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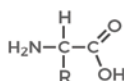
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A collaboration between C&EN and
Andy Brunning, author of the popular
graphics blog **Compound Interest**

THE CHEMISTRY OF VENUS FLYTRAPS

Most plants get nutrients from the soil. But Venus flytraps prey on insects to get what they need. Here, we look at how these carnivorous plants molecularly lure and trap their prey.

CARNIVOROUS PLANTS



AMINO ACID

When Venus flytraps digest prey, they extract nitrogen from the insects' amino acids to make proteins and extract carbon to fuel respiration.



LURING PREY

60
VOLATILE
ORGANIC
COMPOUNDS

TERPENES

BENZENOIDS

ALIPHATICS

These plants attract prey with brightly colored traps and by releasing fruity and flowery scents, such as terpenes.

TRAPPING PREY

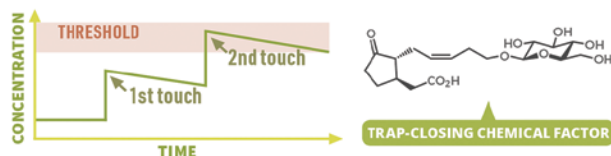


TWO STIMULI IN <30s

0.1 SECONDS TO CLOSE



If an insect touches a trigger hair in the trap once, nothing happens. If a second hair is ruffled, the trap snaps closed.



The touches cause accumulation of chemicals, including β -D-glucopyranosyl-12-hydroxyjasmonic acid (above). When their concentrations reach a threshold, the trap closes. More touches start production of the hormone jasmonic acid.

DIGESTING PREY

Jasmonic acid signals the trap to make digestive enzymes such as proteases. When the trap seals, the pH drops. Glutathione protects the enzymes in the acidic environment. The digestion process takes up to five days.

