VETERINARY INVERTEBRATE SOCIETY JOURNAL



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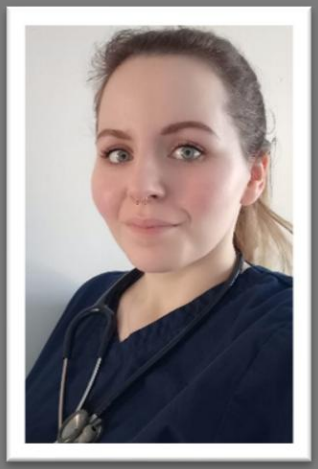
Editorial Team





Co-editors
Benjamin and Agata

Word from the Editors

Dear Veterinary Invertebrate Society Journal Readers,

We are delighted to welcome you back to another issue of the journal. It has been quite a long time that we have been underground! We have been very active as a society since the last edition and have a packed issue for you. We have a peer reviewed article on theraphosid euthanasia, a set of articles on foul brood in bees, as well as an opinion piece on the risk of parasiticide use in households with invertebrate pets. Finally, we have some scans contributed by John and Margaret Cooper that shed light on how invertebrate medicine is not so novel as we may often think. We do hope you enjoy reading this issue!

It has been a pleasure to continue to provide an avenue for the publishing of invertebrate research and case reports. We hope that by working hard on the VISJ that we may help our community to share knowledge in invertebrate medicine and care. Please do consider submission should you have anything interesting to share.
Benjamin and Agata

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From the Chairman



Steven Trim,
Chairman of the Veterinary Invertebrate Society

Welcome to another great issue of the VISJ, as the Chairman I am not involved with the hard work of collating, editing and assembly of the VISJ so it is always a pleasure to see the final draft. The VIS is a voluntary learned society and thus everything we do is in addition to our, usually greater than, full-time jobs. Since our last issue we have hosted another very successful conference at Dudley Zoo and Castle for which I want to formally thank our host Jack Williams, the Conservation and Deployment Coordinator. Jack made the VIS extremely welcome and was a great help to the VIS conference committee, without which these events can't take place. So please enjoy this issue and thank you all for your support, by reading the VISJ and thinking about veterinary care of invertebrates you are also helping the VIS and our aims. Thank you.

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Summary of Recent Research

Review of most recent papers and research surrounding invertebrates

Compiled by Dr Carol Margaret Trim MRSB SFHEA

Lessons Learned from the Sea Star Wasting Disease Investigation

Hewson I, Johnson MR, Reyes-Chavez B. Lessons Learned from the Sea Star Wasting Disease Investigation. Ann Rev Mar Sci. 2025 Jan;17(1):257-279. doi: 10.1146/annurev-marine-040623-082617. Epub 2024 Nov 25. PMID: 38885431. https://pubmed.ncbi.nlm.nih.gov/38885431/

This review highlights that further investigations of the candidate agent believed to have caused pathogenic and transmissive disease in the 2013-24 sea star wasting disease mass mortality event (MME) failed to prove that this was the cause of the event. The lessons they have learnt from this has been effectively applied in the 2022 Diadema antillarum investigation.

A histopathological guide for the social spider *Stegodyphus dumicola*

Clark G, Keiser CN, Cassidy ST, Dalton D, Bojko J. A histopathological guide for the social spider Stegodyphus dumicola. J Invertebr Pathol. 2025 Feb;208:108236. doi: 10.1016/j.jip.2024.108236. Epub 2024 Nov 17. PMID: 39561872. https://pubmed.ncbi.nlm.nih.gov/39561872/

This paper provides histological images for healthy spider tissues of the social spider *Stegodyphus dumicola*. While investigating these tissues they also discovered an intranuclear, baculovirus-like pathology.

Diseases of Gastropoda

O'Brien MF, Pellett S. Diseases of Gastropoda. Front Immunol. 2022 Jan 13;12:802920. doi: 10.3389/fimmu.2021.802920. PMID: 35095886; PMCID: PMC8792982. https://pubmed.ncbi.nlm.nih.gov/35095886/#full-view-affiliation-1

This review investigates the bacterial, fungal, viral, parasitic and miscellaneous conditions in gastropods and discusses some of the factors that make them more vulnerable to disease.

Updated roles of the gut microbiota in exploring shrimp etiology, polymicrobial pathogens, and disease incidence

Xiong, J. B., Sha, H. N., & Chen, J. (2024). Updated roles of the gut microbiota in exploring shrimp etiology, polymicrobial pathogens, and disease incidence. Zoological research, 45(4), 910–923. https://doi.org/10.24272/j.issn.2095-8137.2024.158 https://pmc.ncbi.nlm.nih.gov/articles/PMC11298683/

The shrimp species *Litopenaeus vannamei* is of great economic value so their health is key to successful aquaculture. Disease outbreak is a huge problem in this species. This review collects the limited data on shrimp diseases and their effects on the shrimp gut microbiome.

Summary of Recent Research

Distribution of infectious and parasitic agents among three sentinel bee species across European agricultural landscapes

Babin, A., Schurr, F., Delannoy, S., Fach, P., Huyen Ton Nu Nguyet, M., Bougeard, S., de Miranda, J. R., Rundlöf, M., Wintermantel, D., Albrecht, M., Attridge, E., Bottero, I., Cini, E., Costa, C., De la Rúa, P., Di Prisco, G., Dominik, C., Dzul, D., Hodge, S., Klein, A. M., Dubois, E. (2024). Distribution of infectious and parasitic agents among three sentinel bee species across European agricultural landscapes. Scientific reports, 14(1), 3524. https://doi.org/10.1038/s41598-024-53357-w

Bee health is at risk from environmental stressors like infectious and parasitic agents. In this study three bee species *Apis mellifera*, *Bombus terrestris* and *Osmia bicornis* were tested for infection in eight European countries.

Decoding Octopus Skin Mucus: Impact of Aquarium-Maintenance and Senescence on the Proteome Profile of the Common Octopus (Octopus vulgaris)

Pérez-Polo, S., Mena, A. R., Barros, L., Borrajo, P., Pazos, M., Carrera, M., & Gestal, C. (2024). Decoding Octopus Skin Mucus: Impact of Aquarium-Maintenance and Senescence on the Proteome Profile of the Common Octopus (Octopus vulgaris). International journal of molecular sciences, 25(18), 9953. https://doi.org/10.3390/ijms25189953

This paper discusses using non-invasive biomarkers found in the skin mucus proteome to monitor octopus health and welfare in captive environments.

Peer-Reviewed Article

Recommendations on euthanasia techniques for theraphosid (Tarantula) spiders

Dr Benjamin Kennedy, Dr Tom Bunn, Dr Sarah Pellett

Introduction

Euthanasia is defined as “painless killing to relieve suffering” (Royal College of Veterinary Surgeons Code of Conduct, Section 8, 2024) and is a widely discussed topic in the context of human and veterinary medicine. However, the application of euthanasia to invertebrates is less well travelled. Spiders exhibit multiple unique physiological and anatomical characteristics that make euthanasia challenging, and understanding of pain perception and sentience in these species is not yet fully understood (Pizzi and Kennedy 2022).

This article aims to describe and review appropriate techniques for performing euthanasia in theraphosid spiders, respecting both the welfare and experience of the animal and associated human, and the requirements for preserving diagnostic tissue samples. To ensure the responsible and humane handling of spiders during euthanasia, this article will present a thorough overview of preferred anesthesia procedures, euthanasia techniques, and confirmation of death, supported by relevant scientific literature.

Common situations where euthanasia may be required for pet tarantulas include severe dysecdysis or haemolymph loss, chronic or age-related conditions, unresolvable disease processes and trauma (Pellett, O’Brien & Kennedy, 2020). In the UK, theraphosid spiders are not governed by the same legislation as vertebrate species or cephalopod invertebrates, but humane treatment of these animals is essential on welfare and ethical grounds (Pellett & Trim, 2021; Animal (Scientific Procedures) Act 1986).

General Anaesthesia

Several factors limit successful anaesthetic and analgesic use in theraphosids. These include subjectivity in pain assessment as well as a paucity in the literature relating to efficacy, safety and dosing in these species (Sladky, 2014).

The authors generally advocate for the administration of general anaesthesia prior to euthanasia for ease of positioning, handler safety and to protect the animal from any noxious effects of the procedure. Even in very debilitated or immobile spiders where it may be possible to perform euthanasia in the conscious patient, general anaesthesia is still recommended. Some species can move very quickly and have a painful venomous bite, therefore anaesthesia is ideally performed within the travel container if adequate visualisation allows. Otherwise a large canine facemask can be placed over the spider and the volatile agent introduced. The respiratory openings for tarantulas are the book lungs, located on the ventral surface of the opisthosoma. These must be exposed to the anaesthetic agent (Pellett & Trim, 2021).

Induction of anaesthesia can be achieved through exposure to isoflurane, sevoflurane, or carbon dioxide within an induction chamber, as delineated in the invertebrate medicine literature (Cooper, 2011; Pizzi and Kennedy, 2022), Isoflurane and sevoflurane are favored over carbon dioxide due to their more rapid action while appearing to be less aversive (Dombrowski, De Voe and Lewbart, 2013; Zachariah et al., 2014).

Peer-Reviewed Article

Loss of the righting reflex and chelicera tone serve as reliable indicators of adequate anesthetic depth (Pizzi and Kennedy, 2022). Alternatively, the use of injectable anaesthetics such as ketamine and alfaxalone have been documented (Gjeltema, Posner and Stoskopf, 2014). The use of chilling or rapid freezing are strongly discouraged as have unreliable onset and effect, are considered inhumane without better understanding of how pain pathways are and will cause damage to histological specimens preventing further analysis (Cooper 2011; Pizzi and Kennedy 2022).

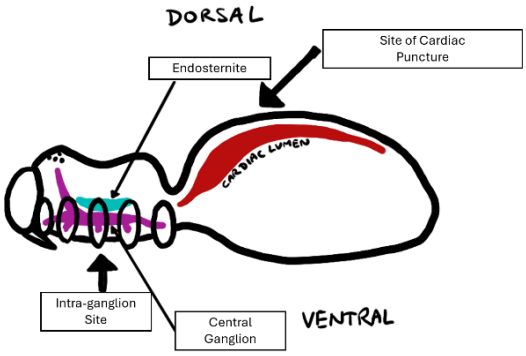

Figure 1. Demonstrating the anatomical location of the pericardial sinus/cardiac lumen and the central ganglion.



Figure 2. Demonstrating haemolymph collection from the pericardial sinus in a theraphosid spider under isoflurane anaesthesia. This site is the same for administration of intra-cardiac medications or fluids.

The approach to the sub-oesophageal ganglion requires placement of the spider in dorsal recumbency, and inserting a 21-23 gauge hypodermic needle through the central midline ventral prosomal cuticle until the increased resistance of the endosternite is reached. At this point retract 1-2mm, and administer the full volume at the ganglion site (Bennie et al., 2012; Pizzi and Kennedy, 2022). This method may be more suitable for dehydrated or debilitated theraphosids compared to the pericardial sinus approach.

Another acceptable method of euthanasia includes immersion in 70% ethanol or 10% formalin following anaesthesia (Pizzi and Kennedy, 2022). Spiders may demonstrate hypermotility for several minutes even at an adequate depth of anaesthesia. Although unlikely to be a reaction to noxious stimulus given plane of anaesthetic, these movements can be quite distressing to observe. For this reason, we would recommend reserving this method for when there is no access to barbiturates or potassium chloride.

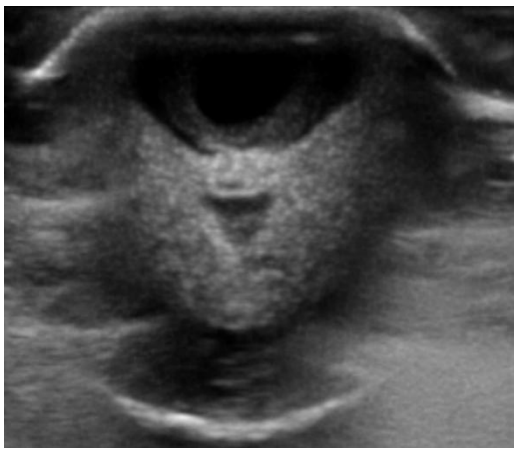

Figure 3. Dorsal transverse ultrasound section of a theraphosid opisthosoma demonstrating the cardiac lumen and the surrounding pericardial sac

Other methods described in the literature

Mechanical destruction, for example by rapid crushing of the prosoma is often discussed. This crude method can be effective if the ganglia are fully and instantly destroyed, however in our experience this is harder than it seems and particularly challenging for larger tarantulas. If any further diagnostics should be required this would not be possible after crushing, and it should also be stressed that this would be wholly inappropriate for a beloved pet and may elicit an extreme reaction from an owner.

Historically, rapid freezing has also been used as a method of euthanasia. This is ineffective at achieving a rapid death and causes the fluids within the spider to form ice crystals, which are likely to cause significant noxious stimulus as well as damaging the tissues and limiting their diagnostic value. It should be noted that rapid freezing relies on the extremely low temperatures found in liquid nitrogen and is not achievable with domestic freezers as is sometimes suggested in hobbyist forums. Even in anaesthetized animals slow freezing is unacceptable as the spider may recover from the anaesthetic prior to death. We do not recommend freezing of any sort due to the risk of suffering.

For immersion in alcohol or formalin, mechanical destruction and rapid freezing, these techniques are not considered humane as a sole method of euthanasia and should only be used as the second stage of a two-step method, following anaesthesia as described above (Leary et al., 2020).

Confirming death

Spiders can be incredibly resilient and given their tolerance for hypoxia and diffuse neurological tissue they can be challenging to euthanase successfully. Diagnosing death can also be challenging, as even when dead, pinching or moving the limbs will result in some movement in the other limbs due to hydraulic pressures. This is normal but can create the impression that the spider is still alive. There are a few ways to improve one's confidence that euthanasia has been achieved. Firstly, a Doppler probe placed on the dorsal opisthosoma can confirm a lack of heartbeat. This can be challenging in smaller spiders, and heart rates can be very low so listening for at least 2-5 minutes is advised. Spiders under deep sedation may have an undetectable heartbeat thus this is only a suitable method of confirming death following a suitable euthanasia method [Steve Trim, 2023]. It can be helpful to check Doppler probe positioning prior to euthanasia for comparison.

Conscious living spiders will also have a righting response, movement of the hair sensillae, jaw tone and spinneret movement, thus the absence of these indicators can increase confidence that death has been achieved, though anaesthesia will mask these. Alternatively, a second mechanical method of euthanasia can be employed to rule out recovery, for example mechanical destruction or immersion in 70% ethanol solution. Historically drawing an outline or scattering sand around the animal to confirm no movement over a 24-hour period was advocated to confirm death. Unfortunately, as a very sick or anaesthetized tarantula may not move for 24-hours, this doesn't give the clear confirmation desired.

To maximise diagnostic quality of tissue samples, the author will typically immediately fix all spiders in Kahle's fixative, 70% alcohol or 10% formalin. Fenestrating the cuticle in multiple points helps to ensure good fixation (Kennedy, 2017).

Conclusion

In conclusion, theraphosid spiders offer challenges for euthanasia relating to restraint, landmarks and confirmation of death. We hope this article demonstrates several safe and effective methods using drugs and equipment that should be present in any small animal veterinary practice to enable better euthanasia practices for theraphosid patients.

Resources

If in doubt when performing euthanasia on an unfamiliar species, the Veterinary Invertebrate Society can be a good source for advice in all invertebrate taxa.

Conflict of Interest/Disclaimer

The authors are all members of the steering committee of the Veterinary Invertebrate Society

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Short Communication

Foulbrood Diseases of Honeybees

Dr John Hill MRCVS of the British Bee Veterinary Association

Introduction

Foulbrood diseases represent some of the most significant bacterial threats to honeybee colonies. The two primary diseases in this category are American foulbrood (AFB) and European foulbrood (EFB). Both have the potential to devastate hives by causing the death of developing brood and weakening entire colonies. As such, effective management and early detection are critical to preventing the spread of these diseases and protecting bee populations.

American foulbrood is caused by the bacterium *Paenibacillus larvae*, whereas European foulbrood is the result of infection by *Melissococcus plutonius*. Although both diseases impact the brood, each presents distinct symptoms that require accurate identification for successful intervention and treatment. Recognising these symptoms promptly is key to saving affected colonies and reducing the risk of transmission to neighbouring apiaries.

Despite their names, American foulbrood was first described in the United States and European foulbrood in Europe. However, both diseases are now found worldwide, affecting honeybee populations across the globe.

Aristotle described AFB and it appears in writings throughout history. The term Foulbrood relates to the rancid smell of the comb caused by the purification of the dead larvae. This is not caused by *P. larvae* but by secondary bacterial infection, *Paenibacillus alvei*.



American foulbrood bacteria

AFB exists in two forms, the spore state and the vegetative form. The spore form is highly resistant to temperature, humidity, desiccation, chemicals, antibiotics and time. Spores can survive up to 70 years. European Foulbrood is a bacillus that does not sporulate and, like AFB, is spread to young larvae by the nurse bees in brood food.

AFB kills larvae usually just before the brood cell is sealed. Nurse bees transmit the spores to the larvae in brood food. The larva ingests the spores, and they enter the larval stomach or ventriculus. Here the spores hatch into the vegetative form, which produce chemical which allow it to penetrate through the thin stomach wall into the larval blood or haemolymph. This process only happens in larvae up to 56 hours old. After this, the stomach wall thickens and prevents bacteria from traversing. The bacteria multiple very rapidly in the haemolymph and cause larval death by septicaemia. The remains begin to disintegrate, and the bacteria revert to the spore form. There can be up to 2.4 billion spores in a single cell. The larval remains form a sticky homogeneous fluid which will eventually dry out into a black scale that adheres to the cell wall and unable to be removed by the worker bees.

Short Communication

Melissococcus plutonius kills the larvae in a different manner. The bacteria are fed to larvae by nurse bees in brood food. The bacteria rapidly multiple in the larval stomach, ventriculus, and compete with the larva for food. The larva starves to death and begins to disintegrate. If the bees sense a dead larva, they will extract it from the cell and eject it from the hive intact. If the larval abdomen is ruptured, the infection will spread to more workers and on to more larvae.

An infected frame will have a pepper pot appearance with lots of open cells because the workers cannot clean them out due to the adherent black scale and the queen not re-laying in them. AFB usually kills the larva after the cell is sealed which means the signs of infection are with the cappings.

Normal worker cappings are slightly convex and a dry digestive biscuit colour. Infection will cause the capping to sink, darken in colour and look greasy. There may be perforations in the wax, which is caused by bees, sensing there is a problem in the cell and pierce the capping to sense what is happening. The pungent putrid smell may be apparent.



Appearance of AFB infestation

European foulbrood infection will kill the larvae before the cell is sealed. A normal larva is C shaped, glistening pearly white and segmented. The infected larva darkens in colour and twists itself in the cell. It loses segmentation and eventually has a rubbery consistency.

The bees are likely to pull the larva out of the cell and eject it from the hive. This means that you could see infected cells today but by the time you look a day or two later with the bee inspector the infection may not be visible.

Research shows that if you have one infected colony in an apiary, then all the other colonies in the apiary are likely to be infected. This is why it is seen as being a classical sub-clinical disease.

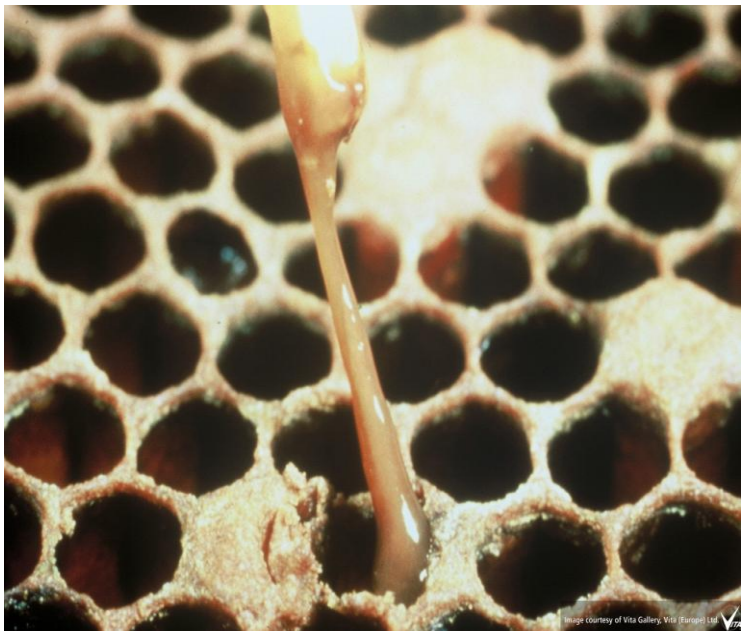
Short Communication

If a beekeeper suspects a foulbrood infection or is not sure, then he/she must contact the bee inspector by law. The bee inspector will attend as soon as possible and will do a detailed colony examination. Samples may be taken and sent to the laboratory. It is the bee inspector who will make the formal diagnosis. If the infection is AFB, then the colony of bees must be euthanised. This operation is done in the evening when all the bees have returned to the hive.

The entrance is closed and about 250 mls of petrol or diesel is poured through the hole in the crown board and sealed. The bees will be dead in about 10 minutes. The contents of the brood and super boxes are placed in a pre-dug hole, 3 feet deep and 3 feet square and set on fire. When the fire is burnt out, the contents are buried with soil. While most of the honey and wax will burn, there will be a puddle left at the end which needs to be covered over before any bee would rob the contents. The boxes can be scraped and sterilised by searing the insides with a blowtorch to kill spores or the boxes could be burned in the fire. Incidence of AFB cases is between 25-50 cases a year with most being found by the bee inspectors.

EFB cases again must be diagnosed by a bee inspector. The colony can be euthanised in a similar manner to AFB, and this would be the recommended procedure.TH law allows for the use of antibiotic treatment and using the Shook Swarm procedure, where the bees are shaken into a fresh clean brood box and new frames with foundation.

Up to the 1960's both AFB and AFB had statutory destruction orders, and the incidence had fallen sharply since the second world war. Bee farmers in 1960's requested that EFB should have the option of antibiotic use. Law was changed and this was allowed. Advice at the time was to treat all colonies in an apiary and to change the wax for fresh wax in all colonies. This advice was observed for many years but was eventually stopped. Effect was the incidence of EFB increased considerably in 1980's and 1990's. Shook Swarm procedure was promoted around the millennium and antibiotic use reduced to virtually zero. The mistake of relaxing the law has meant that the incidence of EFB has increased to around 800 plus cases per year in England and Wales. It is generally accepted that EFB infected colonies should be culled if clinical signs are present.



Rope test for AFB

Short Communication



Stages of decay for EFB infected larva

The USA took on a policy of treating bee colonies prophylactically twice a year with the antibiotic oxytetracycline twice a year with the product being sold over the counter to beekeepers by merchants. This has not been successful as resistance to this antibiotic became widespread. The beekeepers moved on to other products, tylosin and lincomycin with resistance now developing. Restrictions have now come about in 2017 with beekeepers required to obtain a vet's prescription before the antibiotics can be acquired.

The first ever insect vaccine has been developed by Prof Dalial Freitag in Finland and Austria for American Foulbrood. A process called Transgenerational Immune Priming was successfully used to vaccinate queen bees with fragments of AFB spores. The solution containing the antigen was mixed in sugar water and given to worker bees to feed the queen. Queen developed immune chemicals in her system which passed through the molecule Vitellogenin to the ovaries and then into the eggs thereby giving the offspring immunity to AFB. The product has a licence in the US and is currently being sold to beekeepers. Results should be available soon.

AFB and EFB can spread through various means, including movement of contaminated equipment, drifting bees, and the movement of infected honey or brood between hives. To limit outbreaks, good husbandry practices are vital. These include regular hive inspections and thorough cleaning of beekeeping tools and bee suits. Beekeepers must stay vigilant for signs of foulbrood diseases and respond quickly to isolate and treat affected colonies. By doing so, they help safeguard the health of their apiaries and protect the wider bee population.

Foulbrood disease remains a major problem for beekeepers worldwide and measures must be constantly used to combat them.

Communication

Short communication on reducing exposure and mitigating risks of anti-parasitic medications for vets in general practice

Dr Benjamin Kennedy

Introduction

Small animal veterinarians regularly use Prescription-Only Veterinary Medicine (POM-V) anti-parasitic products, which, while essential for pet health, pose risks to non-target species, including invertebrate pets, humans (Kim *et al.*, 2019), and the environment (Perkins *et al.*, 2024; Tassin De Montaigu *et al.*, 2025). To effectively mitigate these concerns, veterinarians carefully consider treatment options based on a holistic approach to the patient's care, involving the patient's needs and lifestyle, other non-target species in the household and the exposure of the patient to the environment. Owners should be fully informed of what the anti-parasitic treatment is doing and be educated on how to manage risk.

Reducing Risk to Non-Target Invertebrates:

Many invertebrate pets, including spiders, snails, and insects, are highly sensitive to anti-parasitic products. Veterinarians should establish what pets are present within the household, such as invertebrates, birds, reptiles, amphibians, and fish, to assess and mitigate associated risks effectively. When exposure to anti-parasitic treatment is unavoidable, lufenuron is preferred due to its insect-specific mode of action without neurotoxic effects, thus posing less risk to non-target species. Oral medications are preferable because the majority are hepatically metabolised and thus excreted in bile which in turn means that collecting and disposing of faeces will greatly reduce environmental exposure. Treated animals, whether receiving oral or topical treatments, should ideally be kept separate from enclosures and rooms containing invertebrates or other exotic pets. Client education should emphasise secondary contamination risks, highlighting the importance of proper hand hygiene and environmental cleanliness following treatment and handling of any other pets.

Minimising Human Exposure:

Although anti-parasitic products primarily target invertebrates, they pose significant risks to humans, particularly to children who share similar body weights with treated pets (Powell, Foster and Evans, 2018). Veterinarians should assess household dynamics, specifically regarding pets that sleep with humans, and issue guidance tailored to the product used and the household situation. Examples of guidance could include that pets receiving spot-on treatments should not co-sleep with humans for at least 72 hours post-treatment, or that the treatment could be washed off after the initial absorption period (off-label use). Pets wearing flea collars must never co-sleep with humans due to prolonged exposure risks and previously reported neurological incidents especially in children. Clear instruction on the proper handling, including the use of gloves during application, should be provided. Veterinarians should reconsider the necessity of year-round prophylactic treatments for indoor or low-risk animals. Additionally, product datasheets must be supplied to pet owners, clearly highlighting any precautions or risks noted there (Veterinary Medicines Directorate, 2025; *Summary of Product Characteristics, See references*).

Environmental Protection:

Environmental contamination with anti-parasitic products primarily occurs through improper disposal, faecal excretion (especially when not cleaned up), and inappropriate reuse of pet-derived materials such

as hair. Veterinarians should advise that cats treated with spot-on products remain indoors for 48–72 hours, particularly during rainy weather, to prevent environmental runoff. Dogs similarly treated should refrain from swimming or bathing for at least 72 hours post-treatment, though a strong argument could be made for 28 days following treatment (Perkins, Glauser and Goulson, 2025). Oral medications offer greater environmental control as for the most part, picking up and disposing of faeces appropriately will greatly reduce environmental contamination. Hair from all flea-treated animals should be disposed of safely and not used in gardens or as nesting material for birds. If hair is to be used, it should ideally originate from an animal that has not received ectoparasite treatments for at least six months. Veterinarians should recommend treatments based on lifestyle rather than routine blanket prophylactic treatments, further reducing unnecessary environmental exposure ('BVA, BSAVA and BVZS policy position on responsible use of parasiticides for cats and dogs').

Practical Takeaways

- Clearly communicate risks associated with anti-parasitic POM-V products, especially in households with invertebrate pets and other exotic animals. Vets should make themselves aware of all animals in household that may be vulnerable.
- Oral formulations may have less environmental contamination than spot on formulations.
- Especially when using flea collars and spot-ons, determine if owners or children co-sleep with the treated pet and advise the owners accordingly.
- Recommend anti-parasitic treatments based on a holistic understanding of patient's risk and lifestyle rather than routine "one-size-fits-all" prophylactic use.
- Ensure clients are fully informed of risks and are educated on correct administration and personal protection.

Conclusion

Responsible use of anti-parasitic POM-V products involves careful consideration of treatment choices, clear communication of potential risks, and comprehensive client education. By taking proactive steps to protect non-target species, minimise human exposure, and reduce environmental contamination, veterinarians can significantly enhance patient care while safeguarding public and environmental health.

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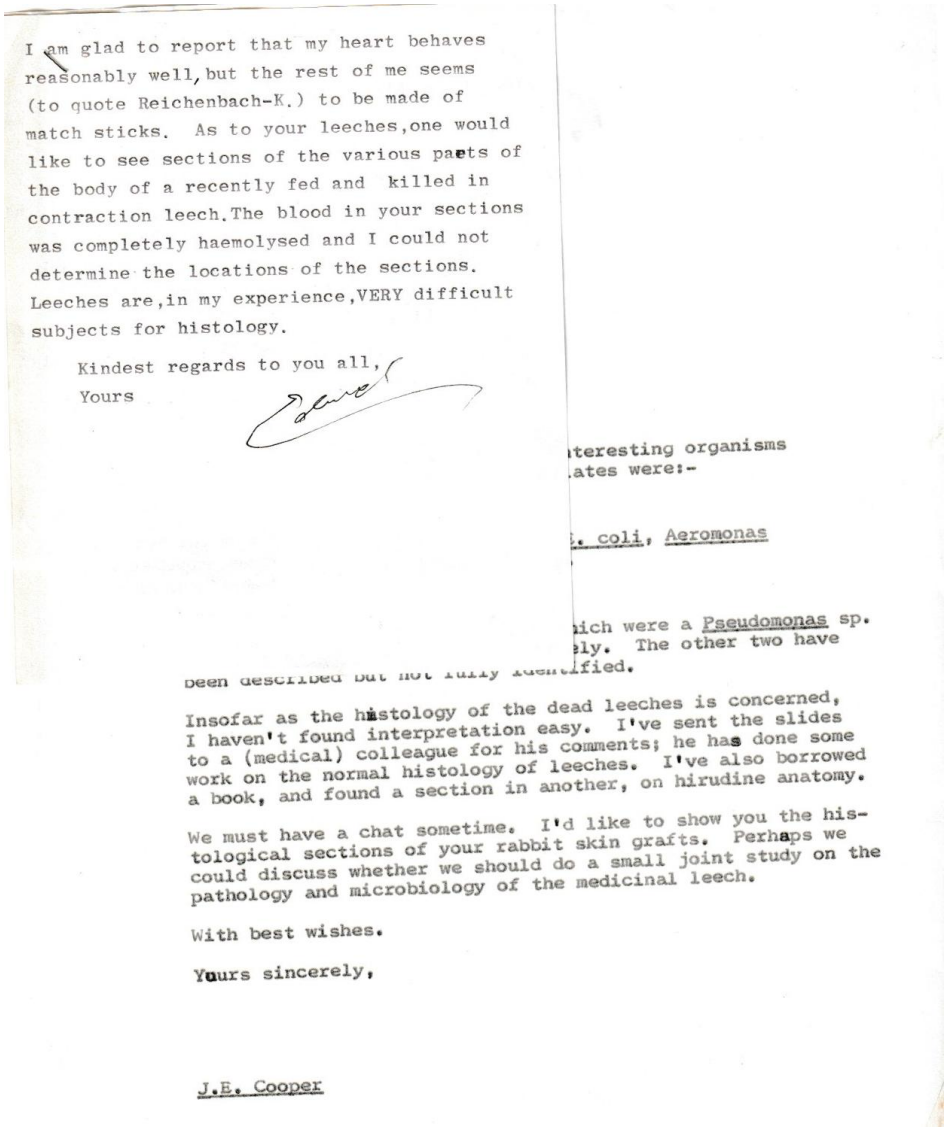
From the Archives

Into the Archives: Some Glimpses from invertebrate medicine past.

Professor John E. Cooper and Margaret E. Cooper have kindly shared a selection of scanned material that give us a view of earlier work with invertebrates, their health, welfare and husbandry. Invertebrate medicine is not as 'novel' as we often hear. Benjamin Kennedy (Co-Editor) offers some commentary on this material.



I am glad to report that my heart behaves reasonably well, but the rest of me seems (to quote Reichenbach-K.) to be made of match sticks. As to your leeches, one would like to see sections of the various parts of the body of a recently fed and killed in contraction leech. The blood in your sections was completely haemolysed and I could not determine the locations of the sections. Leeches are, in my experience, VERY difficult subjects for histology.

Kindest regards to you all,
Yours

teresting organisms
ates were:-

. coli, Aeromonas

hich were a Pseudomonas sp.
ely. The other two have
been described but not fully identified.

Insofar as the histology of the dead leeches is concerned, I haven't found interpretation easy. I've sent the slides to a (medical) colleague for his comments; he has done some work on the normal histology of leeches. I've also borrowed a book, and found a section in another, on hirudine anatomy.

We must have a chat sometime. I'd like to show you the histological sections of your rabbit skin grafts. Perhaps we could discuss whether we should do a small joint study on the pathology and microbiology of the medicinal leech.

With best wishes.

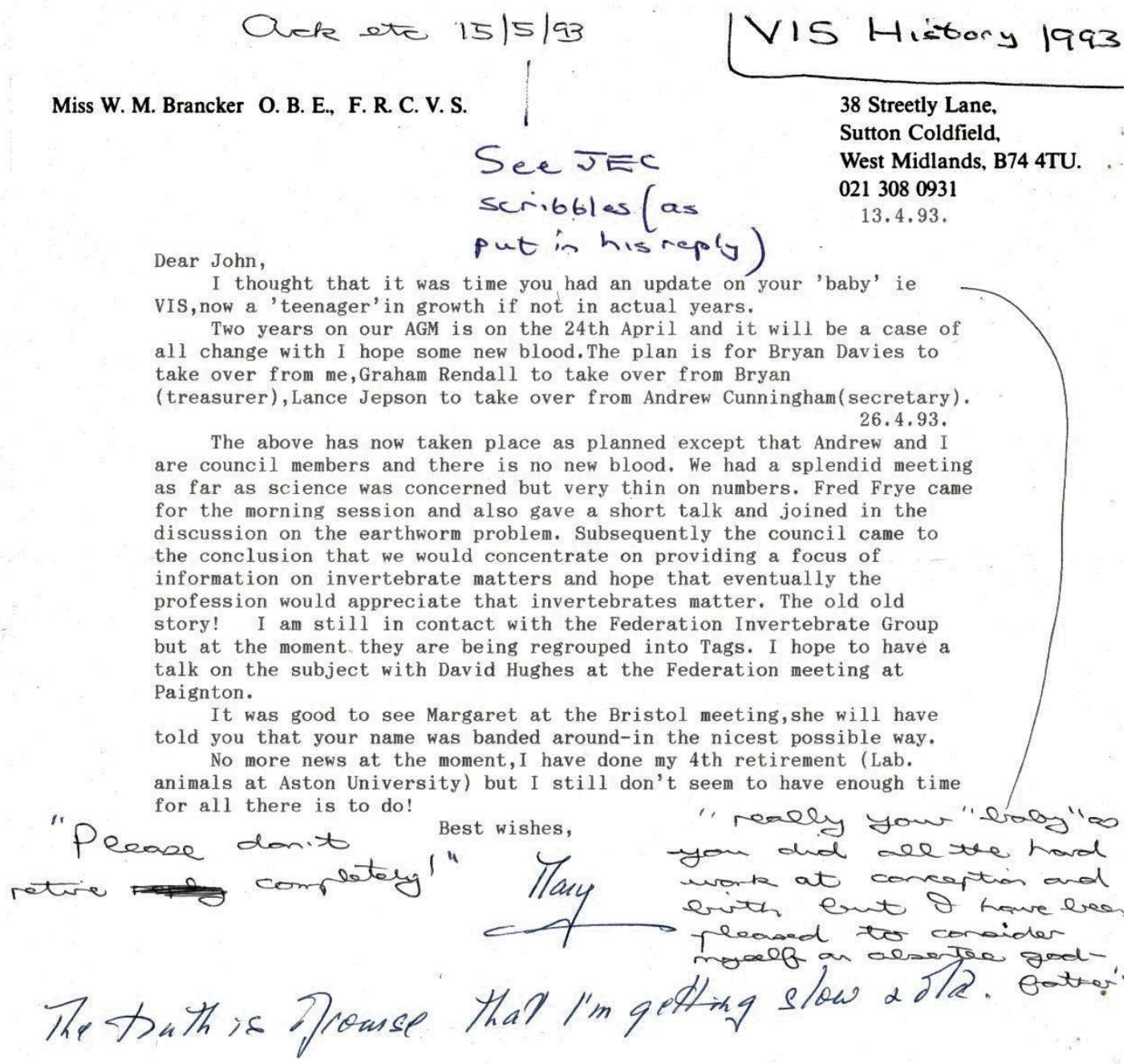
Yours sincerely,

J.E. Cooper

Correspondence on leech histology, 1983

A letter from the much-missed Dr Edward Elkan to a younger Professor J. E. Cooper about the histological examination of medicinal leeches. Elkan notes that leeches are "VERY difficult subjects for histology", while Cooper's accompanying note mentions possible microbiological findings and the difficulty of interpreting sections from dead leeches. Having also done some anatomical histology on leeches, I can confirm they can be very challenging to section though they do make for fascinating histology!

From the Archives



Ack etc 15/5/93

VIS History 1993

Miss W. M. Brancker O. B. E., F. R. C. V. S.

38 Streetly Lane,
Sutton Coldfield,
West Midlands, B74 4TU.
021 308 0931

See JEC scribbles (as put in his reply)

13.4.93.

Dear John,

I thought that it was time you had an update on your 'baby' ie VIS,now a 'teenager'in growth if not in actual years.

Two years on our AGM is on the 24th April and it will be a case of all change with I hope some new blood.The plan is for Bryan Davies to take over from me,Graham Rendall to take over from Bryan (treasurer),Lance Jepson to take over from Andrew Cunningham(secretary).

26.4.93.

The above has now taken place as planned except that Andrew and I are council members and there is no new blood. We had a splendid meeting as far as science was concerned but very thin on numbers. Fred Frye came for the morning session and also gave a short talk and joined in the discussion on the earthworm problem. Subsequently the council came to the conclusion that we would concentrate on providing a focus of information on invertebrate matters and hope that eventually the profession would appreciate that invertebrates matter. The old old story! I am still in contact with the Federation Invertebrate Group but at the moment they are being regrouped into Tags. I hope to have a talk on the subject with David Hughes at the Federation meeting at Paignton.

It was good to see Margaret at the Bristol meeting,she will have told you that your name was banded around-in the nicest possible way.

No more news at the moment,I have done my 4th retirement (Lab. animals at Aston University) but I still don't seem to have enough time for all there is to do!

Best wishes,

Mary

"Please don't retire ~~reply~~ completely!"

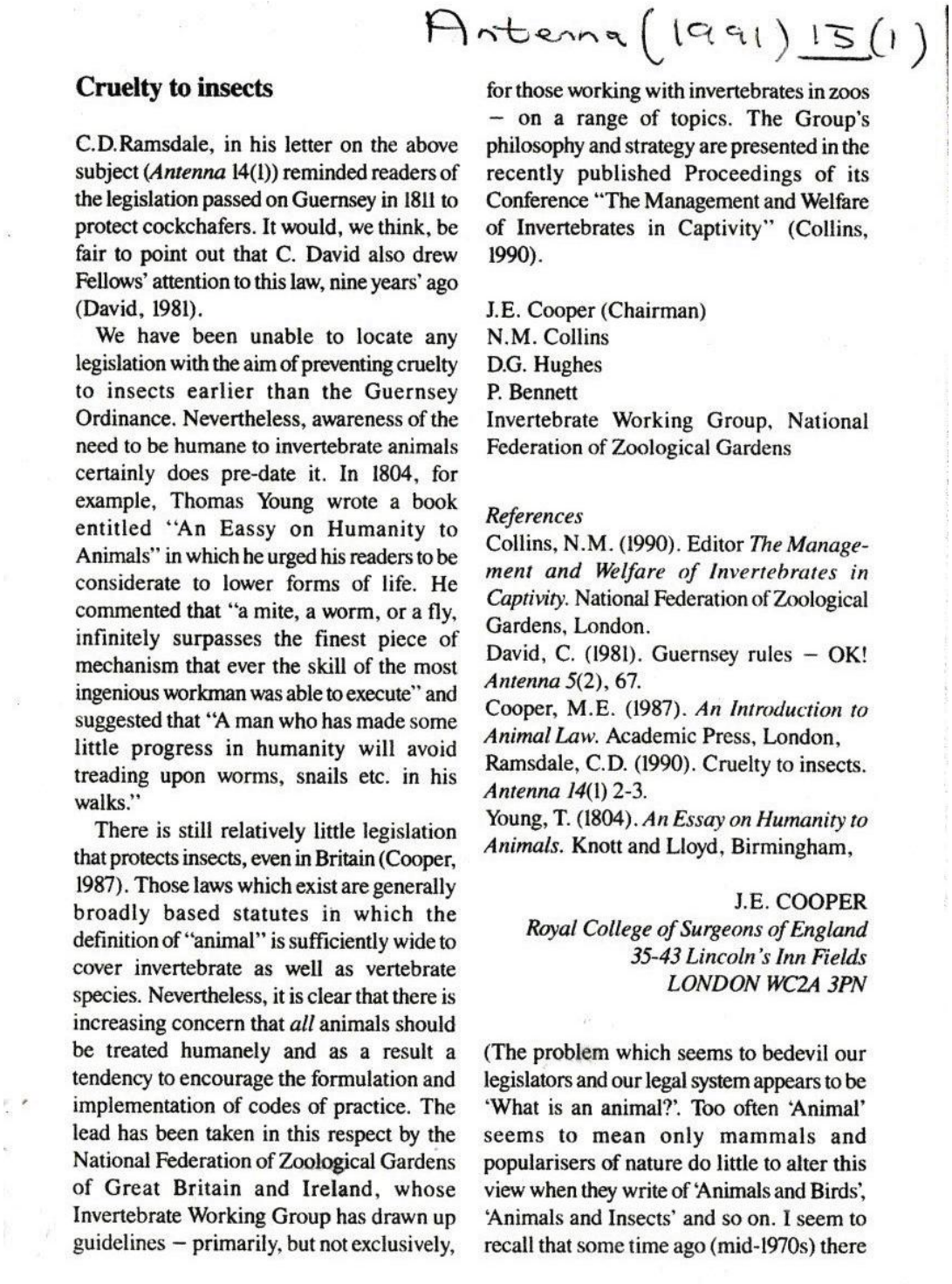
"really your "baby" as you did all the hard work at conception and birth but I have been pleased to consider myself an absentee god-father"

The truth is of course that I'm getting slow & old.

Letter from Miss W. M. Brancker, 1993

A letter from Mary Brancker OBE, FRCVS, who was one of the founding members of the Veterinary Invertebrate Society. She is updating Professor Cooper on the progress of the Veterinary Invertebrate Society. She describes the Society as Cooper's "baby", now a "teenager", and reflects on the continuing need for a focus for information on invertebrate matters. I wonder what the VIS would be now? Is it middle-aged or still a perpetual teenager!

From the Archives



Antenna (1991) 15(1)

Cruelty to insects

C.D. Ramsdale, in his letter on the above subject (*Antenna* 14(1)) reminded readers of the legislation passed on Guernsey in 1811 to protect cockchafers. It would, we think, be fair to point out that C. David also drew Fellows' attention to this law, nine years' ago (David, 1981).

We have been unable to locate any legislation with the aim of preventing cruelty to insects earlier than the Guernsey Ordinance. Nevertheless, awareness of the need to be humane to invertebrate animals certainly does pre-date it. In 1804, for example, Thomas Young wrote a book entitled "An Eassy on Humanity to Animals" in which he urged his readers to be considerate to lower forms of life. He commented that "a mite, a worm, or a fly, infinitely surpasses the finest piece of mechanism that ever the skill of the most ingenious workman was able to execute" and suggested that "A man who has made some little progress in humanity will avoid treading upon worms, snails etc. in his walks."

There is still relatively little legislation that protects insects, even in Britain (Cooper, 1987). Those laws which exist are generally broadly based statutes in which the definition of "animal" is sufficiently wide to cover invertebrate as well as vertebrate species. Nevertheless, it is clear that there is increasing concern that *all* animals should be treated humanely and as a result a tendency to encourage the formulation and implementation of codes of practice. The lead has been taken in this respect by the National Federation of Zoological Gardens of Great Britain and Ireland, whose Invertebrate Working Group has drawn up guidelines – primarily, but not exclusively, for those working with invertebrates in zoos – on a range of topics. The Group's philosophy and strategy are presented in the recently published Proceedings of its Conference "The Management and Welfare of Invertebrates in Captivity" (Collins, 1990).

J.E. Cooper (Chairman)
N.M. Collins
D.G. Hughes
P. Bennett
Invertebrate Working Group, National Federation of Zoological Gardens

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(The problem which seems to bedevil our legislators and our legal system appears to be 'What is an animal?'. Too often 'Animal' seems to mean only mammals and popularisers of nature do little to alter this view when they write of 'Animals and Birds', 'Animals and Insects' and so on. I seem to recall that some time ago (mid-1970s) there

"Cruelty to insects", *Antenna*, 1991

The Antenna is a publication associated with the Royal Entomological Society (RES). This short article looks at cruelty to insects from both historical and legal angles, including an 1811 Guernsey ordinance protecting cockchafers. Articles like this demonstrate that the debates over whether and how welfare extends to invertebrates have been around for far longer than we might think. This is particularly notable and fascinating as the RES in recent years has facilitated many of the conversations into welfare of farmed insects.

From the Archives



A taste of honey

From Mrs Margaret Spencer

Sir,I was so pleased to read in *The Times* today (September 13) the letter from Mary Iles, and would like to add to this interesting piece of information my own experience with both "bumbles" and other bees.

Some years ago, when we were suffering from a long, hot spell of drought, I was spraying some plants in my greenhouse when I heard the familiar hum of a bumble bee nearby – to my surprise several of these had flown into the greenhouse and were eagerly drinking the drops of water left on the leaves.

There have been many times when I have "rescued" an exhausted bee by melting a few grains of demerara sugar in a little warm water, which, with some coaxing would soon be consumed, and the bee would fly off fully resuscitated. In future, I shall use a drop of honey!

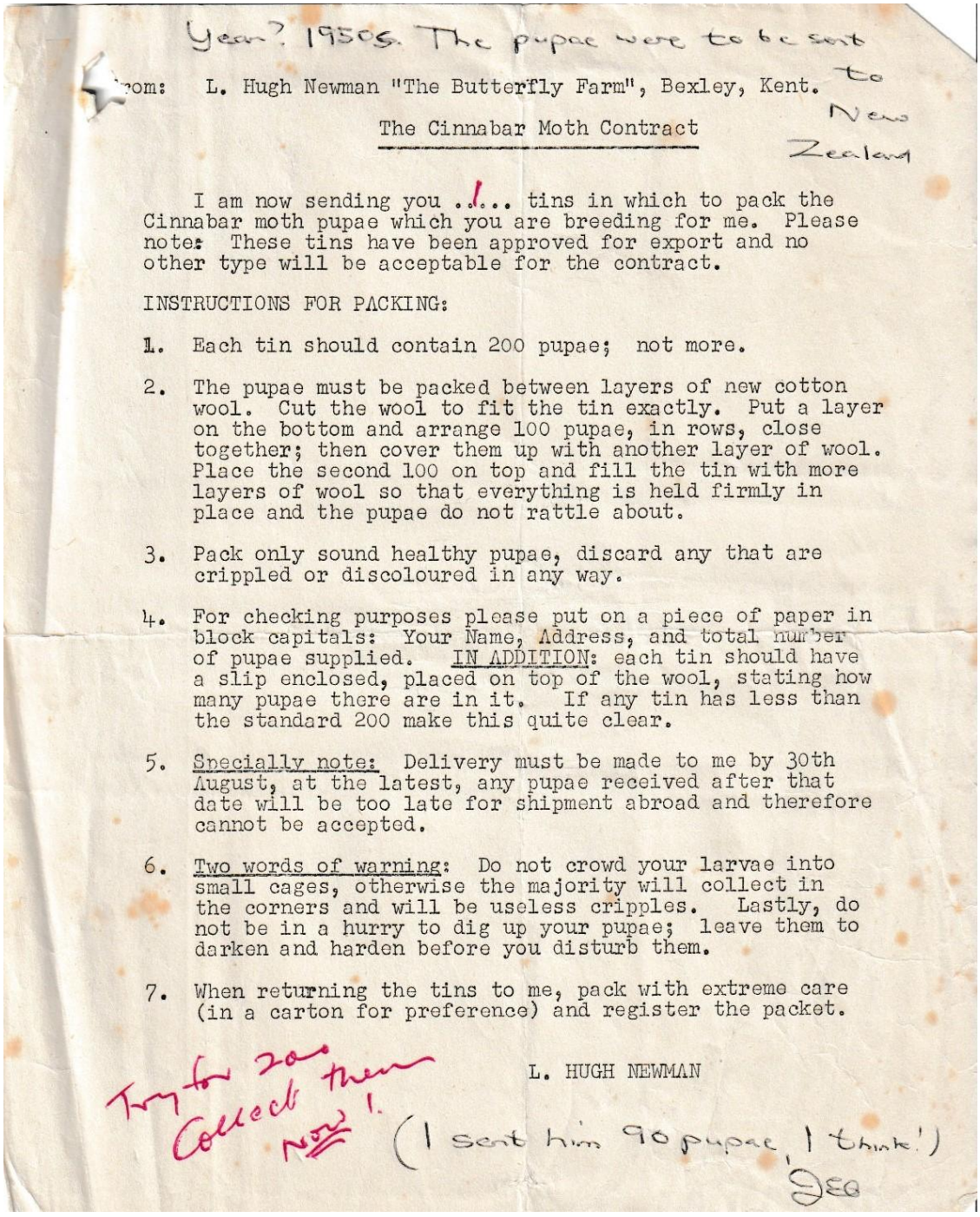
Yours sincerly,
MARGARET P. SPENCER,
Star Cottage,
Gibraltar Terrace,
St Mawes,
Truro, Cornwall.

Times 17 Sept 82

"A taste of honey", *The Times*, 1982

A newspaper letter describing how exhausted bumblebees were revived with warm sugar solution. The author first noticed bees drinking water from leaves during a drought, then went on to offer sugar water to weakened bees. This is advice that still feels very familiar today, both to the public and to vets asked about dehydrated or exhausted bees. I will use a 5-10% sucrose or dextrose solution with Hartmann's as my "Bee saver", I tend to avoid honey or watered down honey as this could be a way of passing on bacillus spp. to an already quite unwell bee! (which it could well then introduce to a hive)

From the Archives



Year? 1950s. The pupae were to be sent to New Zealand

From: L. Hugh Newman "The Butterfly Farm", Bexley, Kent.

The Cinnabar Moth Contract

I am now sending you .1... tins in which to pack the Cinnabar moth pupae which you are breeding for me. Please note: These tins have been approved for export and no other type will be acceptable for the contract.

INSTRUCTIONS FOR PACKING:

1. Each tin should contain 200 pupae; not more.

2. The pupae must be packed between layers of new cotton wool. Cut the wool to fit the tin exactly. Put a layer on the bottom and arrange 100 pupae, in rows, close together; then cover them up with another layer of wool. Place the second 100 on top and fill the tin with more layers of wool so that everything is held firmly in place and the pupae do not rattle about.

3. Pack only sound healthy pupae, discard any that are crippled or discoloured in any way.

4. For checking purposes please put on a piece of paper in block capitals: Your Name, Address, and total number of pupae supplied. IN ADDITION: each tin should have a slip enclosed, placed on top of the wool, stating how many pupae there are in it. If any tin has less than the standard 200 make this quite clear.

5. Specially note: Delivery must be made to me by 30th August, at the latest, any pupae received after that date will be too late for shipment abroad and therefore cannot be accepted.

6. Two words of warning: Do not crowd your larvae into small cages, otherwise the majority will collect in the corners and will be useless cripples. Lastly, do not be in a hurry to dig up your pupae; leave them to darken and harden before you disturb them.

7. When returning the tins to me, pack with extreme care (in a carton for preference) and register the packet.

L. HUGH NEWMAN

Try for 200. Collect them NOW!

(I sent him 90 pupae, I think!)

JEG

The Cinnabar Moth Contract

Instructions from L. Hugh Newman of “The Butterfly Farm”, Bexley, for packing cinnabar moth pupae for export to New Zealand. The advice includes several points that still ring true: select only healthy pupae, avoid overcrowding larvae, and leave pupae undisturbed until they have darkened and hardened. The warning about crowding and later deformity has clear echoes in modern concerns about dysecdysis and poor emergence in captive insects. This advice could still be used today.

Guidelines for Authors – Veterinary Invertebrate Society Journal

Aims and Scope of Journal

The Veterinary Invertebrate Society Journal endeavours to be a point of reference for vets and academics for current and upcoming research into invertebrate medicine, welfare, and conservation. There will be a focus on the practical application of veterinary principles and research to invertebrate species. This journal is an open access journal with no publication or submission fees. Prior to open publication, the journal is accessible by members of the Veterinary Invertebrate Society.

The journal accepts submissions of clinical case reports, original research papers, review articles and short communications.

Authorship

Authors should only be listed if they have made a significant contribution to the data and work involved in any submission. One author should be nominated as the corresponding author. The contact details of this author will be present alongside the published paper. As a rough guide contributors should have contributed at least 15% of the work to be an author or else should be recognized in the acknowledgements. Authors may be asked to produce a short biography for the membership to go alongside the article.

The journal has a philosophy of promoting young authors and researchers so welcomes submissions from university students.

Authors should disclose if they have any conflicts of interest regarding data expressed or conclusions taken.

Manuscript Submission and Peer Review

Manuscripts should be submitted directly to the editor via email at visjeditor@gmail.com . This journal does not have any submission fees. As this journal is primarily published online, there are no figure or table fees. Type of submission (as detailed further on in this document) should be detailed during submission.

The editor has full responsibility for the review process. At least two academic or clinical reviewers will be selected should peer review be applicable to the article submitted.

The peer review process will be double blinded, and authors may be required to revise the manuscript dependent on the comments made by reviewers. Additional reviewers may be utilised for additional review if revision involves significant change to the manuscript.

Readership

This journal will initially be published to paid members of the Veterinary Invertebrate Society. After a period of four months, the journal will be published online through social media, the society website and through a mailing list. Following this period, access to the journal will be free and not dependent on membership.

Manuscript Formatting

The manuscript font should be “Ariel” of size 12 point with single spacing. Text should be aligned to the left. Formatting that may be used includes bold, italics, superscript and subscript. Avoidance of personal pronouns is expected (i.e., “We”, “I” and “Our”). American and British English may be used but it is expected that this be consistent throughout the manuscript. It is expected that submitted articles will be written in clear English and will be spell and grammar checked before submission.

The Harvard referencing style is used within this journal (e.g., Vega, F.E., 2008. Insect pathology and fungal endophytes. Journal of invertebrate pathology, 98(3), pp.277-279).

Abbreviations must be explained and elaborated on within the text. Numbers between one and nine should be expressed in words unless they are used with respect to units or mathematical symbols (e.g., 3 grams or 2%).

Articles should be submitted with a title page. This should include the manuscript title, authors, and organisation affiliations of all authors.

Tables and figures should be referenced in the text and have a descriptive legend that can be understood alone.

Drugs should be stated by their generic names with the trade formulation in brackets with the manufacturer (e.g., meloxicam (Metacam, oral suspension for cats, Boehringer Ingelheim)). This nomenclature will also apply to diagnostic tests and laboratory equipment where appropriate.

Genus and species names should be italicised when scientific names are used. Due to the variable and dynamic taxonomic status of invertebrates, it is recommended to cite the species authority when discussing taxa as this will make it clear which species is being discussed.

Apart from opinion/end piece articles, all submissions should include a 250-word abstract.

Article Types

The maximum length of articles is expressed below.

Article Type	Word Length
Original Research Paper	3000
Opinion/End Piece Article	700
Short Communication	1000
Case Reports and Series	1500
Review Article	3000

The following article types will be included in the journal:

Opinion Pieces/End-piece Articles

These articles are more informal and opinion-based though appropriate references are expected when factual discussion is undertaken. These articles are designed to inform the journal readership on a specific area within invertebrate medicine.

Short Communication

Short communications should provide novel information on current research or clinical cases. They differ from original research papers in their scope and involvement. These submissions should typically involve some novel information or species which have not been reported on previously. New information should be placed in the context of existing literature. Headings should include short communication and references.

Case Reports and Series

Case reports will focus on a specific invertebrate species with a core clinical focus. This can involve a novel disease, treatment, diagnostic process or follow up of a previously reported presentation.

These should be formatted as: Initial Presentation, History and Clinical Exam, Diagnostics, Treatment, Discussion, Acknowledgements, and References.

Original Research Papers

Original research papers should report the results of original research that has not been reported elsewhere. Authors should contact the editor if there is a query to what constitutes existing preliminary reports (i.e., presentation or prior publication), though generally if research has been previously reported at a conferenece in preliminary form as an abstract of less than 250 words then it would still be acceptable for this research to be published in this journal.

Original research papers should be formatted as: Introduction, Materials and Methods, Results, Discussion, Conclusions, Acknowledgements and References.

Review Article

A review should report on the current research and discussion around a specific disease or relevant clinical area. It is advisable that a specific invertebrate family or species is the focus of an article, as the entirety of invertebrates as a group can be diverse and challenging to discuss easily. Their format will be similar to original research papers.

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Article Submission – The Journal of the Veterinary Invertebrate Society welcomes articles on all aspects of invertebrate health, medicine, and welfare. We favour articles that involve practical application of veterinary principles to invertebrates and their care.

We seek clinical case reports, original research findings, review articles, meeting reviews and short communications. We intend to produce a journal of a high standard and so we may choose to reject an article that is poorly written or not up to a reasonable academic standard. Peer review will be provided as appropriate to the article submitted. This journal is an English language journal. There are no submission fees for this journal.

Please do not hesitate to contact the editor for guidelines (published in this issue) should you wish to submit an article. Contact: **visjeditor@gmail.com** or **vetinvertsoc@gmail.com**

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