

VETERINARY INVERTEBRATE
SOCIETY JOURNAL

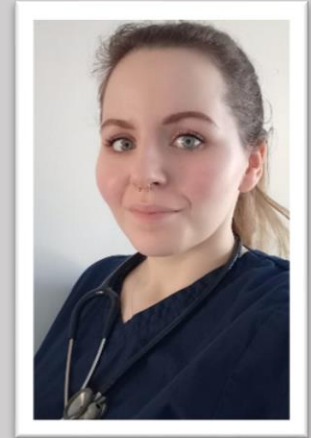


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Editorial Team



Co-editors

Benjamin and Agata

Word from the Editors

Dear Veterinary Invertebrate Society Journal Readers,

We hope this message finds you in good health and high spirits, especially considering the unprecedented times we've been through. It's been quite some time since our last issue, a hiatus that was undeniably exacerbated by the global pandemic. During this challenging period, the importance of in-depth research and reliable communication has become even more evident, reinforcing our commitment to this community.

We're planning a regular publishing cadence, targeting at least one issue annually. Its frequency will hinge on your contributions. Thus, we invite submissions—be it novel research, insightful reviews, or intriguing case reports about invertebrates. There are no submission fees, and our focus remains on peer-reviewed invertebrate-centric content.

Together, let's push the boundaries of our shared knowledge.

Benjamin and Agata

Editors of the Veterinary Invertebrate Society Journal

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Dr. Sarah Pellett BSc(Hons) MA VetMB CertAVP(ZooMed) DZooMed (Reptilian) MRCVS

Dr. Micheala Betts BVetMed. MRCVS

From the Chairman



Welcome to our latest issue of the VISJ, it is a sign of the times that it has been two years since I last wrote. However, I am very excited to be sharing the news that eclosion is coming for the patiently pupating Veterinary Invertebrate Society. The steering committee is now having regular meetings once again and this is allowing us to gather pace once more. If you are interested in joining the committee, we are looking for enthusiastic people to help with the following positions; treasurer, Student liaison (needs to be active registered student), event organiser and social media champion. The reinvigorated VISJ editorial team also have space for further assistance. As well as being able to have your say in how the committee grows it is also great for the CV.

We are keeping the membership free in 2023 whilst we continue getting back on our feet. I am very pleased to say that another VIS conference is on the cards for 2024 and the location is planned to be at a fantastic location, The Bug Parc in Norwich. Please get in touch if you have exciting invertebrate cases or research to present, full details and registration will be published through the VISJ, our website and our social media platforms later in the year.

I'm sure you all understand our community has been frantically busy finding the new normal and trying to recover the lost connections and opportunities of the past few years. As our website gets updated, we will be including more information on the excellent work of our members, including their peer-reviewed publications for your enjoyment. With that thought I hope you enjoy this latest issue of the VISJ, and we hope to see you next year at the VIS 2024 conference.

Veterinary Invertebrate Society Steering Committee

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Communications	Michelle O'Brien	michelle.obrien@wwt.org.uk
Science Co-Ordinator	David Williams	dlw33@cam.ac.uk
Co-Editor and Communications	Benjamin Kennedy	bkennedy2@rvc.ac.uk
Co-Editor	Agata Witkowska	awitkowska@hotmail.com

The Committee are happy to provide advice. Please contact us through the communication channels shown below.



vetinvertsoc@gmail.com



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Review of most recent papers and research surrounding invertebrates

Compiled by Dr Carol Margaret Trim MRSB SFHEA

Biotic and abiotic stresses on honeybee health

Lin, Z., Shen, S., Wang, K., Ji, T. (2023) 'Biotic and abiotic stresses on honeybee health', *Integr Zool*. doi: 10.1111/1749-4877.12752. Epub ahead of print.

This review discusses the stressors that affect honeybee health including mites, viruses, invasive giant hornets, and small hive beetles. Chemicals, pollution, and mite treatments can also cause harm and of course expanding cities and towns and climate change are all having an effect. They conclude that combinations of stressors are more of a problem than the individual stressors.

Impact of particulate pollution on aquatic invertebrates

Gokul, T., Kumar, K., Veeramanikandan, V., Arun, A., Balaji, P., Faggio, C. (2023) 'Impact of particulate pollution on aquatic invertebrates', *Environ Toxicol Pharmacol*, 100:104146. doi: 10.1016/j.etap.2023.104146.

This review discusses the impact of pollution on aquatic invertebrates which causes developmental problems and multi-organ toxicity. These organisms are so vulnerable to pollutants from particulates like heavy metal and nanoparticles. There is a call for more research to understand the impact of pollution on aquatic and terrestrial invertebrates. Once we have this evidence, we can hopefully influence aquaculture and fishery industries to improve current practices.

Geriatric Invertebrates

Pellett, S., O'Brien, M., Kennedy, B. (2020) 'Geriatric Invertebrates', *Vet Clin North Am Exot Anim Pract*, 23(3), pp. 595-613. doi: 10.1016/j.cvex.2020.05.002.

If you type invertebrates and vets into PubMed the first article that comes up is a wonderful review about Geriatric invertebrates written by three of our VIS committee members. This review deals with species that the authors have come across in general practice and covers everything from supportive care to euthanasia of elderly invertebrate pets. It discusses the importance of understanding physical signs of aging and breeding and husbandry history.

Invertebrate Behavior for the Exotic Pet Practitioner

Lewbart, G., Bergmann, L. (2021) 'Invertebrate Behavior for the Exotic Pet Practitioner'. *Vet Clin North Am Exot Anim Pract*, 24(1), pp. 229-251. doi: 10.1016/j.cvex.2020.09.011.

This review discusses a number of behaviours that may be interesting to vets and the veterinary community. For certain groups a lot is known about behaviour and whole books have been written about them. This review covers a number of clinic care points like theraphosid moulting and bee communication.

Notes on a case of fungal pathogenesis on a juvenile of the theraphosid spider *Aphonopelma gabeli* Smith, 1995 in captivity (Araneae: Theraphosidae)

Sherwood, D. (2021) 'Notes on a case of fungal pathogenesis on a juvenile of the theraphosid spider *Aphonopelma gabeli* Smith, 1995 in captivity (Araneae: Theraphosidae)', *SERKET The Arachnological Bulletin of the Middle East and North Africa*, 18(1), pp. 27-30.

This case study investigates a fungal pathogen on a captive bred juvenile theraphosid *Aphonopelma gabeli* from the family Cordycipitaceae. Most research is needed to manage disease and develop new treatments.

On the life expectancy of a male Chilean rose tarantula, *Grammostola rosea* (Walckenaer, 1837) (Araneae: Theraphosidae) reared in captivity

Cortés-Fossati, F. & Martín-Rodríguez, I. (2022) 'On the life expectancy of a male Chilean rose tarantula, *Grammostola rosea* (Walckenaer, 1837) (Araneae: Theraphosidae) reared in captivity', *Revista Chilena De Entomología*, 48(4). Retrieved from <https://www.biotaxa.org/rce/article/view/78254>

This is a case study of a male Chilean rose theraphosid living much longer than previously recorded life spans (8.5 years). The article provides the husbandry conditions and feeding regime the spider.

Short communication on assessing and treating dehydration in theraphosid spiders

Dr Benjamin Kennedy BSc, MSc, BVetMed, MRCVS, Mem. RES
 Invertivet Bearded Vets Ltd. Milton Keynes
 Contact details: Bkennedy2@rvc.ac.uk

Dehydration is a commonly presented clinical sign in invertebrate medicine and particularly in theraphosid spiders. Assessing dehydration in spiders can be particularly difficult. While many textbooks mention a flattened opisthosoma as a sign of dehydration, this clinical sign is often seen only in severely dehydrated or dead spiders, rather than mildly dehydrated spiders (Pizzi and Kennedy, 2022). Spider skin tents are difficult, if not impossible, to assess via conventional means that could be applied to vertebrate species, and mucus membranes are not as accessible as they are in vertebrates. One possible method to assess dehydration is to examine the joint membranes to determine their turgidity and observe the spider's movements for signs of weakness. Dehydration can be one of the causes the 'dyskinesia syndrome' clinical sign in spiders (Draper and Trim, 2018), which is characterized by weakness in the limbs due to the hydraulic aspect of their extensor movements (when dehydration is the cause). However, it is important to note that dehydration is a clinical sign, not a diagnosis, and identifying the underlying cause of dehydration is crucial to successfully management and treatment of dehydration.

Evaluating haemolymph biochemistry can be helpful in assessing hydration in spiders beyond a clinical exam. The author recommended two non-lethal collection techniques of haemolymph from spiders.

One method involves collecting haemolymph from the proximal coxa joint membrane of a limb, while the

other involves collecting haemolymph from the pericardial sac of the spider's double-luminal heart. The latter method carries significant risks, such as cardiac fenestration, which is usually fatal in spiders. To collect haemolymph for analysis, chemical restraint using isoflurane or sevoflurane in an induction chamber, fume cupboard, or isolator is recommended (Dombrowski et al., 2013; Zachariah et al., 2014).

The risks associated with this method are reduced compared to those associated with vertebrates, but complications such as vasoconstriction, cardiac arrest, and respiratory depression can still occur (Benjamin Kennedy et al., 2019; Pizzi and Kennedy, 2022). Venepuncture can also long-term cuticular damage, which can only be fully healed during the spider's next moult (Personal communications. S. Trim). The ruler technique, which involves restraining the prosoma, may also be used for cardiac collection (Eichelmann and Lewbart, 2018; Pizzi and Kennedy, 2022), but is not recommended for limb collection in tarantulas.

Multiple studies have been performed on haemolymph biochemistry in theraphosid spiders from which some reference intervals have been generated (Benjamin Kennedy et al., 2019; Eichelmann and Lewbart, 2018; Zachariah and Mitchell, 2009).

It should be considered that many vertebrate proteins such as Albumin, AST, CK proteins are not present in spiders as assessed by a search of their genome assembly (Benjamin Kennedy

et al., 2019). Therefore, albumin levels (or rather the albumin assay, bromocresol green or purple) cannot be used to assess the hydration status of a spider in the same way that it could in a vertebrate. One could speculate that the assays for albumin, AST and CK could be binding to an equivalent in theraphosid spiders, but we simply do not have the evidence to say this with any certainty.

However, total protein and globulin levels, along with reference intervals for uric acid, can provide insight into the spider's hydration status. Invertebrate haemolymph biochemistry is still a relatively untouched field of study, and the significance of various biomarkers is not yet fully understood. There are several options for treating dehydration in these spiders. Oral rehydration with an electrolyte solution can be effective for mild cases of dehydration. If the spider is severely dehydrated, injections of fluids into the opisthosoma or joint membrane may be necessary.

Injections into the opisthosoma should be taken with great care as the underlying structures within the opisthosoma are adhered together with midgut diverticula and this matrix can be potentially damaged. The method of injecting into the joint membranes is like that of haemolymph collection. Increasing the humidity in the spider's enclosure can also help prevent dehydration.

Correcting any husbandry deficits, such as inadequate water sources or ventilation, is important to prevent dehydration from occurring in the first place. If the dehydration is caused by an underlying disease, such as bacterial

septicaemia, treating the underlying condition will also be necessary to ensure a successful outcome.

References

Benjamin Kennedy, Anne-Sophie Warner, Steven A. Trim, 2019. Reference Intervals for Plasma of Hemolymph in Subadult Chilean Rose Tarantula (*Grammostola rosea*) under Chemical Restraint. *Journal of Zoo and Wildlife Medicine* 50, 127–136. <https://doi.org/10.1638/2018-0037>

Dombrowski, D., De Voe, R, Lewbart, G, 2013. Comparison of Isoflurane and Carbon Dioxide Anesthesia in Chilean Rose Tarantulas (*Grammostola rose*): Anesthesia of Tarantulas. *Zoo Biol.* 32, 101–103. <https://doi.org/10.1002/zoo.21026>

Draper, E., Trim, S., 2018. Dyskinetic syndrome in tarantula spiders (Theraphosidae). *Veterinary Nursing Journal* 33, 230–232. <https://doi.org/10.1080/17415349.2018.1484677>

Eichelmann, M., Lewbart, G., 2018. Hemolymph Chemistry Reference Ranges of the Chilean Rose Tarantula *Grammostola rosea* (Walkenaer, 1837) Using the VetScan Biochemistry Analyzer based on IFCC-CLSI C28-A₃. *Journal of Zoo and Wildlife Medicine* 49, 528–534. <https://doi.org/10.1638/2015-0145.1>

Pizzi, R., Kennedy, B., 2022. Spiders, in: *Invertebrate Medicine*. John Wiley & Sons, Ltd, pp. 301–347. <https://doi.org/10.1002/9781119569831.ch14>

Zachariah, T., Mitchell M., 2009. Vitamin D₃ in the Hemolymph of Goliath Birdeater Spiders (*Theraphosa blondi*). *Journal of Zoo and Wildlife Medicine* 40, 344–346. <https://doi.org/10.1638/2007-0059.1>

Zachariah, T., Mitchell, M., Watson, M., Clark-Price, S., McMichael, M., 2014. Effects

of sevoflurane anesthesia on righting reflex and hemolymph gas analysis variables for Chilean rose tarantulas (*Grammostola rosea*). *American Journal of Veterinary Research* 75, 521–526. <https://doi.org/10.2460/ajvr.75.6.521>

Stick insects (*Carausius morosus*) – a sluggish invertebrate

Prof Ross G. Cooper

Physiology Department, Midlands State University, Zimbabwe

Contact details: rgcooperuk@yahoo.com

Stick insects (order Phasmida) numbering ca.2,000 species, e.g. the winged *Labidura riparia*, are exopterygote insects resembling sticks. *Carausius morosus* made its way into U.K. homes when Britain ruled India and returning enthusiasts brought the insect back as pets. In the wild, the stick insect can grow to enormous sizes of nearly a meter as found in Zimbabwe (*Palophus reyi*). The Asian species *Palophus titan* is the longest living insect. Other species include *Bacillus rossii*, native to Europe, and the prickly and smooth stick insects from New Zealand, *Acanthoxyla prasina* and *Clitarchus hookeri*, respectively. Forest-dwelling stick insects include *Diapheromera femorata* (North

America) and *Sipyloidea sipyilus* (Madagascar). These invertebrates are often kept as pets in private homes and in school, college or university laboratories.

Being self-fertilising, they are very easily kept in an insect vivarium in which they are fed privet, ivy or lilac leaves lightly sprayed with a mist of water. They mimic their surroundings by swaying from side-to-side, thus resembling a twig blowing in the wind (McGavin, 2001; Sayce, 1987; Schmidt-Nielsen, 1997; *The Bundu Book of Birds, Insects and Snakes*, 1981). They have prehensile, gripping appendages which allows them to position

themselves upside-down. They thrive well indoors at 17-25°C and 60-70% R.H. (Figure 1).

Stick insects are elongated and cylindrical with biting mouthparts. In the winged species, the forewings are small and bark-like, while the hindwings are folded into a fan. In addition to their cryptic colouration, they may resemble stumps of broken twigs or thorns, respectively. They can remain motionless for long periods, with their forelegs extended anteriorly. If disturbed they feign death or, in the winged species, suddenly spread their wings with a rustling noise.



Figure 1. A vivarium, a collection of feeding stick insects and a large specimen (*C. morosus*).

Stick insect	1	2	3	4	5			6	7	8	9	10	Sum	Mean	SD
Total egg count	33	28	19	27	30			35	49	38	26	45	330	33.0	9.09
Hatching count	26	20	15	20	28			30	40	33	25	40	277	27.7	8.34

Table 1. Counts of stick insect eggs laid over 30 days and hatching in 4 months.

Reproduction is often parthenogenetic and the eggs are enclosed in hard capsules that resemble seeds. The eggs are dropped onto the soil and may take up to 2 years to hatch. The smaller species generally feed on grass stems, while the larger species feed on tree meristems (Burton and Burton, 1980). The largest winged species in Zimbabwe, *P. reyi*, can grow in excess of 25 cm long and, like most of the large species, lives in the low altitude areas (Cooper and Cooper, 2009i-iv).

Potentially a tank housing 10 stick insects will, under ideal conditions, successfully permit the considerable laying of ca.330 eggs/mth. with a loss of 53 eggs after 4 months or an unhatched 16.1%, as shown in the current study.

The means were not significantly different and the close parity of the SD's (Table 1), suggested that there is normally a low percentage loss of eggs due to extraneous factors like humidity, genetic aberrations or failure to hatch. One could therefore reasonably assume that with just a pair of stick insects, there will be a successful annual replacement of numbers and such a project would therefore be very cost-effective in school, college or university laboratories and amongst pet enthusiasts at home, even though they are most active at night. Shining a torch into their tank in the hours of darkness, will remarkably reveal their red eyes in the reflection (Cooper, 2010).

During the day, stick insects pass into a catalyptic or hypnotic state, although some winged species are active during sunlight hours. If disturbed, the sudden revelation of their brightly-coloured

wings confuses a predator. When the wings are closed again, the bright colour vanishes and the exact position at which the insect has alighted is therefore concealed. This well-documented protective device is called flash-colouration. Additionally, stick insects may become numerous enough to defoliate areas of woodland or damage agricultural crops. Stick insects are therefore of global veterinary, biological and ecological interest.

References

Burton, M. and Burton, R. (1980) *The New International Wildlife Encyclopedia*. London: N.C.L.S. Ltd.

Cooper, R.G. and Cooper, R. (2009i) A pleasant walk through Bulawayo Garden Park. *Zimbabwe Wildlife* Sept.: 4

Cooper, R.G. and Cooper, R. (2009ii) A walk along the Matsheumhlope River, Bulawayo. *Zimbabwe Wildlife* Sept.: 3.

Cooper, R.G. and Cooper, R. (2009iii) Mabukuwene Nature Reserve. *Zimbabwe Wildlife* Sept.: 4.

Cooper, R.G. and Cooper, R. (2009iv) A trip to Rhodes and MOTH graves in Matopos. *Zimbabwe Wildlife* Sept.: 7.

Cooper, R.G. (2010) *Sid the Stick Insect*. Morrisville: Lulu Press Ltd.

McGavin, G.C. (2001) *Essential Entomology*. Oxford: Oxford University Press.

Sayce, K. (ed.) (1987) *Tabex Encyclopedia* Zimbabwe. Harare: Quest Publishing (Pvt.) Ltd.

Schmidt-Nielsen, K. (1997) *Animal Physiology. Adaptation and environment*. 5th edn. New York: Cambridge University Press.

The Bundu Book of Birds, Insects and Snakes (1981) 5th Impression. Salisbury: Longman Zimbabwe (Pvt.) Ltd.

Prolapses in snails: a case study and review of literature

Dr Agata Witkowska, BVM, BVS, MRCVS
 Veterinary Invertebrate Society, Sandwich, Kent
 Contact details: awitkowska@hotmail.com

Initial Presentation, History and Clinical Exam

A two-year-old, Giant African Land Snail (*Lissachatina fulica*) was presented for an emergency appointment with a history of an oral prolapse. The prolapse had been noted an hour prior to presentation. The patient was temporarily being cared for by an agent. Husbandry was largely unknown and unspecified but reported to be a custom-built enclosure suitable for the species. On examination the patient was quiet, alert, and responsive with normal reflexes upon palpation. A large buccal mass prolapse was present with what was presumed to be a large portion of the crop (Figure 1). This was heavily contaminated by the substrate (soil), but no trauma had occurred in transit. The shell was in good condition.

Treatment

As the prolapse was acute and the patient had been presented quickly, treatment consisted largely of decontamination and replacement. Room temperature sterile saline (Aquapharm, No 1) was used to gently flush the prolapse and remove the soil. This was well tolerated by the patient – soaked cotton swabs assisted with removal of smaller particles. No substrate appeared to be embedded in the prolapsed tissue. Copious lubrication (KY jelly) was used during handling of the crop with moistened nitrile gloves and the lumen was identified. A lubricated cotton swab was used within the lumen to gently manipulate the crop back into the buccal mass (Figure 2). This was well tolerated.

Following prolapse replacement further monitoring was performed for ten minutes. The patient became more mobile and was discharged. Advice on environmental temperatures and humidity were provided to the agent along with contact details for emergency care if prolapse recurred.

Outcome

The patient represented with another prolapse within 48 hours. Activity and

reflexes were much reduced and obvious dehydration was present. The patient was humanely euthanised with 2-phenoxyethanol (Aqua-Sed, Vetark) and intracoelomic pentobarbital (Dolethal, Vetoquinol).

Discussion

The popularity of invertebrates as household pets has risen in the past decade (Battiston, *et al*, 2022). It can be speculated that these animals may



Figure 1. A large prolapse was present upon presentation. Presumed to be originating from the digestive tract it was identified as the crop.



Figure 2. Appearance post prolapse replacement.

provide an attractive, alternative option to more traditional pets such as dogs and cats and often require less time of their owner. The cost of initial purchase and ongoing care is generally lower; in the current economic climate this is likely to be desirable (Osborne and Doherty, 2021). African Giant Land Snails (AGLS) appear to be one of the most kept invertebrates; true numbers are unknown, but multiple husbandry sheet recommendations can easily be found (RSPCA, no date; RVC 2022).

The husbandry of AGLS should be closely monitored to prevent development of disease. O'Brien (2009)

recommends environmental temperatures between 20° and 28° C with daily water spraying. A shallow water dish for drinking and bathing can also be provided. Diet should consist of leafy green vegetables and fruit. Provision of calcium is important for continued shell development, but this should be offered in the form of a cuttlefish bone or calcium powder.

In this case, the patient was presented by an agent who was unable to provide detailed information on the husbandry. A review was therefore performed on initial discharge highlighting importance of appropriate

environmental temperatures and in particular humidity.

A particular challenge in this case was the presence of such a large, prolapsed mass. As in any other species, accurate identification will aid with treatment as well as determining prognosis. Additionally, recurrence of a prolapse may indicate an underlying issue such as husbandry deficits or primary disease. However, whilst excellent reviews of gastropod anatomy (Smolowitz, 2006), biology (Cooper, 1991), husbandry (Cooper, 2004) and general clinical and emergency care of invertebrates (Braun, *et al.* 2006; Cooper, 1998; Dombrowski and De Voe, 2007) can be found, little is available on prolapses.

Pizzi (2010) reports that prolapses are not uncommon in AGLS and various organs may be present including the reproductive tract or the dart apparatus. Digestive tract prolapses may indicate severe systemic disease. As in any other species, if not addressed promptly and subjected to trauma, any prolapse may become a life-threatening emergency. Veterinary surgeons should therefore follow the same principles as for small animals; prompt decontamination, lubrication, and replacement (Gallagher, 2020). Little is known about the efficacy of commonly used analgesics such as opioids in gastropods, but these could be considered off license especially if trauma is present.

Schmidt-Ukaj (*et al.* 2023) reports four cases of kidney disease in AGLS. Three out of four presented patients had a prolapse speculated to have been caused by renomegaly exerting pressure on the digestive tract. Organ enlargement was shown in all four cases with the use of radiography and computed tomography. The author speculated whether excessive dietary protein, overfeeding and inadequate water consumption may have predisposed to development of nephropathy. Radiography is accessible

to most veterinary surgeons in practice and whilst superseded by computed tomography, may be financially prohibitive to most owners. Equally, treatment options for nephropathy in invertebrates are likely to be limited further prohibiting the benefit of imaging. As aforementioned, adequate provision and intake of water as well as environmental humidity are of vital importance to health of AGLS – as husbandry was largely unknown in this case discussed here it is impossible to determine what caused the prolapse, but nephropathy such as renomegaly cannot be excluded.

The impact of pet ownership on human health has long been studied; one survey revealed that 90% of owners saw their pet as a valued family member (McNicholas, *et al.* 2005). Whilst this applied to more traditional pets, it can be questioned whether the reported 0.3% of pet invertebrate UK households (Bedford, 2022) would say the same.

For now, this remains unknown, but the impact of the human-animal bond should not be underappreciated. As evidenced by this case study, it is likely that veterinary surgeons may be called upon during an invertebrate emergency and should keep their skills and knowledge up to date. Whilst treatment options may be limited the duty of care to patients stands.

References

- Battiston, R., Di Pietro, W., Anderson, K. (2022) 'The pet mantis market: a first overview of the praying mantis international trade (Insecta, Mantodea)', *Journal of Orthoptera Research*, 31 (1), pp. 63-68. Doi: <https://doi.org/10.3897/jor.31.71458>
- Bedford, E. (2022) 'Leading pets owned by households in the United Kingdom (UK) 2021/2022', *Statista*, available at: <https://www.statista.com/statistics/308218/leading-ten-pets-ranked-by-household-ownership-in-the-united-kingdom-uk/>
- Braun, M., Heatley, J., Chitty, J. (2006) 'Clinical Techniques of Invertebrates', *Veterinary Clinics of North America: Exotic Animal Practice*, 9 (2), pp. 205-211.
- Cooper, J. (1991) 'Snails and Snail Farming: an Introduction for the Veterinary Profession', *The Veterinary Record*, 129 (25-26), pp. 541-549.
- Cooper, J. (1998) 'Emergency Care of Invertebrates', *Veterinary Clinics of North America: Exotic Animal Practice*, 1 (1), pp. 251-264. Doi: [https://doi.org/10.1016/s1094-9194\(17\)30164-0](https://doi.org/10.1016/s1094-9194(17)30164-0)
- Cooper, J. (2004) 'Invertebrate Care', *Veterinary Clinics of North America*, 7 (2), pp. 473-486. Doi: <https://doi.org/10.1016/j.cvex.2004.02.004>
- Dombrowski, D. and De Voe, R. (2007) 'Emergency Care of Invertebrates', *Veterinary Clinics of North America: Exotic Animal Practice*, 10 (2), pp. 621-645. Doi: <https://doi.org/10.1016/j.cvex.2007.01.005>
- Gallagher, A. (2020) 'Rectal Prolapse in Animals', *MSD Manual Veterinary Manual*, available at: <https://www.msddvetmanual.com/digestive-system/diseases-of-the-rectum-and-anus/rectal-prolapse-in-animals>
- McNicholas, J., Gilbey, A., Rennie, A., Ahmedzai, S., Dono, J-A, Ormerod, E. (2005) 'Pet Ownership and Human Health: A Brief Review of Evidence and Issues', *BMJ*, 331 (7527), pp. 1252-1254. Doi: <https://doi.org/10.1136%2Fbmj.331.7527.1252>
- O'Brien, M. (2009) 'Dealing with African Land Snails', *The Veterinary Times*, available at: <https://www.vettimes.co.uk/app/uploads/wp-post-to-pdf-enhanced-cache/1/dealing-with-giant-african-land-snails.pdf>
- Osborne, D. and Doherty, C. (2021) 'Blame the pandemic: Why you need to raise your fees for 2021', *Can Vet J*. 62 (4), pp. 413-414.
- Pizzi, R. (2010) 'Invertebrates' In: Meredith, A. and Delaney, C. (eds) *BSAVA Manual of Exotic Pets*, Gloucester, British Small Animal Veterinary Association, pp. 373-385.
- Royal Veterinary College (2022) 'Giant African Land Snail', available at: <https://www.rvc.ac.uk/Media/Default/Beaumont%20Sainsbury%20Animal%20Hospital/EXOTICS/Animal%20Care%20Factsheets/Giant-african-land-snails-care-and-advice-Dec-2022-jh.pdf>
- Schmidt-Ukaj, S., Gumpenberger, M., Mutschmann, D., Richter, B. (2023) 'Case Report: Four Cases of Kidney Disease in Giant African Land Snails (*Lissachatina fulica*)', *Front Vet Sci*, 10: 1152281. Doi: <https://doi.org/10.3389%2Ffvets.2023.1152281>
- Smolowitz, R. (2006) 'Gastropods', In: Lewbart, G. (ed) 1st Ed, *Invertebrate Medicine*, Blackwell Publishing, Oxford, pp. 65-79.
- The Royal Society for the Prevention of Cruelty to Animals (no date) 'Giant African Land Snails', available at: <https://www.rspca.org.uk/documents/1494939/7712578/Giant+African+land+snails.pdf/9cc80746-c984-9872-2858-5b2f74c81e26?version=1.2&t=1607698331607&download=true>

News and Acknowledgements

News



Professor Cooper with his wife Margaret performing a health check on one of the competing snails.

The annual Snail Racing World Championships were held on the 8th of July. A tradition since the 1960s, the races are held in the village of Congham, Norfolk. The event is a popular attraction bringing spectators and competitors of all ages since the 1960s. This year's organisers requested veterinary input and the event was attended by The President of The Veterinary Society, Professor John Cooper, along with his wife Margaret, a member of the society. Health checks were performed on all competing snails before and after the race. Further education was provided on the biology, husbandry, and handling of gastropods. The event gained a lot of media attention and was covered by radio West Norfolk.

Call for submissions.

Attention all researchers and enthusiasts in the field of invertebrate veterinary medicine! The Veterinary Invertebrate Society Journal is seeking submissions for our upcoming issues. We welcome original research, case studies, reviews, and any relevant contributions that advance our understanding and care of invertebrate species. Your work is crucial to fostering knowledge in this growing discipline. Please consider submitting your findings and insights and contribute to the collective wisdom of our community.

Acknowledgements

The Veterinary Invertebrate Society would like to express their heartfelt thanks to previous committee members for their time, expertise, and contributions. Without volunteers willing to share their knowledge and experience the society would not persist and play a vital role in promoting education and welfare of invertebrates worldwide. We would therefore like to offer our thanks to Dr Martin Cooke, Dr David McHattie, Dr Marie Kubiak and Dr Chris Palgrave for their time and contributions.

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 conference 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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