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Warning about radio-collar design

Geoff Dandie, CEO, ANZCCART

We have been made aware of a potentially very serious issue associated with the use of some tracking collars in wildlife studies. The problem occurred when possums wearing a commonly used tracking collar became trapped while in their natural habitat and three animals died as a result. While the problem appears to be a relatively minor design flaw that can (and has in at least those three cases) have fatal consequences for the animals on which they have been placed. Obviously, like the researchers, we take issues like this very seriously and so we have reproduced the warning notice the authors published through the Australian Mammal Society – clearly with a view to warning as many of their professional colleagues who might be using these collars as quickly as possible.

Looking at this from the perspective of a group such as ANZCCART, there are a few important points coming out of this report that should be highlighted. First and foremost, we must offer our thanks and sincere congratulations

to the two researchers, who took the initiative and published this warning. Well done! We salute both Katherine Moseby and Hannah Bannister in this regard and would suggest that they and their institution should be very proud of the way they have handled this issue.

Equally, this should be seen as an excellent example of how the system that is in place requiring researchers to submit unexpected adverse event reports to their Animal Ethics Committee (AEC) should work. It is also a great example of how researchers should be assured that the submission of an unexpected adverse event report is not something that will necessarily cause the AEC to think poorly of them or their work – in fact, I strongly suspect that the immediate response of the AEC to this report would have been the exact opposite and meant that the report would have resulted in the AEC developing or extending their respect for these scientists.

It is also really important to recognise exactly where this report came from and what it shows about the people who put it together. Reading through it makes it

absolutely clear that they have genuine concern for the welfare of the animals with which they are working. The fact that they automatically considered it vital to adopt a conservative approach and head out to find the other animals they had fitted with the tracking collars with a view to modifying those collars to protect the animals says a lot about them and this is something that might challenge the perception of scientists held by some.

The AEC perspective is also worthy of consideration at this point. When research work results in the unintentional death of native animals, there can be an initial horror reaction based on the assumption that the researchers have done something wrong. There is also potentially a tinge of guilt among members of the AEC – almost certainly unfounded of course, but the idea that they may have missed something when considering the initial application can play on anyone's mind. After all, they too are only human. At some levels, any sense of moral indignation or concern about the research work is understandable because the fitting of tracking collars to those animals was clearly the defining step that resulted in their entrapment and subsequent death. However, there must always be recognition of the fact that researchers are also human and are probably experiencing exactly the same feelings. In most cases, such as this one, AEC members can be greatly encouraged by prompt reporting of problems and the collaborative and welfare friendly way the researchers handled the problem. They should also remember that all procedures like this come with a risk and where established methods and proven equipment are being used, it is usually reasonable to assume that those risks have been considered and minimized. More importantly however, is the need to foster a collaborative relationship between the AEC and the researchers / teachers rather than a combative one, because the single most important aspect of that relationship is open and honest communication. So adopting a very positive and possibly appreciative tone when acknowledging the report and steps taken by the researchers to address the issue and share what they have learned, is an important way to help encourage that collaborative relationship and protect the welfare of other animals.

What is not clear from this report, is how best to proceed in the longer term. Clearly, there seems to be a design flaw with the collar / antennae system used, with the crimped metal section at the end of the antennae liable to being caught in crevices in the environment, but is cutting off the crimped metal end the only or best solution? Is the metal required to maintain signal strength / reception so that the collars can be detected over the required distance? Might there be a better way to ensure that it is not going to cause entrapment of animals, such as using a shrink wrap style of cover over the length of the antennae (including the metal crimp

section if required) that would provide the necessary degree of slip and ensure that there is no ridge that could catch in any crevice found in the environment? Unfortunately, it would seem that while not all collar designs involve the use of crimped metal at the end of the antennae section, a lot do. This begs the question, are such problems more common than we have previously considered or alternatively, was there something specific about these particular collars and the crimped metal section of their antennae? Either way, we strongly encourage all researchers whose work may be effected by potential problems similar to those described in the following report to take this issue seriously and look at the potential risks associated with the use of such collars and ways those risks can be further reduced. Where appropriate, the findings described in this report might also be worth considering when purchasing equipment such as tracking collars. We would also strongly urge the manufacturers of such collars and related tracking equipment to examine the design of the products they sell and do whatever they can to further reduce the risk of animals wearing their collars becoming trapped.

What follows is a copy of the safety warning report that has been reproduced here with permission from the authors.

Warning about radio-collar design

Katherine Moseby and Hannah Bannister

As part of a reintroduction project, 44 brushtail possums were fitted with VHF collars with external antennas. Part of the collar design includes a small metal crimp at the end of the antenna (Fig. 1), which is covered with thin black rubber (or similar), but which quickly wears away (worn from 100% of our collars).

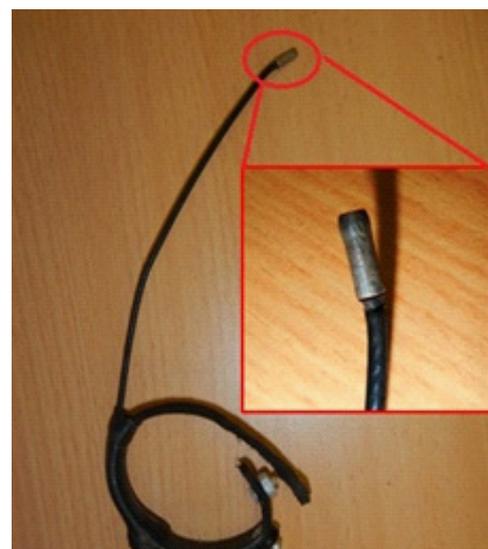


Fig. 1. The radio-collar design, with the metal crimp visible at the end of the antenna (see enlargement).

We write to warn other users about the serious issues we had with this type of radio-collar. We retrieved the carcass of a possum whose collar had gone into mortality mode whilst inside a dead *Callitris* tree; it became apparent that the metal crimp had become firmly wedged in a crack inside the tree preventing the possum from exiting the shelter site. Believing this was a 'freak' accident we made the decision to err on the side of caution and immediately catch the remaining possums and cut off the crimp from all collars, and to seal the end of the shortened antenna with super-glue. Unfortunately whilst trapping the remaining possums we had two more deaths, one in a dead *Callitris* and one using a rock crevice as a shelter site. The remaining 41 possums were captured and crimp removed. This issue is not limited to animals using one particular shelter type and we felt compelled to warn others of the risks in using this collar design, regardless of whether the study species is arboreal or not. We have since been able to ascertain that at least one other researcher has experienced this problem with brushtail possums. Had the carcasses not been retrieved in our study then the cause of death would not have been determined, therefore it is possible that other researchers may have had the same collar problem and not realised due to the carcass being irretrievable. The manufacturers of these collars have been notified and consumers can request to have collars made without the crimp on the antennas, however the default design still includes a crimp to protect the end of the antenna. We suggest that researchers specifically request antennas without crimps and that any collars currently deployed have the metal crimp removed.

Please note this project was conducted under ethics approval and the relevant ethics committees have been notified of these unexpected deaths.

Animal welfare as a socioscientific issue: Engaging adolescents in science

*Dr Sally Birdsall,
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Student interest in science education is declining and fewer are choosing to take specialist science subjects at senior secondary level, both nationally and at an international level. This is a concern considering that we are living in a society that increasingly relies on science for answers to the many problems facing society, e.g. growing obesity epidemic, environmental degradation

and biodiversity loss. Some science educators believe that one solution could be to teach about science concepts related to current issues that are relevant to students' lives. In this way, students could feel that their learning is more personally meaningful and thus, more motivating. However, many of these issues, such as climate change, require more than science education - they extend to the social, political, historical and moral dimensions of learning - and such issues have multiple possible solutions, often requiring value judgments to be made. These issues are referred to as socioscientific issues. Animal welfare can be considered a socioscientific issue, and given that one of the aims of ANZCCART is to promote informed debate about the use of animals, the New Zealand Council has developed two educational resources to be used in New Zealand secondary schools.

Central to both resources is a DVD entitled *Caring for the Animals We Use in Research and Teaching*. This DVD comprises seven small movies. One is a compilation giving an overview of the other six, and is narrated by Dr Jessie Jacobsen (the 2007 MacDiarmid Young Scientist of the Year). Dr Jacobsen was deliberately chosen because we wanted to promote scientists as 'real' people, rather than perpetuate the stereotypical scientist as a European balding male wearing a white coat, glasses and working with bubbling chemicals in a laboratory. There are five movies on the DVD featuring prominent New Zealand scientists talking about their research and how they use animals ethically in their work. These scientists are:

- Professor Bill Wilson – development of anti-cancer drugs
- Professor Jane Harding – effects of prenatal nutrition
- Professor Craig Johnson – use of pain relief on farms
- Professor Alan Herbison – effects of the gene kisspeptin on puberty and fertility
- Associate Professor Kathy Mountjoy – genetic causes of obesity
- Dr Tim Day – development of the Xcluder Pest Proof Fence

The final movie is about how legislation governs the use of animals in schools and classrooms, narrated by Professor Don Love.

To accompany the DVD, the first resource is a CD of learning activities that was developed for 13-15 year old students by practising secondary teachers. These resources have a focus on developing scientific literacy, particularly scientific language, and understanding of the myriad ways in which scientists

work to construct new knowledge and the process of its verification. Learning activities to accompany each of the movie clips include glossary activities; word-searches and crosswords; cloze and domino activities; barrier and sequencing activities; as well as structured fishbowl debates. There are also activities from other subject areas, e.g. poetry, writing postcards and art. A variety of websites are also provided.

The DVD and its accompanying CD was then distributed to all secondary schools. These resources can be accessed by contacting ANZCCART New Zealand directly at <http://anzccart.org.nz/schools/teachers/>

However, the DVD is also suitable for older students because of the science content featured. Because students aged 16-18 are involved in New Zealand's secondary assessment framework, National Certificate of Education Achievement (NCEA) see <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea>, it was decided to develop further resources based on the DVD that related to this assessment framework. The NCEA is made up of three levels of achievement with multiple achievement standards at each level in each learning area, such as biology, physics, geography and photography. Each achievement standard is assigned a number of credits and students need to gain a set number of credits to gain an NCEA certificate at one of the three levels. Some achievement standards are assessed internally (within the school but often sent off to outside moderators) and others are assessed through external examination.

The ANZCCART resources written to align with the NCEA framework focus on three biology achievement standards, one at each of Levels 1, 2 and 3. These three achievement standards are linked across the levels and are designed to develop students' understanding of the complexity of a socioscientific issue; in ANZCCART resource the use of animals in research. The specific achievement standards' requirements are described below.

Level 1 – AS 90926 Report on a biological issue

<http://www.nzqa.govt.nz/ncea/assessment/search.do?query=Biology&view=all&level=01>

To achieve this standard, students need to write a report about an issue, and the ANZCCART resource focuses on the issue of the use of animals in research. Multiple viewpoints about this issue are studied, one of which is available on the ANZCCART DVD, and in the report students are expected to show evidence of:

- Having refined a given question and/or purpose related to the issue;

- Being able to describe biological ideas presented from a range of resources;
- Having collected and/or processed data, e.g. evidence of summarising;
- Being able to present findings and take a position on the issue.

Level 2 – AS 91194 Analyse the biological validity of information presented

<http://www.nzqa.govt.nz/ncea/assessment/search.do?query=Biology&view=all&level=02>

Prior to students completing the assessment task for this standard, they examine and identify biological features involved in an issue (in this case the use of animals in research), identify bias and purpose of information, decide who has a vested interest in that information and consider how such information would affect the public.

Students are then provided with three different sources of information about the issue that they need to analyse. Sources can include a video clip (such as one from the ANZCCART DVD), a newspaper/magazine article, or a scientific paper. Their analysis of the sources needs to show evidence of them being able to:

- Identify biological features in the source
- Identify information as accurate/inaccurate/biased using biological knowledge about the issue
- Correct any inaccuracies found within the source
- Identify the purpose of the source, e.g. the intended audience

Level 3 – AS 91602 Integrate biological knowledge to develop an informed response to a socioscientific issue

<http://www.nzqa.govt.nz/ncea/assessment/search.do?query=Biology&view=all&level=03>

To pass this achievement standard students are expected to work independently with some guidance from their teacher to construct a presentation, e.g. a report or poster that presents and justifies their personal viewpoint about an issue (the use of animals in research) and propose action that they could take. The action can be individual or collective. Requirements for the presentation include:

- An explanation of the position taken by the student and why an action has been chosen;
- Relevant biological knowledge about the issue;
- An evaluation of the biological knowledge used, e.g. commenting on its validity and bias, comparing significance of implications and considering the efficacy of actions.

Four practising secondary teachers were contracted to write four assessment resource packages for these achievement standards. Each assessment resource is a complete package for a teacher and consists of:

- A copy of the relevant achievement standard and conditions of assessment;
- Planning notes to contextualise each achievement standard in the issue of the use of animals in research;
- The assessment task, its marking schedule and assessment criteria for three levels of achievement;
- A range of relevant resources to accompany the planning notes.

Each package was checked for scientific accuracy and copyright and then sent to the New Zealand Qualifications Authority (NZQA) for 'QAAMing' (Quality Assured Assessment Materials). 'QAAMing' means that each assessment package was moderated by NZQA subject experts so that it is approved by them as meeting the requirements for the nominated standard. Consequently, a 'QAAMed' assessment package is very desirable for secondary teachers because teachers do not have to modify the assessment task before teaching. Nor does the assessment task itself need further moderation when teachers send students' work away for moderation by the NZQA.

The packages developed are:

- Biology 1.2 – AS 90926 – Animal research: What's a life worth?
- Biology 2.2 – AS 91154 – Animal research: The best thing for human medicine and animals?
- Biology 3.2 – AS 91602 – Using animals for research and teaching in New Zealand
- Biology 3.2 – AS 91602 – Animal research: Predator proof fences

This latest ANZCCART resource has been advertised as being available by request by emailing anzccart@royalsociety.org.nz. To date, 60 secondary schools, mostly in the North Island have written to request copies. Two university education faculties have also requested copies as has one NGO.

Through the use of these resources it is hoped that students will develop deeper scientific understandings and learn about the roles that animals play in the expansion of scientific knowledge, as well as appreciate the legal and social responsibilities that such use entails. As a result, they could develop a more informed viewpoint about this socioscientific issue and be able to participate in discussions about it with others.

Amendments to the Prevention of Cruelty to Animals Act 1986 (Victoria)

POCTA amendments

Recent amendments to the Prevention of Cruelty to Animals Act 2015 came into effect on 23 December 2015. Amendments relevant to the use of animals in research and teaching include:

Increased maximum penalties for offences relating to scientific procedures;

A new offence for a licence nominee to fail to take all reasonable steps to ensure that any scientific procedure, or breeding of specified animals, conducted under the licence is carried out in accordance with the licence conditions;

Clarification of the powers of Authorised Officers in relation to compliance monitoring; investigation of illegal animal research; entry, search and seizure under warrant; and the introduction of a 'notice to comply' that may be issued to a person committing, or likely to commit, an offence under Part 3 of the Act.

The latest version of the Act can be found at:

<http://www.legislation.vic.gov.au/>

For more information please email:

sp.licensing@ecodev.vic.gov.au

Recent Articles of Interest:

A mouse's house may ruin experiments

Often, experimental treatments that succeed in one mouse population do not even work in other mice, suggesting that many rodent studies may be imperfect from the start. Researchers rarely report on environmental factors such as the mice's food, bedding, lighting and as these conditions vary across laboratories the animals' biology can be significantly affected. For example, some mouse foods contain oestrogens that can affect research on cancer and when the high fat and sugar food used in obesity studies goes rotten, the mice refuse to eat it and can lose weight. Improved mice and food are available, however, within the competitive scientific environment some researchers are reluctant to use them for fear

that it will affect their results. Some Institutes of Health in the US have addressed some of these issues by requiring that certain animal trials are to be duplicated before moving into clinical trials. In 2014 the NIH gave out extra grants to researchers who complained about the cost involved with using female animals however no funding was offered to study other factors. As Caroline Zeiss, a veterinary neuropathologist at Yale, said, it is disappointing that "The information and the wisdom is out there but studies get funded without necessarily a lot of attention to that". Read the full article at:

http://www.nature.com/news/a-mouse-s-house-may-ruin-experiments-1.19335?WT.ec_id=NATURE-20160218&spMailingID=50720412&spUserID=MjA1NzU1ODMzOQS2&spJobID=862152809&spReportId=ODYyMTUyODA5S0

Mouse Model for Zika Virus Enables Immediate Screening of Potential Drugs and Vaccines

Researchers from the University of Texas Medical Branch have been investigating the rapid rise in the Zika virus infection raging through parts of Central and South America. Their recently published study of a mouse model for the virus is an important first step to enable testing of vaccine and drug candidates.

Little is known about how the virus behaves once inside the body, and after searching for viral infection in animals organs, researchers found high level of viral particles in the brain, spleen and testes. The finding of virus in the brain could be important as in the current outbreak in Brazil, children born to infected mothers have abnormally small heads and even some are born with under-developed brains. Shannan Rossi, leading author of the study says "While the mouse study does not prove a direct connection between Zika infection and microcephaly, it does underscore the urgent need for effective animal models to further study the course of disease and its transmission". Read more at:

http://www.alnmag.com/news/2016/03/mouse-model-zika-virus-enables-immediate-screening-potential-drugs-and-vaccines?et_cid=5203170&et_rid=497549351&type=cta&et_cid=5203170&et_rid=497549351&linkid=http%3a%2f%2fwww.alnmag.com%2fnews%2f2016%2f03%2fmouse-model-zika-virus-enables-immediate-screening

SPF 30 Sunscreen May Cut Cancer Risk by 80%

A recent mouse model developed at Ohio State University allows researchers to test the ability of a sunscreen to not only prevent burns but also to prevent melanoma. The research has shown that when SPF 30 sunscreen was applied prior to UVB exposure, it greatly reduced the risk of the deadliest kind of skin cancer, melanoma. The study had some restrictions. Besides the fact that it was done on animals, it also looked only at a short but intense dose of UVB rays - UV rays across the range can contribute to cancer risk, and the average person is not exposed to that much UVB at one time.

Christin Burd, assistant professor of molecular genetics and lead researcher at the University, added, "We hope that this model will lead to breakthroughs in melanoma prevention" and is currently seeking funding to explore further conditions. Read the full article at:

<http://time.com/4297623/spf-sunscreen-melanoma-cancer-risk/>

Camera traps may aid conservation

A motion-triggered camera has been used to analyse 8,000 photographs of 44 species of mammal across the Okavango Delta of Botswana.

Lindsay Rich of Virginia Polytechnic Institute and State University in Blacksburg set the 'camera traps' at over 200 locations for 6 months. Using the photographs they were able to develop models to assess the spatial spread of the mammals and found that the range of species increased with distance.

The study has proven to be an efficient way of data collection for wildlife conservation and in the case of Botswana, revealed that the grasslands and floodplains are home to varied animal populations. Read more at:

http://www.nature.com/nature/journal/v533/n7601/full/533011d.html?WT.ec_id=NATURE-20160505&spMailingID=51301208&spUserID=MjA1NzU1ODMzOQS2&spJobID=920498312&spReportId=OTlwNDk4MzEyS0

Dirty room-mates make lab mice more useful

David Masopust, an immunologist at the University of Minnesota, doubted that commercial lab mice specifically bred in sanitized environments are good research models for people, who do not live in such clean conditions. He and his colleagues published a paper which shows that wild and pet-shop mice have tough complex immune systems that imitate those of adult humans. When the lab mice were exposed to these mice their immune system was strengthened.

To determine whether the differences between the two mice were genetic or due to environmental factors, the immunologist housed pet shop mice and lab mice, monitoring them for two months. Many of the lab mice became sick from contact to the dirt and germs from the outside mice and 20% of them died. The lab mice who did survive appeared stronger.

Masopust said his study should not be seen "as an argument against using mice to model human diseases" however the model could be used for pilot studies before testing on humans. The immunologist's next stage is to test "the hygiene hypothesis - the idea that allergies and autoimmune diseases result when babies are not exposed to enough microbes or allergens when they are young". Read the full article here:

<http://www.nature.com/news/dirty-room-mates-make-lab-mice-more-useful-1.19768?spUserID=MjA1NzU1ODMzOQS2&spJobID=902556060&WT.ecid=NATURE-20160421&spReportId=OTAYNTU2MDYwS0&spMailingID=51196306>

Revamped ANZCCART Website

We have just finished a major revamp of the ANZCCART Website.

If you experience any problems could you please let us know so we can address them as soon as possible.

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**It is a publication for researchers and teachers:
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and members of the public with interests in
the conduct of animal-based research and
teaching and the welfare of animals used.**

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