

News in Brief: Plants, Physics

Liverwort reproductive organ inspires pipette design

The tool relies on water's surface tension to hold a droplet

By Laurel Hamers 7:00am, March 15, 2018



NATURE'S DESIGN The female reproductive structures of the umbrella liverwort, shown here, capture sperm-filled water droplets under their fronds.

Katja Schulz/flickr.com (CC BY 2.0)

The sex organs of primitive plants are inspiring precise pipettes.

Liverworts are a group of ground-hugging plants with male and female reproductive structures shaped like tiny palm trees. The female structures nab sperm-packed water droplets by surrounding them with their fronds, like an immobilized claw in an arcade machine.

Scientists have coopted that design to create a plastic pipette that can pick up and transfer precise amounts of water, researchers report March 14 in the *Journal of the Royal Society Interface*.

Normally, the female reproductive structures of the umbrella liverwort (*Marchantia polymorpha*) clutch the spermy droplets beneath their fronds around the stems. But researchers flipped the umbrella-like cap upside down and stuck it onto a needle so it instead resembled a broom. That rejiggered liverwort could capture a droplet when dipped into water. Tilted at just the right angle, the drop slid back out.

Unlike traditional pipettes, which draw up liquids using suction, the liverwort relies on the surface tension of the water to hold droplets, says study coauthor Hirofumi Wada, a physicist at Ritsumeikan University in Kusatsu, Japan. Wada and his colleagues then 3-D printed plastic structures — varying the overall shape, diameter and number of fronds to adjust how much water the device could grab.

Lengthening the fronds to make the water-grabber more spherical enabled it to pick up larger drops, up to a centimeter in diameter.

The invention probably won't replace the utilitarian workhorse pipettes used in research labs around the world, but could be a low-cost alternative for educational settings, Wada says.

Citations

K. Nakamura et al. Plant-inspired pipettes. *Journal of the Royal Society Interface*, March 14, 2018. doi:10.1098/rsif.2017.0868.

Further Reading

S. Milius. Tough Frills: Ferns' wimp stage aces survival test. *Science News*, Vol. 172, November 17, 2007, p. 307.

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