

Warwickshire Amphibian & Reptile Team

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Editorial

Hello there WART fans! Welcome to the latest edition of the WART newsletter. This edition brings with it a host of articles from various sources, bringing you news from around the world and close to home.

Probiotic bug is a frog lifesaver

A DEADLY fungus thought to be behind declining amphibian populations worldwide is spreading fast - most recently to the Philippines, where it has just been detected. But now researchers are finding ways to fight back.

They are pinning some hope on a probiotic skin bacterium that occurs naturally on the skin of several amphibian species. One of the first animals to benefit could be the Panamanian golden frog, a striking yellow toad now extinct in the wild that has become a symbol for amphibian conservationists (see right).

Public enemy number one is the fungus *Batrachochytrium dendrobatidis* (Bd), which causes chytrid disease. Reid Harris of James Madison University in Harrisonburg, Virginia, and colleagues reported last year that frogs exposed to Bd maintained their weight better if they were first coated with the bacterium *Janthinobacterium lividum*. Now they have shown the treatment stops frogs dying from the disease, and they know how it works. Harris's team dunked 12 mountain yellow-legged frogs in a bath of *J. lividum* and then infected six of them with Bd, along with six untreated frogs.

Twenty weeks later, five of the untreated frogs had died, while all six treated frogs survived and even gained weight (*The ISME Journal*, DOI: [10.1038/ismej.2009.27](https://doi.org/10.1038/ismej.2009.27)). The treated frogs' skin contained high levels of an antibiotic called violacein, which is produced by the bacteria. Harris presented the results last month at a meeting of the American Society for Microbiology in Philadelphia, Pennsylvania.

Later this year, the researchers plan to test the treatment on Panamanian golden frogs which have been bred in captivity. If that works too, they envisage a trial in a more natural setting in.

Panama - perhaps in large cages next to a stream. Ultimately, they hope it may be possible to protect frogs in the wild by treating both animals and the soil and water in their habitats with the probiotic. "I applaud what they're doing," says Trenton Garner of the Institute of Zoology in London. "So many people are talking about chytrid, but very few are actually taking steps to find out if anything can be done to try to mitigate it."

In April, Garner's team travelled to Majorca, Spain, for the first ever attempt to tackle Bd in the wild. They removed tadpoles of the Majorcan midwife toad from an isolated set of ponds and are now treating them with the antifungal drug, itraconazole. The toadlets will be returned to the ponds in October.



Panamanian golden frog

Article courtesy of [New Scientist](#)

Amphibians mate under a full moon

Amphibians around the world synchronise their mating activity by the full Moon, researchers have discovered.

This global phenomenon has never been noticed before, but frogs, toads and newts all like to mate by moonlight. The animals use the lunar cycle to coordinate their gatherings, ensuring that enough males and females come together at the same time.

In doing so the creatures maximise their spawning success and reduce their odds of being eaten. Details of the discovery are published in the journal *Animal Behaviour*.

Biologist Rachel Grant of the Open University was studying salamanders near a lake in central Italy for her PhD in 2005 when she noticed toads all over the road, under a full Moon.

"Although this might have been a coincidence, the following month I went along the same route every day at dusk and found that the numbers of toads on the road increased as the Moon waxed, to a peak at full Moon, and then declined again," she says. A review of the scientific literature found little mention of any similar records, so Grant returned to the same site in 2006 and 2007 to survey the amphibians in more detail.

She then collated her data with a 10-year analysis of the mating habits of frogs and toads at a pond near Oxford, UK, collected by her supervisor Tim Halliday, and with data on toads and newts living in Wales collected by colleague Elizabeth Chadwick from Cardiff University, UK.

"We analysed the data, and found a lunar effect at all three sites," Grant says.

For example, the common toad (*Bufo bufo*) arrives at all its breeding sites, mates and spawns around the full Moon. The common frog (*Rana temporaria*) also spawns around the time of the full Moon.

"Newts also seem to be affected by the lunar cycle but the results are less clear," says Grant.

Newt (*Lissotriton vulgaris*, *L. helveticus* and *Triturus cristatus*) arrivals peak during both the full and new moons.

But "newts appear to avoid arriving at the breeding site when the Moon is in its third quarter. This could be because the Earth's magnetic field is highest at that time. More research is needed to clarify this," Grant says.

The researchers have also looked at historical data collected in Java on the Javanese toad (*Bufo melanostictus*) and found that it too mates by the lunar cycle, with females ovulating on or near to the full Moon.

"We now have evidence of lunar cycles affecting amphibians in widespread locations. We definitely think that Moon phase has been an overlooked factor in most studies of amphibian reproductive timing," says Grant. "We think this may be a worldwide phenomenon. However, differences between species in ecology and reproductive strategy may mean that not all amphibians are affected in the same way. This is something we would like to investigate further."

Grant and her colleagues now hope to produce a statistical model that takes into account weather factors and other environmental variables such as geomagnetism, as well as the lunar cycle. Making accurate predictions of mass amphibian movements is important in their conservation, she says. For example, roads could be closed at precise times to avoid cars killing thousands of mating frogs and toads.

"Given the current global crisis among amphibian populations, further understanding of [their] breeding behaviour is extremely important," she says.



Article courtesy of www.bbc.co.uk

How the turtle's shell developed

Scientists have revealed a spectacular insight into turtle evolution - how the unique animals get their shells.

A Japanese team studied the development of turtle embryos to find out why their ribs grow outward and fuse together to form a tough, external carapace. Reporting in the journal *Science*, the researchers compared turtle embryos with those of chicks and mice.

They found that, as turtles developed, part of their body wall folded in on itself forcing the ribs outward. The team of researchers from the Riken Center for Developmental Biology in Kobe, Japan, described the turtle shell as an "evolutionary novelty". It represents such a leap from the soft-bodied ancestors that turtles share with mammals and birds, that scientists have long puzzled over how exactly it came about.

"Other groups have looked into why the shoulder blade in turtles is encased inside the rib cage," said Olivier Rieppel from Field Museum in Chicago, an expert in reptile evolution who was not involved in this study. "That makes them unique."

This study identified the key event in the development of a turtle embryo that changes its fundamental "body plan" - when the upper part of the its body wall folds in on itself.

This fold produces what scientists refer to as the carapacial disc - a thickening of the deep layer of the turtle's skin that maps out the position of its shell. "Once you have this body plan, you have the carapacial disc and all the rest of it follows," said Dr Rieppel.

In the early embryo, the muscles and skeleton are in similar positions to those of the chicken and mouse, explained Shigeru Kuratani, one of the authors of the study. As the embryo develops, this folding essentially "re-maps" the turtle's body - mechanically preventing the ribs from growing inward and holding the shoulder blades in place.

Dr Kuratani explained that some of the connections between developing bones and muscles were the same as in birds and mammals, but there were some, including the pectoral muscles, that "showed entirely unique (types of) connectivity in turtles".

The discovery helps define a position in evolutionary history for a 220-million-year-old turtle fossil discovered last year in China, which had an incomplete shell that only covered its underside.

"The developmental stage of the modern turtle, when the ribs have not encapsulated the shoulder blade yet, resembles the (body) of this fossil species," said Dr Kuratani.

Dr Rieppel, who examined the Chinese fossil when it was discovered late in 2008, said this study illustrated that the ancient turtle was "basically an intermediate step in the animals' evolution".

The scientists do not yet know what causes the folding. "That belongs to a future project," said Dr Kuratani.

Stressing the importance of developmental research to evolutionary biology, Dr Kuratani said:

"Developmental changes in evolution give rise to an enormous diversity of animal forms."

"No matter how exquisite it may seem, as if it were some sort of magic, evolution is at most a good trick... and there is a way to make it work."

"In case of turtle evolution, a major part of the trick was found to be (this) embryonic folding."



Article courtesy of www.bbc.co.uk

Adders ahoy?

WART are currently working in partnership with Warwickshire Wildlife Trust to try and find an answer to the question of whether the Adder is alive and well somewhere in Warwickshire. For some time now there have been no confirmed sightings or "reliable evidence" in the form of photographs etc to prove the Adder's presence. However, every year there are various "sightings" which sometimes are proven to be grass snake or others go unproven. In addition to this there the annual reports in the local media of people and animals being "bitten by Adders". So in an effort to solve the conundrum once and for all and to help establish a focus for future work we are contacting local veterinary surgeries spread around the county to establish the number (if any) of snake bite incidents they have dealt with over the last 5 years. As you know, the Adder is the UK's only native poisonous snake, so if the results come back and clusters of bite reports have occurred, it will enable us to target our surveys in future years to establish if someone's pet has escaped or whether the elusive Adder is still hanging on somewhere in Warwickshire.

Pond creation update

As you will remember in the last issue we brought you exciting news of pond creation projects in 2009. Well things are progressing and we are currently in the process of completing the paper work to ensure that the excitement of pond creation can go ahead smoothly in the Autumn/Winter of 2009. It is hoped that a number of ponds will be created at Tocil Wood Meadow and Stonebridge Meadows in Coventry. These sites have been chosen on the basis of their locality to good populations of Local Biodiversity Action Plan (LBAP) species (common toads and great crested newts). Hopefully the next newsletter later in the year will have dates to project and if people are interested in coming along to assist with the project then please feel free to get in touch.

Regional conference a big success!!!

As you know Warwickshire recently played host to the first regional ARG (Amphibian and Reptile Group) conference for a number of years back in June. The conference attracted attendees from around the regional stretching north to Derbyshire, and from Bedfordshire to Herefordshire. There were a number of guest speakers from local ARG's to Natural England who spoke on wide ranging topics including pond creation schemes, slow worms to biological record centres. The conference was held at

Rugby High School, and delegates got to enjoy the award winning herp area during their lunch break.

The whole event was widely regarded as a big success, not least due to the quality of the buffet which was not only tasty but extremely plentiful.

It is hoped that another county will hold a similar event in future years to enable like minded individuals to meet up, share best practice and learn more about our local projects.

Records required

Attached to the back of this newsletter you will find a recording form which we would encourage all WART members and indeed members of the public to fill in should they see any amphibians or reptiles in their local area. Records are extremely valuable for a number of reasons, including helping to inform ecological advice in respect of planning applications in Warwickshire, giving an indication of localised populations and their distribution and informing conservationists where "hot spots" occur and which areas of the county are strong holds for certain species.



Slow worms by Nigel Clemons

The recording form can either be emailed electronically to our record collator George Burton at george.burton@sky.com or sent in the post directly to the Biological Records Centre at Warwickshire Museum Field Services, Ecology Unit, The Butts, WARWICK, CV34 4SS. If the records are from Warwickshire Wildlife Trust nature reserves then of course we'd be interested in seeing them too! Which ever method you choose we all share the knowledge between us so please give us all the information you can. Annual records of the same things at the same place are also important, the more recent the record the more relevant it is, so if you know of a site that has always had amphibians or reptiles on it and you think that it must have been recorded at some point then please send the records in any way as it will still be valuable!

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Toad by Philip Precey