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# Spiders may shed light on movement of ancient earth

## NUS researcher studying the only living descendants of extinct group

**By AUDREY TAN**

SPIDERS thought of as living fossils because they look so similar to their ancient ancestors could help scientists understand how the earth's land masses moved to create today's continents.

A researcher from the National University of Singapore (NUS) has found that liphistiid spiders are the only living descendants of an ancient group of spiders, some of which became extinct about 295 million years ago. The remains of the ancient spiders, from the group of arachnids called Mesothelae, were found in France.

But their living descendants, which came about between 39 million and 58 million years ago, live only in South-east and East Asia.

NUS spider expert Li Daiqin, who has studied spiders for over 20 years, believes the globetrotting arachnids could shed light on continental drift, the widely accepted belief that the earth started out with one supercontinent which broke and drifted apart.

"This group of spiders cannot be dispersed over water," said Associate Professor Li, who is with the university's biological sciences department. "So, based on where the original fossils were found, and where the living descendants now occur, they must have travelled with the land."

Three routes could have taken the spiders from Europe to Asia, travelling on one of the land masses, he suggested.

They could have journeyed across the Middle East, through China, or come through Myanmar and western Thailand, he said.

His latest research, a three-year effort involving 11 other scientists from research institutions around the world, was published in scientific journal Proceedings Of The Royal Society B on May 6.

More than 2,000 liphistiid spider specimens, considered living fossils as they have segmented abdomens like their ancestors, were studied.

The findings could help scientists locate other fossils along the hypothesised travel routes, said Prof Li, who is looking to find more liphistiid spiders in South-east Asia. "This will help in our understanding of the dispersal routes taken by the (spiders) from Euramerica to Asia."

Considering the time gap from when the Mesothelae ancestors became extinct to when modern spiders first came about, other families of spiders may have branched out and gone extinct along the way, he said. "If we can find these fossils, we could study them and find out why they went extinct, such as through climate change, for instance."

Tectonic expert Paul Tapponnier, from Nanyang Technological University's Earth Observatory of Singapore, said the study could unearth interesting insights about the earth's climate.

"Since the spiders are now found in tropical Asia, it could mean that France used to have a similar climate some 300 million years ago," he said.

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### Most biologically important of all spider species

**A liphistiid spider that is new to science. Genetically, liphistiid spiders can be traced back more than 50 million years.** PHOTO: DAIQIN LI

OF THE more than 50,000 species of spiders found around the world, 91 belong to the family liphistiidae.

This family is considered the most biologically important of all spider species, as its form has not changed for about 295 million years.

Genetically, it can be traced back over 50 million years. The further back a species' origins, the longer it has contributed to and evolved with an ecosystem, making it more valuable.

■ These spiders can be found only in South-east and East Asia – in Malaysia, Thailand, China and Japan, for instance, though not in Singapore. But about 295 million years ago, their extinct predecessor lived in France, leading researchers to speculate that they moved with the land masses when these split apart and drifted.

■ Liphistiid spiders, which are less than 4cm long, do not build webs to catch prey. Instead, they live in burrows underground that have "trapdoors" made of silk, soil and leaf litter. When the spiders detect movement of an insect against the silk threads, they rush out for their meal.

■ All the Malaysian *liphistius* species are protected there. They are endemic to certain habitats, which means that once an isolated habitat is destroyed, the species could go extinct. The *Liphistius batuensis*, for example, can be found only in the Batu Caves near Kuala Lumpur.

**AUDREY TAN**