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# Bio Technology



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## Ultra-Fast Suction Traps Leave No Chance for Prey Animals

*Bladderworts (Utricularia spp.) constitute the largest genus of carnivorous plants. They catch and digest prey animals, mainly small crustaceans, with millimetre-sized suction traps. These so-called bladders have fascinated scientists since Darwin's early works on carnivorous plants.*

A joint project between the Plant Biomechanics Group of the University of Freiburg, led by Prof. Dr. Thomas Speck, and the Laboratoire de Spectrométrie Physique of the University of Grenoble has investigated the biophysical details of this prey capture mechanism for the first time.

The bladders contain water which is pumped out by special glands, hence generating negative pressure and allowing elastic energy to be stored in the trap walls. A door with four protruding trigger hairs provides a watertight closure for the trap. When these hairs are touched by prey, the door opens and closes in a fraction of a second, and relaxation of the trap walls leads to the sucking of water and prey. This capture process takes less than a millisecond and therefore ranks among the fastest plant movements known so far.

Prey animals are sucked in with an acceleration of up to 600 times that of gravity, leaving them no chance to escape. The door deformation involves a complete inversion of curvature which runs in several distinguishable intermediate steps. This ultra-fast, complex and at the same time precise and highly repetitive movement is enabled by certain functional-morphological adaptations.

Furthermore, this process was verified by numerical simulations and theoretical models.

**Source:** Olivier Vincent, Carmen Weißkopf, Simon Poppinga, Tom Masselter, Thomas Speck, Marc Joyeux, Catherine Quilliet, Philippe Marmottant. Ultra-fast underwater suction traps. *Proceedings of the Royal Society B*, 2011; DOI: 10.1098/rspb.2010.2292