

Abstract Submitted
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The ultrafast valve of an aquatic carnivorous plant PHILIPPE MARMOTTANT, OLIVIER VINCENT, MARC JOYEUX, CATHERINE QUILLIET, Lab. Spectrometrie Physique, CNRS and University of Grenoble, SIMON POPPINGA, CARMEN WEISSKOPF, TOM MASSELTHER, THOMAS SPECK, Botanical Garden of the University of Freiburg, Germany — Aquatic carnivorous bladderworts (*Utricularia* spp.) are plants that catch prey animals with suction traps. Here we present an experimental study with high speed video analyses of the extremely fast trapping movements, and show that suction is performed in less than a millisecond, much faster than previously thought. We reveal how the convex door morphology is optimized for a fast opening and closure, which we confirm by numerical simulations: the trapdoor is an elastic valve that buckles inside (entailing rapid opening) and then unbuckles (entailing rapid closure). These precise and reproducible motions are coupled with a strong suction swirl causing accelerations of up to 600 g, and leaving little escape chances for prey animals.

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