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How the Venus flytrap actively snaps: hydrodynamic measurements at the cellular level MATHIEU COLOMBANI, YOEL FORTERRE, IUSTI CNRS UMR 7343, Aix-Marseille Univ., France, GEP TEAM — Although they lack muscle, plants have evolved a remarkable range of mechanisms to create rapid motion, from the rapid folding of sensitive plants to seed dispersal. Of these spectacular examples that have long fascinated scientists, the carnivorous plant Venus flytrap, whose leaves snap together in a fraction of second to capture insects, has long been a paradigm for study. Recently, we have shown that this motion involves a snap-buckling instability due to the shell-like geometry of the leaves of the trap. However, the origin of the movement that allows the plant to cross the instability threshold and actively bend remains largely unknown. In this study, we investigate this active motion using a micro-fluidic pressure probe that gives direct hydraulic and mechanical measurements at the cellular level (osmotic pressure, cell membrane permeability, cell wall elasticity). Our results challenge the role of osmotically-driven water flows usually put forward to explain Venus flytrap's active closure.

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