The Potential of Veterinary Input into Invertebrate Conservation

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Invertebrate conservation is an oft passed over subject but is increasingly gaining more attention and more traction. In the same way that the nature of invertebrate collections can allow conservation and breeding programs to be very successful, these same features can also present some key challenges (Pearce-Kelly et al., 1998). Invertebrates can often be kept in large numbers, confined spaces and depending on the species, humid conditions. Sometimes dozens of species can be kept in a single room and this can allow very efficient conservation to occur, but in the worst-case scenario, disease can spread across multiple species quickly. This can result in significant mortality, and in the extreme, even extinction (Cunningham and Daszak, 1998).

Indeed, though the humid and hot environment can often be a requirement of good husbandry, it can also create the perfect breeding ground for bacterial, fungal and parasitic disease.

The understanding of invertebrate biology is commonly based on old studies (sometimes from the turn of the 20th Century), which though very helpful, can be limited by the tools available at that time. Even now, science continues to make new discoveries into how disease and pathology can influence invertebrate biology as we begin to apply modern clinical tools.

Clinical pathology in the form of histology, culture and PCR aren't often applied to invertebrate species in the same way that the more personable vertebrates are. These tools have the potential to increase our capacity to captive-breed these animals, improve overall welfare and ultimately to increase their exhibition potential (Cunningham, 1997). From a pure business point of view, if an animal can have an increased lifespan when exhibited, then zoological collections will become less reliant on wild-caught specimens and on their own captive breeding programs. This in turn would allow these organisations to pursue more conservation work.

Some of the stories within invertebrate conservation show us some key lessons in respect to the role that veterinary medicine may play in conservation. One of these would be the story of the phasmid species *Dryococelus australis*, also known as the 'Lord Howe stick insect' (Honan, 2008; Priddel et al., 2003). This species was at one time reduced to two individuals (due to predation by introduced rodents) but was brought back from those two individuals to having successful breeding programs not only in Sydney but also across the world (including our own conservation programme at Bristol Zoo). Part of this story that is always quite telling to us as veterinarians is that when this species was confined to such a small number; there was significant disease in which one of the individuals needed veterinary intervention. This illustrates how veterinary attention and consideration can have a profound effect on the ability of the species to survive in the face of increasing habitat destruction and conservation challenges.

Another more bittersweet story within invertebrate conservation is that of one of the Partula snail species. There has been a successful and fruitful Partula snail breeding program held at the Zoological Society of London for many years. However, this species set has also had some set-backs, as in 1996 a microsporidian parasite was implicated in the extinction of one of the Partula snail species (Cunningham and Daszak, 1998). This represents a rare example of a disease process being responsible for the extinction of any species.

Perhaps with more knowledge and expertise in invertebrate disease and the practical implementation of this to their care we could prevent another invertebrate extinction such as this in the future.

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Drycocelus Australis

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