

# Talking about chameleon care



A panther chameleon in the wild.  
Photo courtesy Fine Art Photos/www.  
shutterstock.com

Out of all the reptiles whose care has progressed significantly since *Practical Reptile Keeping* magazine first appeared back in 2009, the greatest breakthroughs in understanding have probably been in the case of chameleons. John Courteney-Smith MRSB talks with California-based Bill Strand, a chameleon devotee who has done more than most to advance our knowledge of these remarkable lizards during this period.

**B**ill's podcast 'Chameleon Breeder Network' is a free-to-air radio programme that can be listened to online or downloaded to a tablet, mobile or similar device, wherever you happen to be in the world. The podcasts are not just devoted to chameleons though, and Bill has produced equally detailed and informative insights into many other species of reptile, amphibian and invertebrate.

Within this series, Bill not only gladly shares his own knowledge but he also invites many of the world's most famous keepers and experts to participate and share their knowledge and experiences. The result is a show that allows us as keepers to gain a much better understanding of the species that we keep.

► A New Caledonia giant gecko is also represented in Bill's collection.  
Photo courtesy reptiles4all/  
www.shutterstock.com







▲ A male Parson's chameleon in the wild at Ranomafana on Madagascar. Photo courtesy Ryan M. Bolton/www.shutterstock.com

### Personal preferences

**Q** Hi Bill, great to catch up once again and thank you for taking the time to share with us. Before we get into detail I just wanted to ask when, how and why you started keeping reptiles?

**A** I was one of those kids who grew up infatuated with dinosaurs, and lizards were the closest thing to them. I started keeping reptiles when I was around 10 years old, and have been at it ever since!

**Q** What are the species that you have at present?

**A** In terms of chameleons, I currently have Parson's chameleon (*Calumma parsonii*), the Mount Meru Jackson's chameleon (*Trioceros jacksonii merumontanus*), the Natal Midlands dwarf chameleon (*Bradypodion thamnobates*), the West Usambara two-horned chameleon (*Kinyongia multituberculata*), and the Usambara three-horned chameleon (*Trioceros deremensis*). I also keep three types of dart frogs - azureus, tinctorius, and leucamelas. Then there are Satanic leaf-tailed geckos (*Uroplatus phantasticus*), one New Caledonia giant gecko (*Rhacodactylus leachianus*), and, to top it off, a waxy monkey tree-frog (*Phyllomedusa sauvagii*) named Bartimaheus.

**Q** If you could keep any species of chameleon, which would you choose?

**A** It is so hard to pick one favourite species of chameleon! But if I had to choose one, it would be Jackson's chameleon. With their stunning three horns, the fact they give birth to live

young and a gentle disposition, they are one of the nicest chameleons you could pick to join your family. I realise they are not that scarce in collections, certainly here in the USA, and I know to some people, that makes them less exciting, but if all chameleons were of the same rarity and same price, I think the Jackson's would be one of the ones in most demand.



▲ A stunning blue panther chameleon in Bill's collection.

### Some ambitions fulfilled

**Q** What would you say is your greatest achievement in the field of captive breeding to date?

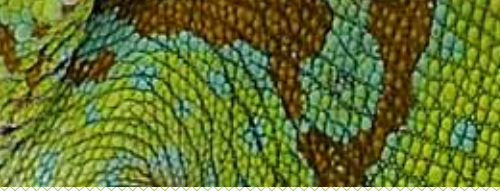
**A** My greatest achievement would probably be the captive hatching of the Usambara three-horned chameleon back in the 90s. I list this one because I put in an enormous amount of effort, and the process forced me to think beyond the limited knowledge that there was at the time. I had so many females become gravid and then not lay eggs. I created multiple types of nesting areas, soil compositions, and dug starter holes, experimenting in every way that I could think of.

I still do not know why they were so much trouble, but many of us back then were having the same issues. These are gorgeous three horned chameleons that lay eggs, but the most striking feature of them is that the young are a robin's egg blue when they hatch. It is almost unreal and I have seen almost no photos of them that truly capture their brilliant blue colour. I call it "the breeder's reward" because this vivid blue appearance fades into green after just a couple weeks. Only breeders of this species are able to enjoy this special experience at first hand.



▲ A male Jackson's chameleon - this is one of Bill's favourite species.



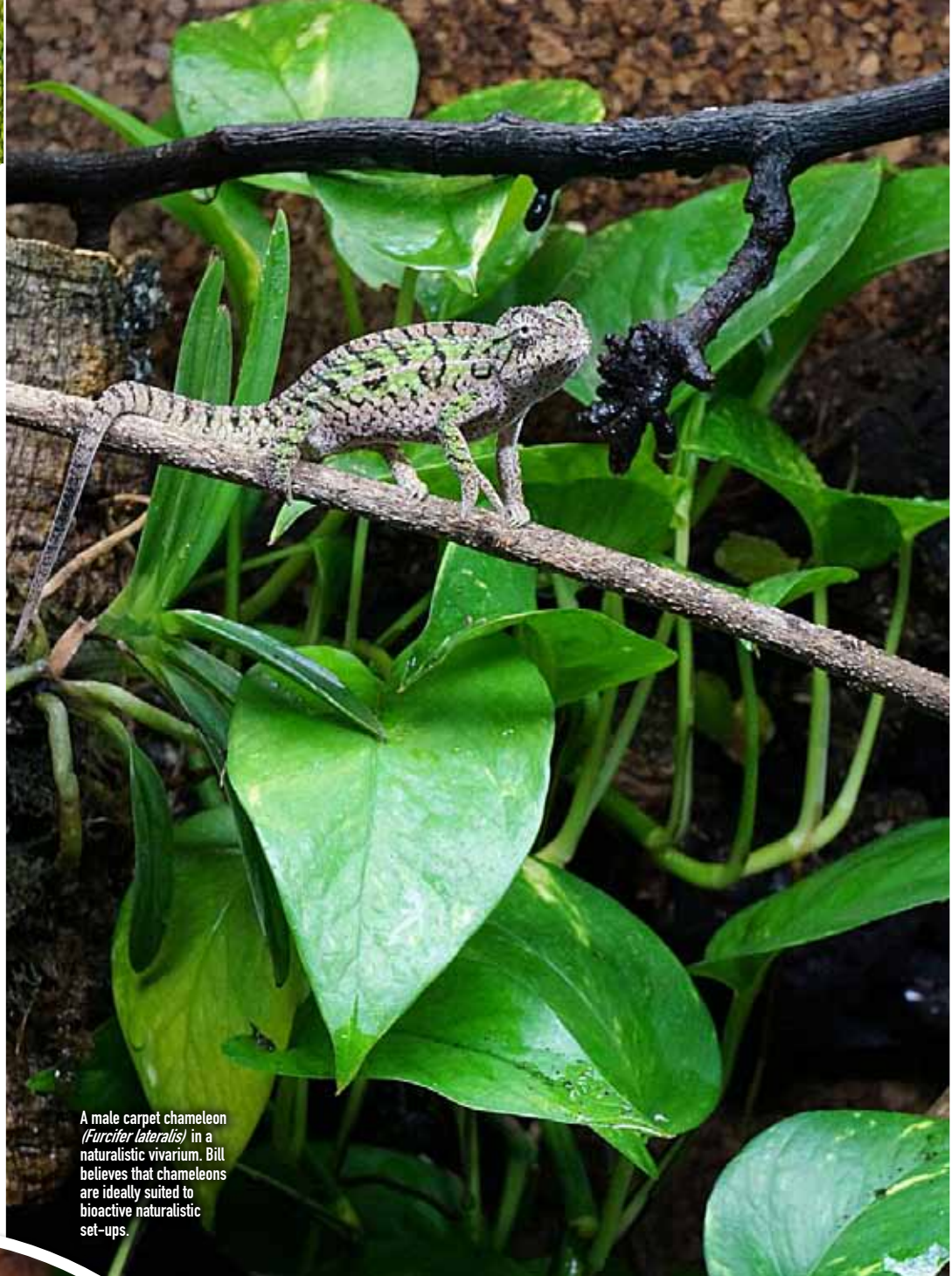


**Q** I noticed that you have developed your own brand of chameleon cages. Why did you diversify into these and what are the benefits?

**A** The Dragon Strand Chameleon Caging Company arose from my desire to facilitate a better way to raise baby chameleons. The Nursery Cage System, which is a set of four cages designed to correspond to baby chameleon dimensions, was my first official product. It was specifically designed to encourage raising chameleons up individually. Group raising is common and can be made to work, but is far from ideal. There is constant dominance play and even physical altercations that occur.

By keeping them separate, each of the babies is able to grow up to its maximum potential with the minimum amount of stress. I expanded into a wider range of cage types simply because there were things we needed that were not available because there were no cages on the market designed by chameleon keepers. Most had, and still do have, substrate trays inside the cage which is not how you want to deal with excess water. It needs to be a drainage tray below the cage to keep the water away from the chameleon.

The last thing you want to do is have faeces, excess water, and escaped feeder insects mingling together, as the latter will then provide the chameleon with an incredible unhealthy super-dose of bacteria. Although chameleon keepers in the EU are well versed with solid side cages, it was a great effort to help the community in the US realise the benefits of that kind of caging and that is what started Dragon Strand.



A male carpet chameleon (*Furcifer lateralis*) in a naturalistic vivarium. Bill believes that chameleons are ideally suited to bioactive naturalistic set-ups.



Hatchling carpet chameleons are housed individually in Bill's Nursery Cage System.

**Pod casting to the world**

**Q** The pod cast is a fantastic resource, and you must have over 60 shows available now?

**You produce and release a brand new show, mostly over an hour long each and every week. How involved is this process and simply how do you find the time?**

**A** It is a huge commitment. Since I edit the show, I can easily listen to the whole thing multiple times depending on the complexity! My purpose in putting it together is to be a reference for chameleon keepers and I work hard to produce a show that will be what we call "evergreen", meaning

that it should be as meaningful three or five years from now. To do this, I research the subject of each episode carefully, so I can be an effective interviewer.

I take on the role of the listener and ask the obvious questions as if I was new to the topic, but there are many hours invested in putting together what "simple" questions to ask that will lead, step by step, to understanding. So the preparation time is often significant. As for finding time, that is a good question and I am not sure I have a satisfactory answer! But it falls to us finding time for what we truly want to accomplish. This is my passion, so it is at the top of my list when deciding what I am going to do with my time outside of my day job.

**Q** Day job? You mean in addition to Dragon Strand?

**A** Yes, Dragon Strand is what financially supports the podcasting, buys





▲ An ambilobe chameleon (*Furcifer pardalis*) which is one of the chameleons occurring on Madagascar.



▲ A baby Usambara three-horned chameleon revealing its transient blue colouration.

lighting, and ensures a wide range of feeders find their way to my chameleons' mouths. But basically, the mortgage here is paid by being in charge of product marketing for a consumer electronics company in Silicon Valley, California.

**Q I must say that you have had some big names on the show, covering some very in-depth topics from core husbandry right the way through to bacterial interactions. I particularly liked Philippe de Vosjoli interview on the mossy gecko (*Rhacodactylus chahoua*) in the wild and Dr Rob Cokes's recent discussion on bacteria. What has been your favourite show?**

**A** Yikes! This is even harder than figuring out what my favourite chameleon is! The truth is that my favourite episode is the latest one: John Courteney-Smith MRSB on gut loading. And, if you'll indulge me for a bit, I'll explain why. Anything that we do, if it is going to have any longevity, must have a purpose and direction. My aim for the Chameleon Breeder Podcast is actually for it to be the next stage in my growth as a chameleon hobbyist!

Much of my first season was just me bringing my audience up to where I am. This second season is where I am going beyond my comfort zone and diving into areas that I have wanted to get better at myself. You being on my show for so many episodes is directly because nutrition was one of my weak areas. I am excited when I look at how much personal growth I have had as a result. Through the podcasts, I am able to invite anyone who shares my chameleon passion to explore and grow right alongside me.

But if I was to pick one episode that really stuck out it would be episode 24 with Karen Stockman talking about free ranging chameleons. After we were done

with the interview, she was quite frank about how confidently she gave advice in the beginning of her chameleon keeping career that she has now reconsidered. That raw honesty and rare self-insight about a growth process we all have gone through, but usually do not like to admit, was unexpected and she gave me permission to make it part of the podcast. It added a human depth to the episode that is not easily able to be recreated. It is well worth listening to and seeing the parallels that exist in all of our lives.

### A better understanding

**Q I know that you also have a special interest in chameleon nutrition. What do you think has been the most important change to reptile nutrition in your time as a keeper?**

▼ Many chameleons on the African mainland are found at high altitude. This is a Mount Hanang chameleon (*Trioceos hanangensis*) from Tanzania. Photo courtesy reptiles4all/ www.shutterstock.com

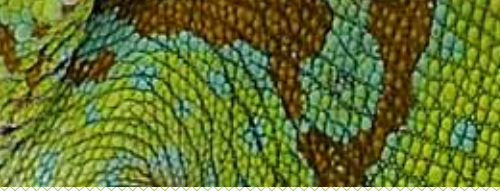
**A** One huge change is the general awareness of the importance of nutrition. The very obvious killer, metabolic bone disease (or MBD for short), made us aware of the importance of calcium early on. We knew nutrition was very significant, but the community seemed to have only a vague understanding of the importance of the rest of those things on the supplement ingredients list. Of course, this may have been partly because of the difficulty of grasping the enormity of the subject. The fact that the nutrition podcasts have proved to be some of the most popular episodes show how desperate we in the community are for that information. The fact that we took four episodes to go over a brief summary of nutrition also attests to its complexity. But we take one step at a time and we are definitely moving forward as a community.

**Q As you know, I am of the firm belief that all of the answers to practical animal care are found in the wild animal, and your stance towards wild research and inviting experts from the field onto the show has allowed me to learn much more about the wild habitats and the animal's interactions within it. What stood out to you from these recordings as a real eureka moment?**

**A** How harsh nature is and how diverse the environments are where chameleons can be found. Although our goal is to recreate their natural environment, we need to differentiate between what a chameleon needs to thrive and when a chameleon just barely survives. Nature nourishes our







chameleons, but it also spends an inordinate amount of time trying to kill those same chameleons! Conversations about how introduced Jackson's chameleons in Hawaii will just drop dead out of the trees from dehydration during a dry spell, or the talk of huge parasite loads that have been recorded in wild individuals are quite sobering.

It is also mind blowing to consider the diversity of climates where chameleons can be found. They naturally range from the sand dunes of the Namib desert to the freezing mountain peaks of Kenya or Madagascar, and of course, into humid, hot rain forests. This is why it is critical to research the species that appeals to you in detail, before starting out. Who knows what conditions that particular chameleon may need? This is most definitely not a case of 'one size fits all'!

I hope my listeners also see how I continually ask for information about chameleon behaviour. The real treasure is learning which microclimate appeals to a particular chameleon. Just knowing the overall temperature for the area from the internet is not telling you if that species is out in the open soaking up the sun or hiding in the deepest brush, hunkering down to wait for the cool of the evening.



An adult Usambara three-horned chameleon in Bill's collection.

▼ **Ornamentation in the form of horns is a feature of a number of different species of chameleon, such as the four-horned (*Chamaeleo quadricornis*).**  
Photo courtesy Eric Isselee/  
www.shutterstock.com

**Q One of the most important aspects of care is nutritional provision. This is tied up within the correct provision of heat, light (UVB), hydration and humidity, variation of diet and the correct supply of earthbound minerals and vitamins. What is the most common ailment reported to you in the US?**

**A** We still see cases of MBD. Unfortunately, I think that common commercial chameleon kits sold through pet store chains may use underpowered UVB lights. This puts the beginners who do not have the benefit of community experience and knowledge on a crash course with MBD. The chameleon's only hope is if the owner was told to get some

mineral powder for calcium and D3 to fill in the gap. I know your life goal is to eradicate MBD in collections, and I think you have made real progress towards that goal. But we have our work cut out for us at the point of sale for the first time keeper who – whether we like it or not – maybe didn't even plan on coming home with a chameleon, much less did any research.

Apart from MBD though, I got an unexpected answer when I asked a chameleon vet what ailment he saw the most, and he said eye problems. Chameleons need misting (or rain) to wash out their eyes and commonly used drippers do not allow for cleaning of the eyes. Water brings both hydration and hygiene. So I am working on raising awareness of that as well!

### Thoughts on live food

**Q There are some clear differences in the species of live foods that are available in the US than the UK. As example we can feed locusts whereas in large areas of the US this is not allowed. You have access to the horn or tobacco worm, a large and protein packed grub that it is banned over here. How much variety of live food do you offer, and do you see merit in producing your own?**

**A** I have my foundation feeder species such as black crickets, dubia roaches, superworms (morios), and fruit flies for baby chameleons. On top of that I add flies, black soldier fly larvae, butterflies, mantises, hornworms, silkworms, and more besides! I am always looking for different feeder insects to introduce to my





Although chameleons reach their greatest diversity in Africa, the Mediterranean species (*Chamaeleo chamaeleon*) is to be found in southern parts of Europe.

Photo courtesy Andrew M. Allport/www.shutterstock.com

## Preserving chameleon habitats

**Q** Many of the habitats where chameleons are found are under threat. Madagascar has had large swathes of forest removed for mining as an example. We can help secure species going forward as dedicated keepers but is there anything we as a community can do to help in protecting their natural habitats?

**A** That is a tricky question. The bottom line is that the forested land needs to have at least the same value as the land clear cut and turned into farmland, mined or burned for charcoal. Even giving land federal protection is not necessarily enough. Money talks the loudest. If our tour groups come through to see the lizards and there are generous tips given out, then there becomes a huge motivation to keep eco-tour groups coming through. If the villagers can earn money by collecting a sustainable amount of wildlife, then they are not chopping down trees. Organisations are being more effective these days in that they are not coming in and condescendingly teaching the people there why they should have the same world view values as those of us who have already benefitted from cutting our forests.

Instead, they are coming in and finding compromises so the native people can see benefit from not destroying the environment. Dr. Chris Anderson, who is a regular on the podcast, just completed a visit to Tanzania to meet with the officials there to develop a plan for sustainable trade. This is the way for success. On our side, we can educate ourselves on what is going on and support people like Dr. Anderson, in the unenviable position of trying to work out a win-win when there are so many short-sighted, unsustainable, but immediately profitable alternatives arising from habitat destruction.

**Q** I see that there are now tours organised within Madagascar to see chameleons in the wild. If this money can be funnelled back into wild conservation, surely this would help? Have you ever had chance to see chameleons in the wild anywhere? If so, did you notice any differences between the wild animals and those held in historic collections?

**A** Yes, the group I interviewed a travel group called Tanala Horizon in episode 64. They operate from Germany, and actually plant a tree for every person who goes on their tours. These trees are in a private reserve and the aim is to create an area that will rejoin two isolated areas



chameleons.

I encourage serious keepers to raise at least one type of feeder insect for themselves. Not only does it save money and ensure supply over holidays or during spells of severe weather, but it allows you to consciously go through the process of raising up at least one of your chameleons' staple food items with diverse and solid nutrition from birth/hatching. Commercially raised feeders are raised efficiently. The measure of success with a commercial insect breeder is to keep the insect alive long enough to sell. While some large scale breeders may be well intentioned, they cannot give the same wide variety of healthy food items to their millions of crickets that you can to those that you need for your chameleons.

This in turn has a direct effect on the long-term health of these lizards.

**Q** What live food species do you or have you produced?

**A** I raise dubia roaches, orange head roaches, Madagascar hissing roaches, green banana roaches, Kenyan roaches, superworms (morios), fruit flies, and wood lice (isopods). In the past, I have also produced crickets and great quantities of black soldier flies, which are probably better-known in the UK as calciworms. I keep live bearing chameleons and so I will always have to be keeping my fruit flies active in case of surprise birth!



▲ The Namaqua chameleon (*Chamaeleo namaquensis*) lives in the south-western part of Africa. This is in one of the most inhospitable places on earth. Photo courtesy dirkr/www.shutterstock.com.



A female carpet chameleon.



of forest. So there is definitely good being done.

I have had a chance to see chameleons in the wild in South Africa and it was a magical experience! Although I would not say this observation is one from being in the wild, there has been a suggestion that our captive-bred animals sometimes do not have the same scalation as those from the wild, even though they are of the same species. The obvious first thought would be that this is because of dietary differences, but I am not aware of any definite findings in this regard. But it's another thing that would be interesting to work out.

### Looking to the future

**Q** Your podcast motto is "Learn, understand, pass it on". It's such a positive sentiment. One of the quickest and most effective ways of learning is to listen to the experiences of others. How do you see the programme evolving in 2017-2018? Can we as keepers help you in this?

▼ Dwarf chameleons can be tiny, as their name suggests. This is a young dwarf chameleon called *Brookesia antacanana*, which still possesses the unmistakable profile of this group of lizards. It is a very small endemic chameleon, restricted to Madagascar.

Photo courtesy Damian Ryszawy/www.shutterstock.com



The tail of a chameleon can provide additional support, helping to prevent them from falling off a branch for example.

**A** Yes, that motto is both a caution and an encouragement! And really, it is understanding that is so important. Unfortunately, we tend to get so excited when we learn something that we immediately pass it on without bothering to go through the understanding stage.

Learning refers to the absorbing of all the knowledge that is out there. And there is a great deal now! Our first step is to absorb all that has been discovered quickly so we do not have to figure out what is already known.

Understanding though is definitely more tricky and takes years. It is this stage that you earn the knowledge you gathered. You have to try different methods and fine tune what you learnt. And here is the part that is so easy to skip. We often jump to passing it on when we have verified that it works. But understanding is not just verifying it works. Understanding is knowing why it works, and, most importantly, understanding the conditions when it will no longer work. This to me is the basis of true understanding. The aversion to using solid side cages in the US is a perfect example of the community passing something on before truly understanding it. We are working on a much more educated approach to caging advice these days.

"Pass it on" should only occur after understanding. Before this stage, you can

only say what has worked for you. You cannot tell someone that they should use a certain cage or a particular light at this point. It is only when you ask their conditions and know whether your method will still be valid within their set-up can you proceed to advise. You need to take yourself out of the equation at this point, and see the world from their perspective.

But this is the critical stage to maintain growth within the reptile-keeping community. It is very easy to do your own thing and avoid being drawn in to answer the same basic questions, once you achieve a certain level of experience. But we do need to be out there, constantly helping the next generation of enthusiasts and using their challenges to push us further in our own growth. The Chameleon Breeder Podcast is my way of doing that.

In 2017, we will be diving deeper into the scientific, conservation, and veterinary aspects of chameleon keeping. Though I will still be heavily involved in talking about basic husbandry, the podcast is going to form a bridge between the individual keeper and the scientific, conservation, and veterinary communities.

I am remaining open to the possibilities for 2018. But I will probably circle back around and go over the basics a level deeper than I did last year. We are growing so much as a community (and I am growing personally) that there is more that can be said about the basics. On my website, <http://www.chameleonbreeder.com>, I have a downloadable mini-booklet



The stunning veiled chameleon (*Chamaeleo calyptratus*) is widely-bred and kept today. It originates from Yemen in the Middle East, sometimes even being called the Yemen chameleon. Photo MattiaATH/www.shutterstock.com



on chameleon care, entitled *Your First Chameleon*, written with the aim of getting people started with the very basics.

I will be updating that each year. The basics remain the same, but as our understanding grows deeper, the explanations need to become more and more substantial. I'd like to get our community understanding to the point where we can make our own gut loading products if we wish, and we can effectively guide someone in Florida, France, Siberia, or Australia because we have that core understanding.

The listeners can help me fulfil the purpose of the podcast by using what I cover as a catalyst. Listen to our talk on nutrition. Listen to my first episode on gradients. Listen to Mark Schertz talk about science in Madagascar. And then dig deeper. My podcasts don't define a subject. Rather, they uncover whole new worlds to explore. Use these introductions to inspire you to become an expert in one of these areas and push the boundaries of what we know as a community. There is so much more to discover.

**Q** I saw that you won the top prize for the Reptile Reports 'best radio programme' of the year. Huge

**congratulations for that. It's quite an achievement. It shows that not only do keepers listen but that they appreciate the ability to learn.**

**A** Thank you very much! I enjoy seeing the chameleon community being more visible and an award like this brings awareness that there is a community that people can join to get solid husbandry advice.

**Q** If there was one piece of advice that you could give to chameleon keepers, what would it be? Thank you for sharing your experience with us, and all the best for the future with both your collection and the podcasts.

**A** I'd like to see more of the community consider keeping chameleons in naturalistic environments. I think we will find much more satisfaction when we create larger environments that are heavily planted. You will see a wider range of behaviours in your lizards then. We obviously enjoy looking at them sitting there and watching them hunt. I'd like to help usher in a greater awareness of how fascinating it is to watch them go about their day when they have a wide variety of exposure choices in their environment. ❖

**►► I encourage serious keepers to raise at least one type of feeder insect for themselves. Not only does it save money and ensure supply over holidays or during spells of severe weather...** ►►

The agility of chameleons, especially when hunting invertebrates as shown here, is a source of fascination and wonderment to us, adding to the level of interest surrounding these lizards. Photo courtesy Svoboda Pavel/www.shutterstock.com

