



Insect aquaplaning:

Wetness-based activation of traps in *Nepenthes* pitcher plants

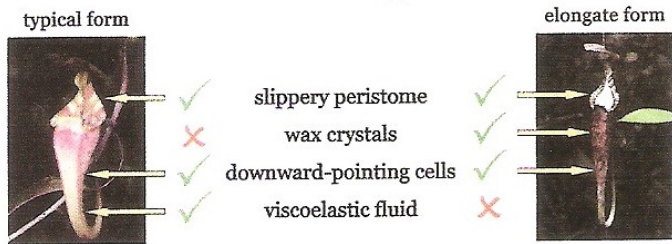
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Pitcher plants use various structures to capture prey

Nepenthes pitchers are highly specialised leaves to attract, capture, retain and digest arthropod prey. Specialised trapping structures include a viscoelastic digestive fluid, slippery wax crystals and downward-pointing cells on the inner pitcher wall, and the pitcher rim (peristome) which causes insects to 'aquaplane' when it is wet. We investigated the relevance of individual structures in the field by comparing two forms of *N. rafflesiana* with different combinations of pitcher traits.

Different combinations of trapping structures in 2 forms of *N. rafflesiana*



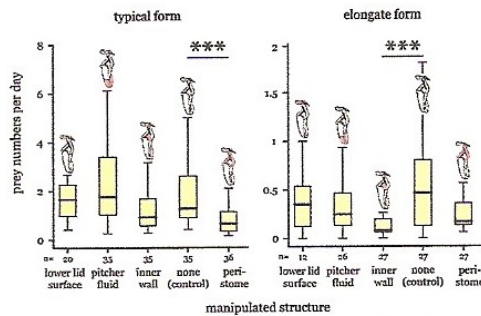
Peristome and wax crystals are relevant for natural prey capture

The test:

'Knock-out' manipulations of individual structures:

- surfaces coated with transparent, odourless silicon polymer
- fluid replaced with water

Observation of natural prey capture



The answer:

Only wax crystals and the peristome are relevant

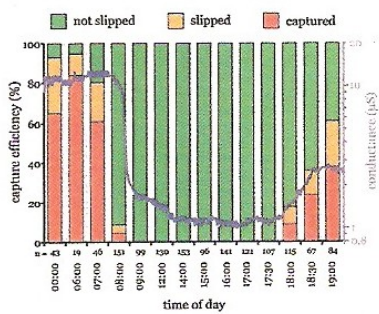
But:

Many species do not have wax crystals!

And:

The peristome is only slippery when it is wet!

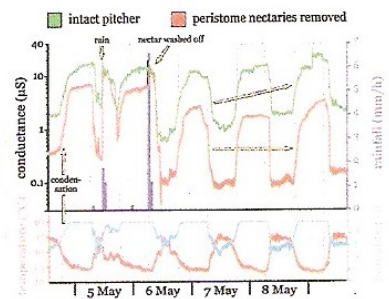
Rain and air humidity cause strong variations of capture efficiency



The test:

Measurement of...

- peristome wetness (as electrical conductance)
- capture efficiency (running tests with ants)
- meteorological data (rainfall, temperature, air humidity)



Capture efficiency and peristome wetness vary synchronously

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Wetting is caused by rain, condensation and nectar