Periodic Graphics

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

More online

To see more of Brunning's work, go to **compoundchem.com.** To see all of C&EN's Periodic Graphics, visit **cenm.ag/periodicgraphics.**

ANT VENOM AND PHEROMONES

Ant bites and stings can cause intense pain. Here, we highlight some of the chemical components in ant venom that are responsible and zero in on molecular signals the insects use to communicate.

ANT VENOM

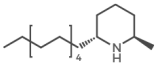
71% OF ANTS ARE STINGING SPECIES

DRY VENOM PRODUCED **10–300 µg**

FORMIC ACID

Formic acid is the main component of many ant venoms, present at concentrations of up to 70% by volume.

ALKALOIDS



Some ant species, including fire ants, have alkaloids in their venoms. These compounds can have toxic effects.

PEPTIDES

Cytolytic peptides penetrate and destroy cells. Neurotoxic peptides, less common in ant venom, target ion channels.

PROTEINS

Proteins can act as neurotoxins. They can also cause inflammation, act as allergens, and promote venom diffusion.

PAIN AND ITS APPROXIMATE DURATION

INCREASING PAIN →

SOUTHERN FIRE ANT	ARMY ANT	RED IMPORTED FIRE ANT	BULLET ANT
5 min	5 min	5 min	300 min

Source: Schmidt Sting Pain Index

Credit: Shutterstock

ANT PHEROMONES

Ants secrete pheromones. These are chemicals used to communicate with other ants for a variety of purposes, including to warn them and to signal food.

ALARM	TRAILS	REPRODUCTION
FORMIC ACID	PYRAZINES	HYDROCARBONS
Secreted to warn other ants of dangers such as predators	Used as a scent trail to guide other ants to food sources	Secreted by queens to stop the reproduction of workers

PERIODIC GRAPHICS