Scientists discover carnivorous plant using sticky catapulting tentacles

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The study found the snap-tentacle movement is not repeatable, possibly due to fracturing epidermal cells, and with a growing season of about four months the plant develops new leaves every three to four days. Credit: sunphlo

The first detailed analysis of a WA native carnivorous plant by a group of German scientists has confirmed the presence of a unique mechanism for trapping prey.

Researchers from the University of Freiburg studied the sundew *Drosera glanduligera*, located in the South West, and its method of prey capture through touch-sensitive snap tentacles.

The plant grows as a rosette on the ground and catches predominantly non-flying arthropods with spoon-shaped trap leaves which feature glue -tentacles towards the centre of the leaf and 12–18 marginal snap tentacles.

University of Freiburg Plant Biomechanics Group researcher Simon Poppinga says the team had to use plants cultivated in Germany to carry out the experiment.

"We wanted to verify experimentally that snap-tentacles play an active role in prey capture by catapulting the prey onto the deadly trap, and to gain a deeper knowledge on how theses tentacles can move so fast (up to 75 milliseconds),"he says.

"It is still up to future studies to record snap-tentacle action in the natural habitat and to elucidate the actual advantage for having snap-tentacles."

The study confirmed that the trap system utilised by Drosera glanduligera is more complex than the mechanism used by other Drosera species.

Drosera glanduligera's mechanism involves animals that touch a snap-tentacle trigger being catapulted onto the central sticky part of the leaf and then digested as opposed to other Drosera plants which rely on stickiness alone to catch prey.

The study found the snap-tentacle movement is not repeatable, possibly due to fracturing epidermal cells, and with a growing season of about four months the plant develops new leaves every three to four days.

Mr Poppinga says the Drosera glanduligera is unique in having an active catapult-flypaper trap – something that no other plant possesses.

"In our experiments we also witnessed that snap-tentacles moved the fastest on healthy plants and under high illumination and temperature," he says.

"The fast motion is under tight physiological control and depends on the vigour of the plant, hence it is also temperature-dependent."

He says this is also the case for all other carnivorous plants that utilise active nastic motions, including the Venus Flytrap.

The researcher who cultivated the plant, Siegfried Hartmeyer, says the study determined the snap-tentacles did not require the storage and release of elastic energy to perform their motion, but is small enough to be actuated hydraulically.

"As a counter-example, the Venus Flytrap uses a snap-buckling instability to perform its fast shutting (motion)," he says.

The study also suggested further areas of research including using electrophysiology to explain how the tentacles mechanical response is triggered as well as the character of the tentacle bending.

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