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SCIENCE IN THE SERVICE OF ANIMAL WELFARE

Report on the 4th FSVO/UFAW Symposium: Humanely Ending the Life of Animals 2024

The symposium took place on 6-7 March 2024 at the FSVO Liebefeld Campus in Bern, Switzerland, with both in-person and online participation. The event gathered international experts to discuss advancements, current knowledge, and future directions in humane euthanasia, killing, and slaughter across various contexts. The symposium featured 92 in-person attendees, 350 online participants, three invited speakers, and 21 presentations, fostering valuable discussions on this critical topic.

Session 1: Animals in research

Invited speaker/Chair: Dr Patricia Turner *(Charles River Laboratories & University of Guelph, Canada)*

Topics presented:

- Humanely ending the life of laboratory rats.
    - Induction of euthanasia with an anaesthetic gas might represent an option to alleviate the negative side effects of CO_2.
- Neurophysiological monitoring of the dying brain: the welfare consequences of hypobaric hypoxia and hypercapnic hypoxia in laboratory mice.
    - Gradual decompression is a promising alternative to CO_2.
- Refining the drop method for isoflurane induction in mice.
    - Rapid induction of unconsciousness with Isoflurane (the drop method) may be a practical alternative for humanely killing laboratory mice in some scenarios.
- Etomidate Effectively Euthanizes Zebrafish *(Danio rerio)*.
    - Exposure to the anaesthetic etomidate in water can be used to humanely kill laboratory zebrafish.

Overview: This session explored humane methods for euthanising laboratory animals, with a focus on alternatives to carbon dioxide (CO_2) euthanasia. Discussions covered recent research and practical applications.

Current knowledge: While CO_2 remains widely used, concerns about distress have led to studies on alternative methods that may improve welfare.

Next steps: Further research is required to validate and implement alternative methods. Training laboratory personnel on improved euthanasia techniques is essential.

Session 2: Humane control of 'pests'/ schädlinge

Chair: Huw Golledge *(CEO UFAW, UK)*

Topics presented:

- Incorporating animal welfare into pathways for developing selective toxins for control of introduced animals.
    - New Zealand is actively seeking to eradicate non-indigenous predatory mammals. Work is underway to build animal welfare considerations into the development pathway for toxins to predict and avoid poor animal welfare.
- Using a naturally occurring sterility gene to humanely control house mouse pests.
    - A naturally occurring sterility gene could potentially be used to control house mice by reducing fertility through the release of mice bearing two copies of aa sterility gene. This method could be more humane than methods which kill mice and is preferable to genetic modification techniques as a naturally occurring gene is responsible for the reduction in breeding.

Overview: Ethical considerations in managing wildlife populations were discussed, emphasising humane alternatives to traditional pest control methods.

Current knowledge: Conventional pest control methods often cause significant suffering. Humane alternatives such as fertility control and habitat modification are gaining attention.

Next steps: Research into non-lethal pest control methods and public education on humane wildlife management are needed.

Session 3: Slaughter of livestock

Chair: Claudio Zweifel *(Federal Food Safety and Veterinary Office, Switzerland)*

Topics presented:

- The role of the EURCAW (the European Union Reference Centre for Animal Welfare for Poultry and other small-farmed animals) in refining the assessment of poultry and rabbit welfare at slaughter.
    - EURCAW-Poultry-SFA supports the European Commission and Member States in the implementation of welfare legislation for poultry and other small-farmed animals (e.g., minks, rabbits) on farms, during transport and at slaughter. Competent authorities can send queries to EURCAW and evidence reviews, study results, webinars, factsheets and Q2E answers are freely available on the Centre's website (https://www.eurcaw-poultry-sfa.eu/).
- A review of indicators and sensor technologies to assess pig welfare at the slaughterhouse.
    - Sensor technologies and computer vision can be used to provide automated objective assessments of the welfare of animals during their time at the slaughterhouse.
- Comparison of 8 different inert gas (mixtures) to CO_2 for stunning pigs at slaughter.
    - Inert gases, especially argon are more humane alternatives to CO_2 for stunning pigs. Existing CO_2 abattoirs can be converted to use argon for a relatively low cost and meat quality is broadly unchanged, suggesting that the use of argon is a viable and more humane alternative to CO_2.
- Improving automatic electric stunning systems for pigs as a viable & more ethical alternative to CO_2.
    - Careful refinement of animal handling to reduce noise and other stressors alongside abattoir design can significantly improve the welfare of pigs undergoing automated electrical stunning.

Overview: This session focused on humane slaughter techniques, including pre-slaughter handling and stunning methods.

Current knowledge: Effective stunning is crucial to minimising suffering. Advancements in stunning technologies have improved animal welfare in slaughterhouses.

Next steps: Continuous refinement of stunning techniques and enhanced training programs for slaughterhouse personnel are necessary.

Session 4: Depopulation and emergency killing

Invited speaker/Chair: Antonio Velarde *(Institute for Food & Agricultural Research & Technology, Spain)*

Topics presented:

- More humane stunning and euthanasia in pigs and poultry based on nitrogen, with high expansion foam technology.
- Animal Disaster Management Decision-Making: Applying an Animal Welfare Science-Ethics Guided framework within One Health.
    - Decision making in animal disaster management should be a consultative process involving veterinarians, public health ethicists, epidemiologists and animal welfare scientists.
- Towards a more humane depopulation of poultry in case of Avian Influenza.
    - Depopulation methods for poultry in the case of an avian influenza (AI) outbreak were surveyed by the EURCAW-Poultry-SFA which will be used to develop context specific recommendations for the most humane method in different scenarios.
- Humane methods for killing day-old chicks.
    - Whilst maceration of day old chicks is unpleasant it was argued that if done correctly chicks would be killed instantly and thus that maceration is not an animal welfare concern. However ethical concerns over the breeding of animals which are used as byproducts remains. If male chicks are eliminated (e.g. by in ovo sexing) other animals may have to be bred as food for reptiles and other animals which is a common use for culled male chicks.
- A Sustainable Approach to Eliminate Male Chick Culling in the Egg Industry (online).
    - A method for identifying male chicks at an early stage in egg development using a fluorescent marker on the male chromosome has been developed which could allow male eggs to be identified and destroyed prior to incubation.

Overview: Strategies for humane depopulation during disease outbreaks, emergencies or production were examined.

Current Knowledge: Emergency depopulation presents welfare challenges due to the scale and urgency involved. Guidelines aim to minimise suffering, but practical limitations exist.

Next steps: The development of scalable humane depopulation methods and better contingency planning are required.

Session 5: Humane killing of aquatic species for food

Invited speaker/Chair: Hans van de Vis *(Wageningen University and Research, Netherlands)*

Topics presented:

- Challenges of determining sensibility in fish.
    - Assessing loss of consciousness is important in determining if stunning methods are effective, this is particularly challenging in fish. Measuring brain activity and behaviour are used in many species. In fish more work is needed to establish brain activity measures to objectively identify when fish are unconscious.
- Optimisation of electrical stunning in the decapod crustacean Norway lobster *(Nephrops norvegicus)*.

    - Norway Lobster (Nephrops) can be electrically stunned without damaging product quality to avoid the common inhumane process of removing the tail from the head of conscious animals to produce scampi.
- Assessment of the efficiency of electric stunning on the behaviour, physiology, and meat quality of the American lobster *(Homarus americanus)*.
    - The American Lobster can be stunned using the Crustastun device. Meat quality is improved in stunned animals. Work is needed to ensure stunning parameters are within recommended times to insure instantaneous unconsciousness within 1 second.
- Impact of electrical shock and analgesia in Norway lobster *(Nephrops norvegicus)*.
    - Norway Lobsters show responses to electrical shock which suggest they may experience pain.
- Optimisation of in-water electrical stunning in tropical prawns (*Penaeus vannamei)*.
    - Tropical prawns can be electrically stunned using appropriate electrical parameters. Behavioural parameters can confirm the effectiveness of stuns.
- Stunning and killing of European lobster *(Homarus gammarus)* and Edible crab *(Cancer pangurus)*.
    - Decapod crustaceans can be rapidly (<1sec) rendered unconscious using electrical stunning. This method is a feasible alternative to inhumane methods such as boiling or cold water immersion.

Overview: Discussions centred on humane slaughter techniques for fish and other aquatic species.

Current knowledge: Awareness of fish sentience is increasing. Electrical stunning is emerging as a preferred humane slaughter method.

Next steps: Further research into species-specific humane slaughter techniques and industry-wide implementation of best practices are essential.

The symposium highlighted the necessity for ongoing improvements in humane euthanasia, slaughter, and killing methods. Future efforts should focus on scientific advancements, regulatory updates, and educational initiatives to improve animal welfare across all relevant sectors.

For a more comprehensive overview of the symposium's discussions, please refer to the official abstract booklet and programme. Additionally, recordings of the symposium sessions are available for viewing on YouTube here.