

Researchers reveal dwarf aquatic plants' hidden ancestry

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A team of UBC researchers has re-classified an ancient line of aquatic plants previously thought to be related to grasses and rushes. The discovery clarifies what may be one of the biggest misunderstandings in botanical history.

"It's a classic case of mistaken identity," says Sean Graham, an associate professor and researcher with the UBC Botanical Garden and Centre for Plant Research in the Faculty of Land and Food Systems. "And it took DNA sequence evidence coupled with a critical re-examination of anatomy to assign these plants to their proper place in the plant evolutionary family tree."

Graham and his PhD students Hardeep Rai and Jeffery Saarela, who is now a research scientist at the Canadian Museum of Nature, show that Hydatellaceae are actually closely related to water lilies. Their findings are published in this week's edition of the journal *Nature*.

Due to their narrow, pointed leaves, botanists had long viewed Hydatellaceae as monocots, a large and diverse group of flowering plants that includes the grasses, gingers and palms. By analyzing the plants at the molecular level, Graham's team has now determined that these moss-size plants are instead part of an older line of flowering plants that includes the water lilies. This ancient line split off the main trunk of the family tree of flowering plants soon after they began to diversify, at least 135 million years ago, during the age of the dinosaurs.

Fully grown individuals in the Hydatellaceae family can be as small as 1-2 centimetres in height, and have dozens of minute flowers clustered into each compact flower head.

Native to Australia, New Zealand and India, they thrive in seasonal freshwater pools and swamps, and may blossom underwater at depths of up to one metre, or as the pools dry out.

"For more than a century, scientists have been piecing together the details of the rapid rise and early diversification of flowering plants," says Graham. "Discovering this living plant's ancient heritage makes us re-evaluate our understanding of early flowering-plant evolution. For botanists, this is like finding something you thought was a lizard is actually a living dinosaur."

Graham led the project with researchers from the Royal Botanic Gardens in Sydney, Australia, the University of Zurich, Harvard University, and the University of California, Davis.

"This provides a major piece in the puzzle of flowering-plant origins – something Charles Darwin once termed an ‘abominable mystery’ – by revealing that some of the earliest evolutionary branches were more diverse than we once thought."

Source: University of British Columbia

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