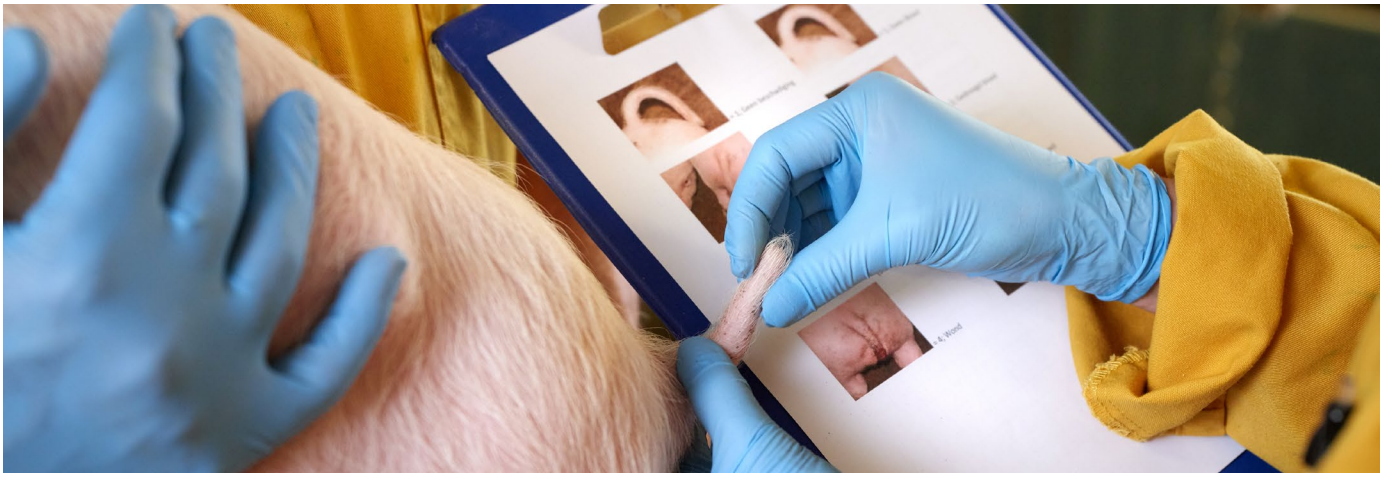
3 **Figures for Wageningen University and Wageningen Research**

4 **Explanation of Wageningen Research figures**

5 **Explanation of Wageningen University figures**

6 **Purposes for animal testing 2023**

9 **Looking ahead**



Figures on animal testing

Wageningen University & Research (WUR) is a partnership between Wageningen University (WU) and Wageningen Research (WR)[1]. The university departments in which animal testing took place are Animal Sciences, Agrotechnology and Food Sciences, Environmental Sciences and Plant Sciences.
The Wageningen Research institutes in which animal testing is carried out are Wageningen Livestock Research (WLR), Wageningen Bioveterinary Research (WBVR), Wageningen Marine Research (WMR), Wageningen Environmental Research (WER) and Wageningen Food Safety Research (WFSR).
In many cases, the figures in this annual report are provided separately for WU and WR. This provides insight into the different types of research being conducted and makes it easier to interpret the figures.

All animal testing reported here is covered by the Experiments on Animals Act (Wod) and was completed in 2023. Not all the animals in the following overview are housed in WUR facilities. Research into the conservation or monitoring of populations in the wild can only be done using wild animals (such as much of the research involving fish). Some animal testing is also carried out on experimental farms, for example on chickens and pigs.

Reuse of animals

To further clarify the figures, it should be mentioned that in some cases an animal may be involved in animal testing on several occasions. This is subject to specific conditions set out in Article 1e of the Experiments on Animals Act (Wod). When animals are reused, for example, the previous test must have caused only mild or moderate distress. The subsequent animal test may only fall into the categories of mild, moderate or no-recovery discomfort (see box). Due to reuse, the actual number of animals used is therefore lower than the number of animal experiments carried out. In 2023, 312 animals were reused at WR. These are mainly cattle used for statutory routine and nutritional testing. At WU, 83 animals were reused in 2023, 56 of which were cattle. This was for the purpose of education and training (33 animals) and as part of behavioural research (23 animals).
In the following overviews, we assume the number of animal experiments, i.e. the number of times that an animal was used or reused in an experiment, with some form of discomfort. We hereby include animals to which non-recovery discomfort applied.

Categories of discomfort
Non-recovery: this category involves experiments whereby the animal is only subjected to procedures under general anaesthetic. The animal does not regain consciousness and is euthanised.
Mild discomfort involves the risk of short-term mild discomfort. These activities and procedures do not therefore significantly impair the animal's well-being. These could include the administration of and waking from a light sedation, taking a single blood sample, or administering a substance through a tube.
With **moderate** discomfort, there is a risk that the animal briefly experiences a moderate level of discomfort, or mild discomfort for a longer time. Examples of procedures that cause moderate discomfort are more frequent blood sampling or several days (depending on the species) of solitary confinement of social animals.
Severe discomfort is the highest category of suffering. The animal is likely to experience severe discomfort during an experiment that seriously impairs the animal's well-being. Examples of procedures that cause severe discomfort are exposure to a deadly disease associated with long-term pain and suffering, or keeping a social species in solitary confinement for long period of time (several weeks).

1 For WUR's organisational chart see: Organisational chart Wageningen University & Research - WUR

Figures for Wageningen University and Wageningen Research

A total of 56,363 animal experiments were carried out at WUR in 2023, 46% less than in 2022. This decrease is largely explained by the lower number of laboratory animals used at WR (from 94,198 in 2022 to 50,415 last year). The use of 'other fish' decreased most.
In 2023, 73% of all animal testing at WUR involved fish, aimed at monitoring fish stock and migration surveys. This research is therefore in the interest of the species itself. WR conducted the majority of fish surveys (98%).

Excluding 'other fish' figures, the number of animals used at WR is 9,853, compared to 13,594 in 2022. This is a decrease of more than 27%. More information on the research for which the above-mentioned fish are used is given below. In second place comes research using pigs (5.8%) followed by research involving chickens (5.2%).

Overview of laboratory animals used in 2023

Animal species	WU	WR	Total
Mice	1258	1928	**3186**
Rats	17	24	**41**
Guinea pigs			
Golden hamster		44	**44**
Other rodents[1]	770		**770**
Rabbits			
Dogs			
Cats	8		**8**
Ferrets		24	**24**
Other predators[2]			
Pigs	86	3292	**3378**
Goats			
Sheep		19	**19**
Cattle	150	1371	**1521**
Other mammals[3]	357	32	**393**
Domestic fowl	213	2916	**3129**
Other birds[4]	434	203	**637**
Reptiles[5]			
Frogs			
Other amphibians[6]			
Zebrafish			
Other fish[7]	2651	40562	**43213**
	5948	**50415**	**56363**

	2018		2019		2020		2021		2022	
Animal species	**WU**	**WR**	**WU**	**WR**	**WU**	**WR**	**WU**	**WR**	**WU**	**WR**
Mice	1146	4572	640	3082	244	1384	815	2258	890	2361
Rats	97	0	69	0	8	30	11	0	17	2
Guinea pigs	0	485	0	52	0	10	0	152	0	0
Golden hamster	0	0	0	0	0	0	0	1337	0	380
Other rodents[1]	101	70	543	238	21	66	1354	0	655	0
Rabbits	0	29	0	12	0	5	0	0	0	0
Dogs	0	4	0	0	0	10	0	0	0	260
Cats	32	0	16	0	0	32	15	0	46	0
Ferrets	0	0	0	24	0	24	0	0	0	0
Other predators[2]	0	74	0	62	0	0	0	0	0	0
Pigs	1397	1716	753	1952	655	1243	566	2367	82	1186
Goats	22	40	0	0	0	0	0	0	0	0
Sheep	0	126	0	119	0	95	0	43	0	34
Cattle	463	696	98	1791	222	2240	80	1788	129	552
Other mammals[3]	5	12	0	3	0	12	5	30	129	287
Domestic fowl	3342	5652	4388	12975	2359	6357	5244	6021	5280	8296
Other birds[4]	0	282	0	164	134	282	0	86	115	236
Reptiles[5]	0	125	0	0	0	360	0	0	0	0
Frogs	0	0	0	0	0	0	0	0	0	0
Other amphibians[6]	0	0	0	41	0	0	0	0	0	0
Zebrafish	843	0	1150	0	602	0	180	0	1023	0
Other fish[7]	2552	32619	5504	44112	3863	40400	4678	54438	2327	80604
Total	**10000**	**46502**	**13161**	**64627**	**8108**	**52550**	**12948**	**68520**	**10693**	**94198**
Total WUR		**56502**		**77788**		**60658**		**81468**		**104891**

1 Wood mouse, big wood mouse, ruddy vole, earth mouse, field mouse
2 Common seal, grey seal, mink
3 Horses, donkeys and cross-breeds, llama, camel, greater white-toothed shrew, crowned shrew, Eurasian pygmy shrew
4 Great tit, blue tit, domestic duck, barnacle goose, wigeon, yellow-browed warbler, goldcrest, starling, skylark, common buzzard, European honey buzzard
5 Slow worm, Common lizard, Turtle
6 Moor frog
7 More than 88 species in total, of which eels form the majority

Explanation of Wageningen Research figures

Fish

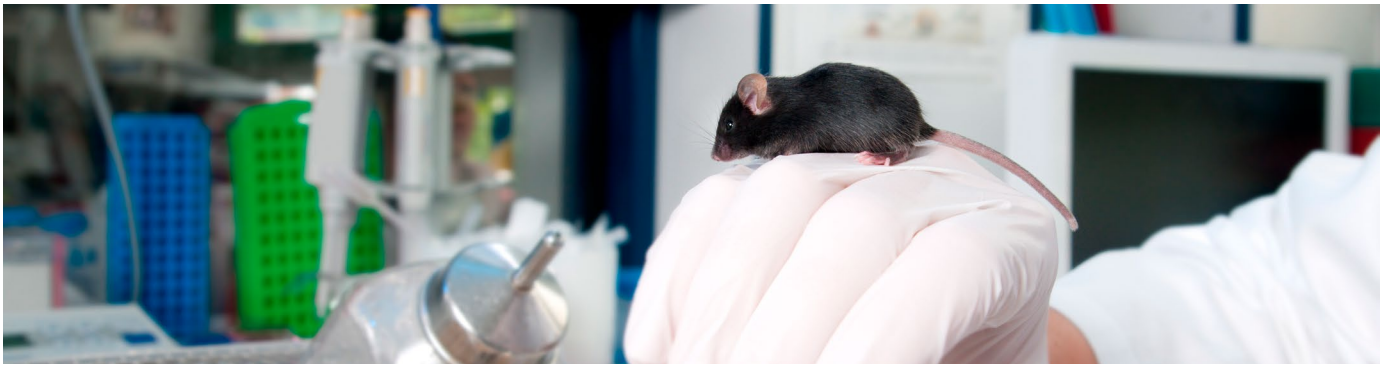
Two projects together explain 84% of the number of fish used at WR. This research is carried out on behalf of authorities such as the Dutch Ministry of Agriculture, Nature and Food Quality (LNV), Water Boards and/or provincial governments and is aimed at the protection of animal species.
One project studies fish migration in water systems - this study was also reported on last year (see Annual Report 2022, p.10). Fish experience delay or obstruction in migration, additional mortality due to so-called 'structures' (human constructions) and a higher risk of predation or fishing at barriers. This research helps to ensure that targeted intervention can restore fish populations.
The second project concerns a study on the size, structure and distribution of fish stocks. Collecting data on fish stocks, by catching, tagging/tracking and recapturing individual fish, tends to arise from statutory obligations. This provides policy-making government agencies with information about the state of fish stocks and the long-term and short-term effects of their exploitation. This information can also help answer questions related to ecosystems and food webs. The main difference between the number of fish used can be explained by the different experiments taking place within the projects, all involving different numbers of animals. In 2023, fewer laboratory animals were required for experiments.

Pigs

Most of the pigs (2,000 animals) were used in an extensive field study on the occurrence of streptococci (S. suis) in pigs. This is a serious disease that can have a major impact on pig welfare. The research aims to map the occurrence of S. suis and develop interventions to contain its spread. This will benefit the health and welfare of pigs and reduce the use of antibiotics. In this field study, samples were taken from the tonsils and saliva samples were collected. The pigs were able to stay on their own farms during the study. Sampling is not painful for the pigs, but holding can be experienced as stressful. For this reason, it was estimated that the pigs experienced mild discomfort.
Other pigs (909 animals) used in 2023 were part of a study into the influence of sows' freedom of movement on piglet farrowing. It is common practice to confine farrowing sows, which causes stress to the sows and disrupts the natural interaction between sow and piglet. The expected benefits of more freedom of movement are improved welfare of the sow and better piglet health due to higher uptake of the first milk, due to a more natural interaction with the sow. This also affects the later life of piglets. In this study, only the piglets experience mild discomfort caused by blood sampling and weighing.

Chickens

There has been a 62% decrease in the number of experiments using chickens (domestic fowl). In 2022, a fairly large number of chickens (5,164 animals) was used as part of a project aimed to provide insight into the nutritional value of feed for poultry and pigs. It examines how to improve feed utilisation, especially for new (hitherto unused) feed materials and feed components such as seaweed and insects, regionally produced feed materials and by-products of human food preparation. This knowledge can then be used to further develop circular agriculture, reduce competition between food and feed production ('feed vs. food') and reduce the carbon footprint of animal production.
In 2023, the same project used 147 chickens (and 88 pigs, compared to 133 pigs in 2022). The discomfort experienced by the animals is caused by blood sampling and housing without ground cover for the purpose of collecting manure for analysis.



Explanation of Wageningen University figures

At Wageningen University, fish are the most commonly used laboratory animal: 2,651 animals, providing 45% of the animals used at WU. Mice come second (21%), other rodents third (13%).

Fish

Some of the fish (996 sea bass) were used to study the influence of training on oxygen uptake capacity. Fish that can cope better with fluctuations in oxygen requirements are expected to be more able to absorb nutrients from their food, resulting in more robust fish. This research is relevant because sea bass is an important farmed fish and improved animal welfare could have a major international impact in terms of food security.
760 fish were also used to increase knowledge about the effects of prebiotics during the early life stages of Niletilapia (fish culture). The hypothesis is that using prebiotics will help reduce the use of antibiotics in fish farming. In this research, the fish are weighed twice and some of the fish are injected once with a saline solution containing bacteria in their throat to determine resistance later. Because these procedures cause the fish some discomfort, it is considered animal testing.

Mice

A total of 1,258 mice were used at WU. Of these, 317 were used for training and education and 467 for human research into the mechanism behind so-called oxidative stress[2] and ageing and related metabolic diseases. In view of the rapidly ageing global population, this research can help develop interventions to ensure that people around the world can age healthily.

Other rodents

In 2023, 668 wood mice and voles and 357 shrews were used to study the spread of zoonoses in small mammals. These animals can transmit diseases to humans themselves, or through fleas or ticks. The aim of this research is to gather knowledge about the species composition of small mammals, the relationship between the mammal and the parasite and how this is affected by changes in the habitat (land use, climate, biodiversity). With this knowledge, we can intelligently design our environment to reduce the risk of zoonoses.

101 wood mice and voles and 1 shrew were used to study mosquitoes, midges, ticks (so-called vectors) and their hosts and the diseases they can transmit. The animals were caught in the wild and sampled to determine the occurrence of infectious diseases. High-risk areas for vector-borne diseases in the Netherlands can thus be identified and knowledge obtained about the extent to which different species of wild mice, Dutch mosquitoes, midges and ticks are capable of transmitting (exotic) infectious diseases. Although these studies are similar, the former is mainly about understanding how interactions between host, insect and pathogen are influenced by changes in environment. The other research focuses more on insect search behaviour and identifying disease sources to reduce the risk of disease.

The discomfort experienced by these animals is caused by trapping, handling and blood sampling. A transmitter is also inserted, but this is done under anaesthetic. The animals that are not euthanised for the purpose of the study are released back into the wild.

2 We talk about oxidative stress when there are too many unstable molecules in the body. These can damage healthy cells, affect tissues and thus lead to muscle breakdown, cardiovascular diseases and Alzheimer's and Parkinson's disease, for example.

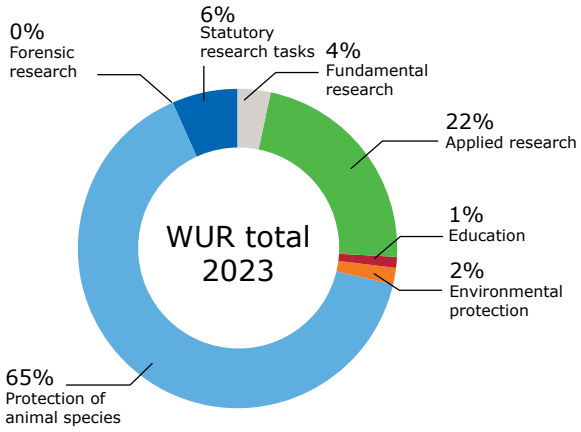
Purposes for animal testing in 2023

Animal testing can be performed for a variety of reasons. From the figures mentioned in the previous chapter, it is clear that most animal testing is carried out for the benefit of the species itself. For example, we conduct research with sea bass to improve the welfare of sea bass in fish farming, while nutritional research in chickens and pigs aims to improve the welfare of these animals in farming. At WUR, we call this target animal research. See the box for more info.

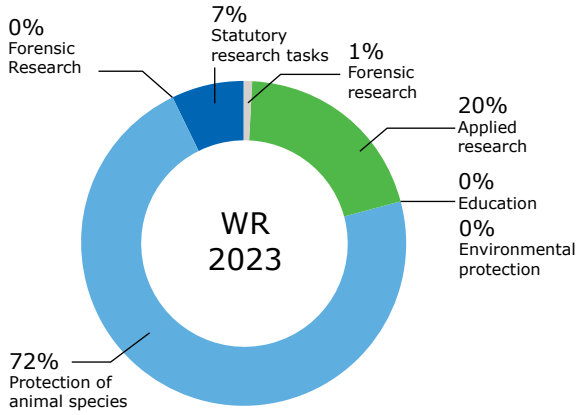
Target animal research
When conducting target animal research, the animal is the model for the species itself. 'Target animal research' is not a category as used in the official registration of used laboratory animals in the Netherlands (or internationally). When these categories are referred to in this report, we feel it is important to mention that target animal research transcends this category. Target animal research can also take place within a category like Applied Research. For example, work is under way to characterise avian flu viruses in chickens, with the aim of reducing symptoms and containing the spread of this virus in poultry.
More information on target animal research can be found in the Animal Testing Dossier, or for example in our podcast 'Op de proef gesteld' (put to the test) (episode 1).

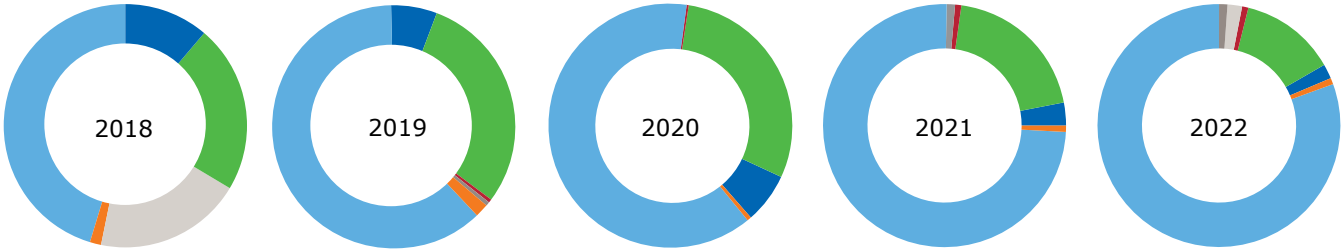
As the charts below show, protection of animal species is the largest category, involving 65% of research at WUR. Applied research comes second at 22%. The majority of this applied research at WUR also benefits animal welfare. At WU, this applies to almost all applied research (93%), while at WR it is the case in more than half of the applied research (56%).
The third category is statutory requirements, at 6%.

Research in this category must be conducted in the context of (inter)national legislation.

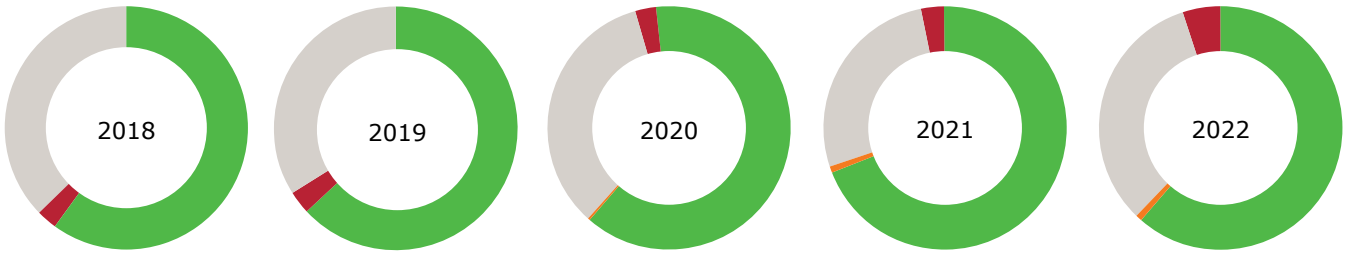


WR's figures reflect those of the overall WUR figures: species protection accounts for 72% of all research at WR, followed by applied research (20%) and statutory requirements (7%). As such, these percentages do not differ from previous years.





	2018	2019	2020	2021	2022
Environmental protection	1% (695)	1% (479)	<1% (575)	<1% (0)	<1% (0)
Protection of animal species	45% (21044)	63% (40770)	72% (37589)	76% (52308)	83% (77996)
Forensic research	<1% (16)	<1% (4)	<1% (26)	<1% (156)	<1% (162)
Fundamental research	20% (9123)	0% (0)	1% (10)	0% (0)	2% (1650)
Education	<1% (29)	<1% (70)	<1% (67)	<1% (32)	<1% (98)
Applied research	22% (10383)	30% (19144)	23% (12286)	20% (13945)	13% (12296)
Statutory research tasks	11% (5212)	6% (4160)	4% (1936)	3% (2079)	2% (1666)

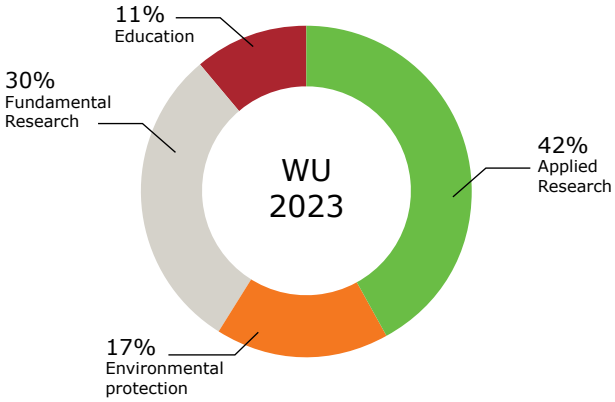


	2018	2019	2020	2021	2022
Environmental protection	0% (0)	<1% (46)	<1% (21)	<1% (29)	<1% (29)
Fundamental research	37% (3728)	34% (4458)	34% (2774)	27% (3516)	33% (3562)
Education	3% (273)	3% (383)	2% (149)	3% (415)	5% (480)
Applied research	60% (5999)	63% (8274)	64% (5164)	69% (8988)	62% (6622)

For WU, applied research is the largest category, at 42%. This represents a decrease compared with previous years. This is followed by fundamental research at 30% and environmental protection at 17%.

While the category of applied research has decreased, environmental protection and education have increased. The research described in other rodents is an extensive study that single-handedly explains this increase. The education and training category includes animals used for the purpose of learning how to handle laboratory animals and practising techniques. In addition, several animals are used during students' practicals. Read more about this in the box.

The separation between WU and WR was made for good reason: there are different emphases when it comes to the purpose of research. At WU, the emphasis is more on applied research, while WR focuses on species protection. If we do not include the largest two studies involving fish at WR (described in Explanatory figures Wageningen Research fish), testing aimed at protecting the environment still account for 54% of all testing, but the share of applied research is suddenly over 33% and the relative share of regulatory requirements becomes 12%.



Education and training

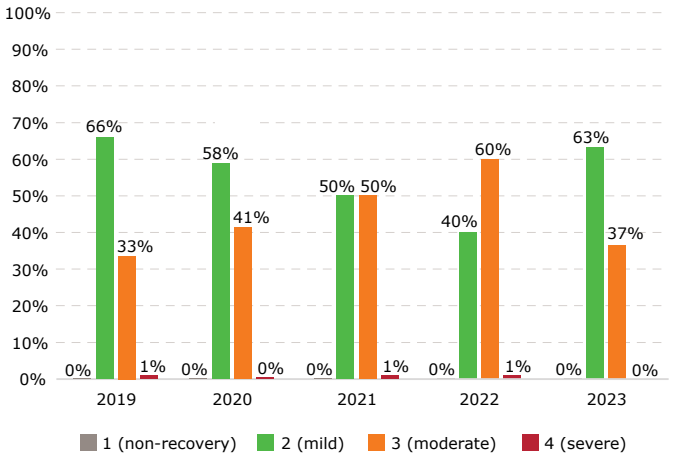
At WUR, we ensure that everyone who works independently with laboratory animals knows what they are doing and can perform the procedures during experiments properly and effectively. This helps reduce distress and improves animal welfare.
Live laboratory animals are only used when there has been sufficient theoretical training, and the same techniques and procedures have first been practised in other animal-free ways. This might be through video footage or use of other non-animal material.
Also, if it helps to reduce discomfort, anaesthesia or analgesia is applied.
In all these ways, WUR works on Reduction, Replacement and Refinement (see also the Animal Testing Dossier).

Level of discomfort caused by animal testing at WUR

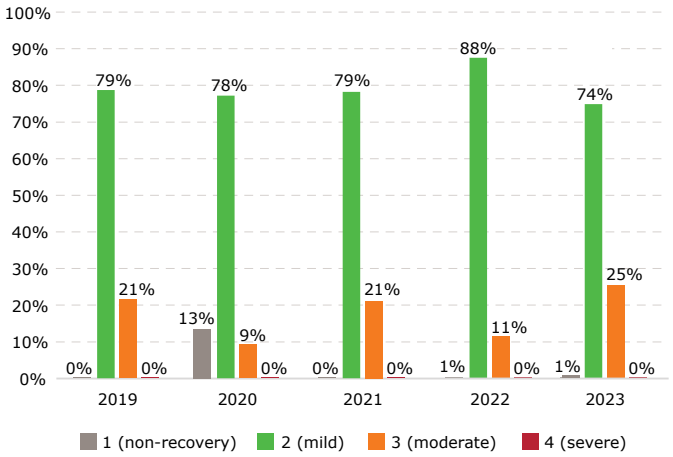
The charts below show the level of discomfort experienced by laboratory animals during animal testing at WUR in 2023. An expected level of discomfort is estimated before the experiment, with a final assessment following afterwards. The assessment considers various factors, such as the pain and fear caused by a particular experiment, any permanent harm to the animal and whether the integrity of the animal is violated. Knowledge of the specific animal species is also needed to assess whether an act causes discomfort. Solitary housing of a social species, for example, causes distress while this is not the case for a solitary species. Animal discomfort is assessed cumulatively. Sometimes an experiment involves different procedures, each causing 'mild discomfort'. However, if we take into account all the procedures throughout the experiment, the entire experiment may then fall into the 'moderate discomfort' category, for example.

WUR-wide, the degree of discomfort shifts from moderate to mild. This is largely influenced by the fish migration survey figures at WR. The tracking and recapture of juvenile eels causes moderate discomfort. If we do not include these figures, the degree of discomfort shifts even further towards 'mild': 80% of the research conducted by WR can then be classified as such.
The level of discomfort has increased at WU. This is partly due to the extensive research with wood mice, voles and shrews in Other rodents.
The animals experience moderate discomfort because a blood sample is taken, albeit under anaesthetic, and a subcutaneous tracker is implanted. The research on oxidative stress and ageing mentioned earlier under mice is also responsible for some of the moderate discomfort. This is because, although most measurements of the animals are classified as 'mild', they are housed solitary. In mice, this is considered moderate discomfort.

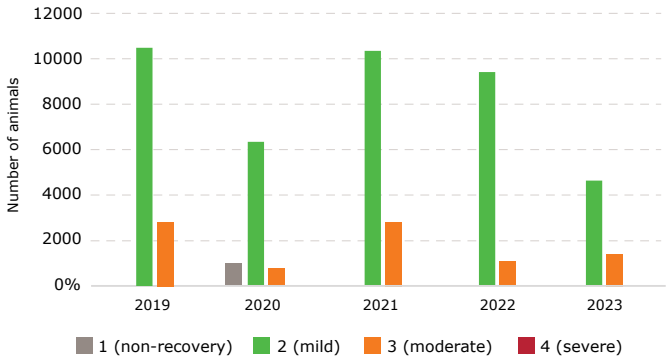
Discomfort as percentage WR



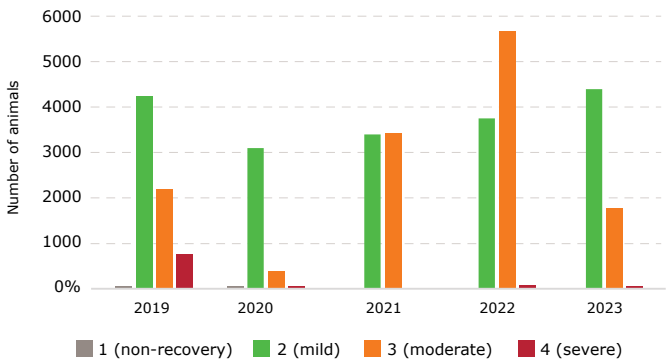
Discomfort as percentage WU



Level of discomfort in absolute numbers animals WU



Level of discomfort in absolute numbers animals WR



Looking ahead

There are several ongoing debates in our society, all related in their own way to our food systems, ecosystems and health, which are in the meantime questioning the position of animals and our relationship to animals. These include the climate debate and the nitrogen debate, but also phenomena like African Swine Fever, Q fever, avian flu and the risk of developing zoonoses. With this comes an increasing awareness of the importance of animal welfare and emphasis on the moral status of animals, which ensures that animal testing is carefully monitored.

In various ways, WUR shows that the animal is at the centre of our research. Extensive information about this can be found on the page 'Scientific research with animals: usefulness and necessity'. This is reflected in the themes on which we conduct research, the biggest being protection of animal species. It is also visible in the way we prioritise animal welfare in all our research: each project is carefully assessed as to whether the expected benefit outweighs the use of animals. It is also compulsory to minimise animal discomfort and keep the number of animals as low as possible. Alongside this, we are committed to training competent researchers and animal attendants to conduct the research as well and effectively as possible, causing minimum discomfort. This obviously includes updating ourselves on new (international) developments and sharing our expertise and insights in various project groups.

Besides our commitment to using fewer laboratory animals, we are also working hard on developing alternatives to animal testing. This was referred to in the introduction. The Animal Sciences Group has set up the Next Level Animal Science programme for this purpose. New examples of what results have been achieved in this research programme are regularly posted on the website, see the Dossier Animal Experiments and the sites of the Innovation Programme Next Level Animal Sciences - WUR and the NLAS magazine: Andere kijk op dieren, nieuwe koers in onderzoek - NLAS magazine NL (wur.nl).

Contact & information

Wageningen University & Research
PO Box 59 6700AB Wageningen
wur.nl/jaarverslagdierproeven

April 2024

Contact
dierproeven@wur.nl

Design
Wageningen University & Research,
Communication Services

Photography
Wageningen University & Research (p1, p4)
Jeroen Bouman (p2)
Shutterstock.com (p5)