Stinging Ants of the Southwest

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My Topics

- Requested by attendees:
  - Native fire ant stings
  - Harvester ant stings
- Bonus topic:
  - Discovering Anaphylaxis

Severe Ant Stings in the Southwest

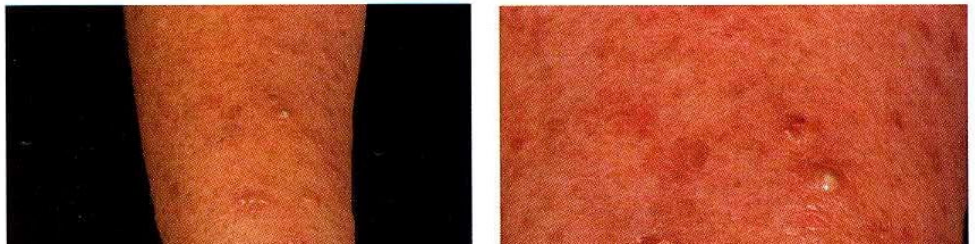
- In the United States, most adverse reactions to ant stings are caused by species belonging to *Solenopsis*, with more than 80 deaths attributed to **imported fire ants. Dome-shaped nests in open grassland (yards).**
- **2 fatalities have been recorded for native fire ants**, *Solenopsis xyloni* (8-month-old in MS, and 3-month-old in Phoenix, AZ).
- Less aggressive *S xyloni* nest in the open, under objects such as boards and stones, and sometimes in woodwork. The **mounds of *S. xyloni* are irregular craters of scattered soil with multiple obscure entrances**.

Imported fire ant mound: Eastern Texas, LA, MS, Georgia, Florida

Other Native Fire Ants

- Stings of 2 other **native fire ants**, *Solenopsis aurea* and *Solenopsis geminata* have caused adverse reactions.
- The former is limited to the Colorado Desert in California and into southern Nevada, AZ. The latter was displaced by imported fire ants but spread to many Pacific islands.
- For Example: Two US servicemen stationed in Guam and Okinawa experienced near fatal reactions to stings by *S geminata*. Before their deployment, both men were sensitized to imported fire ant venom, which is highly cross-reactive with other native fire ant venoms.

Fire ant venom yields **pseudopustules**



Piperidines: burning sensation;
venom is 95% solenopsins

- 40-year-old landscaper with multiple ant stings on arm while removing flowers in Indio, CA (2008)
- Drove to ER right away with SOB, wheezing, itching and faintness
- Treated for anaphylaxis and released
- 6 years prior with similar stings
- Ant: *Solenopsis xyloni*

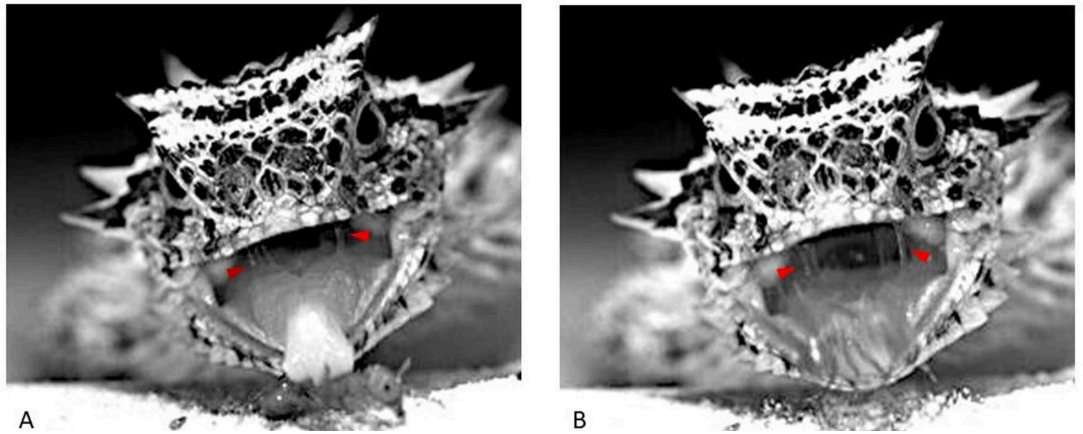
Ants in the US. Some considerations

- Ants are considered by urban pest management professionals to be the top economic pest and by homeowners; more serious than cockroaches.
- The more adaptive native species, such as S. xyloni and P. rugosus, thrive in disturbed habitats, becoming house or yard pests, respectively. These species flourish alongside roadways which retain moisture and may soften the soil for nesting and promote growth of grasses.
- Studies have demonstrated antigenic cross-reactivity for species within the genera *Solenopsis* and *Pogonomyrmex*.
- A surprising degree of cross-reactivity was shown between ***Solenopsis* and the common striped scorpion, *Centruroides vittatus***, but the significance of this finding remains unclear.

Harvester ant: P. maricopa

More on *Pogonomymex*

- Harvester ants are common in the arid grasslands and deserts of the western United States.
- The stings of harvester ants are considered to be the most painful of all North American ants and the most toxic of all insect venoms based on median lethal doses to mice.
- At least 2 deaths have been attributed to stings by this ant in Oklahoma.



Horned lizard; only predator of harvester ants

CC: “Ants in my pants”

- 41-year-old man brought to ER, drunk and disheveled.
- SOB, wheezing, itching all over
- Tender, swollen femoral lymph node with piloerection
- Traced site of sting from EMT notes found P. rugosus mound next to where patient picked up

P. rugosus, rough harvester ant common in Tucson

Harvester ants and Tucson

- During a 1-year period in Tucson, AZ, 8 patients were treated for stings by the Maricopa harvester ant, *P. maricopa*, and rough harvester ant, *P. rugosus*.
- Four of these patients had systemic allergic reactions and the other 4 were large, local reactions. Immunologic tests indicated cross-sensitivity of patients to various species of *Pogonomyrmex*.

Remember: allergy versus toxic reaction

- A middle-aged woman was taken from an abandoned automobile unconscious and covered with ants in Tucson, Arizona.
- When hospitalized in July 2018, she had an extensive papular-pustular skin eruption (pseudopustules) on her abdomen and thigh and disseminated intravascular coagulation.
- She was stung innumerable times by native golden fire ants (*Solenopsis aurea*) while sleeping in the vehicle.
- The large amount of venom injected by stings into this individual may have triggered disseminated intravascular coagulation because the venom contains powerful hemolytic factors.

1901 in Mediterranean Sea. Anaphylaxis was discovered; Nobel prize awarded 1913

Figure 1. Postage stamp issued by Monaco in 1953 to commemorate the discovery of anaphylaxis.

Investigators were expecting desensitization and observed hypersensitivity

- In the definitive experiment conducted after they returned to Paris, Richet and Portier exposed two dogs to weak doses of sea anemone actinotoxin and then repeated the injection at various time intervals. No reaction was noted until an injection 26 days after the beginning of the experiment, when both dogs became extremely ill and died shortly thereafter.
- Richet (1913) proposed two factors that were necessary and sufficient to cause an anaphylactic reaction: "**increased sensitivity to a poison after previous injection of the same poison, and an incubation period necessary for this state of increased sensitivity to develop.**"

Citations

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- John H. Klotz, Jacob L. Pinnas, Stephen A. Klotz, Justin O. Schmidt, Anaphylactic Reactions to Arthropod Bites and Stings, *American Entomologist*, Volume 55, Issue 3, Fall 2009, Pages 134–139, https://doi.org/10.1093/ae/55.3.134
- Klotz JH, Pinnas JL, Greenberg L, Quimayousie D, Schmidt JO, Klotz SA. What's eating you? Native and imported fire ants. Cutis. 2009 Jan;83(1):17-20. PMID: 19271566.
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