

## INSIDE THIS ISSUE: SCORPIONS & MOSQUITOES



Bark Scorpions inject venom with their sting; female mosquitoes feed on blood meals

**Scorpions** are ancient venomous arthropods which have changed very little in the last 430 million years. They are food for many mammals, birds (especially raptors), and various reptiles, and they themselves prey on a wide variety of arthropods including other scorpions, helping to control pest insect populations.

Forty to sixty species of scorpions occur in Arizona, but only one is of medical importance: the bark scorpion (*Centruroides exilicauda*). The bark scorpion is light tan in color, has a body length of 1-3", followed by a 5-segmented "tail" with a stinger (*telson*) on the end. It is the most commonly encountered scorpion in human dwellings, and favors crevices (such as under bark, in shoes, under furniture cushions, etc.). Its unique climbing abilities allow it to scale walls and ceilings. It is one of the few scorpion species that are social and can be found alone or in groups (U of A).

**Bark scorpions are nocturnal and are more active when night time temperatures exceed 70 degrees Fahrenheit.**

They are not aggressive, and would rather run away than sting; however, if threatened they will react defensively by stinging. The venom – a neurotoxin – is injected in varying amounts depending on the level of threat perceived by the scorpion.

Symptoms of a sting include numbness, tingling, swelling at the site, stomach cramps, roving eye and excitability, **noticeably in children/infants, the elderly, or those with an allergic reaction.** If a child is stung, medical attention should be sought immediately. Adults can call the Arizona Poison and Drug Information Center 1 (800) 222-1222 for advice.

IPM steps to reduce encounters with scorpions near the school or home include:

1. **Remove harborages**, such as wood piles against the building or indoor firewood; minimize stones, bricks, and rocks; eliminate low lying ground cover (such as lantana) which they rest in during the day; keep trash cans raised (ideally) or on concrete slabs and off bare ground; keep shrubs and trees pruned away from buildings, and grass trimmed short.
2. **Exclusion.** Make sure all windows have tight-fitting

screens (second story windows also – remember, these critters crawl up walls); caulk and seal all openings such as those around pipes, windows, and roof eaves (use fine-mesh wire to cover larger openings – such as those in brick); check door sweeps and weather stripping around doors for a tight seal.

3. **Sanitation.** Eliminate their food source (insects) by following good hygiene practices in every room food is prepared and eaten; **store food in tightly sealed containers off the ground and away from cardboard.**

Remember: scorpions are predators of other insects (especially crickets); following good IPM practices for insect pests will help keep scorpions away from your building.

**Mosquitoes** in urban settings can cause numerous health problems due to their ability to transfer, or *vector*, viruses and other disease-causing pathogens. The pathogens **they can transmit to humans and other animals** in the southwest include those that cause Dengue Fever, West Nile Virus, St. Louis Encephalitis and Western Equine Encephalitis (humans, horses, and birds), and heartworm (dogs). **Children and the elderly are more susceptible to the effects of mosquito-borne pathogens**, though in some instances extreme illness and/or permanent debilitation can occur in infected human hosts of any age.

Mosquitoes are a small fly, 1/8-1/2" (3-5 mm) long, and should not be confused with the larger and similar looking crane fly (quite harmless) or non-biting midges (which you may find near canals). Also, male mosquitoes have feathery antennae and females do not.

All mosquito species undergo **complete metamorphosis**, a life cycle with four stages: egg → larva (aquatic feeders) → pupa (aquatic non-feeders) → flying adult; this process can be completed in only four days (for some species) under ideal conditions during an Arizona summer! Males and females feed on nectar, **only females feed on the protein-rich animal blood** needed for egg production. Three mosquito species important to human health issues in Arizona are: 1) *Culex tarsalis*; 2) *Culex quinquefasciatus*; and 3) *Aedes aegypti*.

*Culex tarsalis*, or Western Encephalitis Mosquito, has a prominent white band across the piercing mouthparts (proboscis) and two white bands across all lower legs. *Culex quinquefasciatus*, more commonly called the Southern House Mosquito, has five lines running down the abdomen and a distinct high-pitched buzz to announce its presence. The female can lay 6-7 broods containing ~300 eggs in her six weeks of life (Marin/Sonoma).

Both species of *Culex* females deposit their eggs on the water's surface in tight groupings, or *rafts*. Her preferred **egg-laying habitats include nearly every source of standing water** ranging from small sources like mud-puddles, bird baths, outdoor trash cans, landscape ponds, pet water dishes/troughs, and empty flower pots, to larger sources such as school playing fields, over-irrigated lawns, drainage ditches, septic tanks and wells (U of A).

Agricultural fields and other flood-irrigated fields also support high populations of *Culex* mosquitoes. *C. tarsalis* will fly 2-10 miles (sometimes much further) in search of a blood-meal, and *C. quinquefasciatus* will fly 1-5 miles (Olkowski).

West Nile and St. Louis Encephalitis viruses are vectored by both *Culex* species from infected birds, and transmitted to humans (an incidental host). Both *Culex* species feed on birds and mammals, making transmission of the viruses between bird and human hosts more common where the virus is present. ***C. tarsalis* is especially recognized for vectoring West Nile Virus** and populations this mosquito season are being monitored by the Arizona Department of Public Health.

*Aedes aegypti*, or yellow fever mosquito, is from the tropics – new to the southern U.S. – and responsible for transmitting yellow fever (not occurring in the US), dengue fever, and dog heartworm. It has white bands on the hind legs and distinct white lyre-shaped markings on the body.

*A. aegypti* is non-native to the desert southwest, and is **dependent on humans for its breeding habitat and food**. Unlike our native *Culex* mosquitoes, *A. aegypti* lives in close association with human habitation and appears to fly far less than most other mosquitoes based on the availability of egg-laying sites and human blood (yards not miles).

Its native breeding habitat is tree holes, but in Arizona and other introduced areas the female lays eggs on the sides of artificial containers such as old tires, flower pots, barrels, cans, ornamental ponds, and various containers made of wood (Bennett). *A. aegypti* eggs are resilient; they can withstand dry conditions for up to one year, and resume development when water becomes available (Womack). **Adult females often bite around the ankles throughout the day, especially early evening.** So far their documented range in Arizona extends from the southeast Mexico border to Phoenix.

#### IPM Mosquito Management – Fight the Bite!

Mosquito adults have become increasingly resistant to insecticides, and debates continue as to whether fogging is an effective or environmentally sound method. Larvacides, pesticides which target the larval (aquatic) stage of development, are very effective and the most economically sound method that is environmentally friendly, and therefore more widely embraced. The most effective strategy for the community in general is prevention; consider the following:

1. Check flower pots and other containers for excess water

2. Flush out the water in bird-baths and fountains every few days.
3. Store boats, canoes and other objects so that they do not collect rainwater.
4. Remove water that collects in depressions in tarpaulins covering boats and other equipment or objects. Rinse off water collecting on back yard trampolines and other items.
5. Keep rain gutters free of leaves and other debris that prevent water from draining.
6. Correct drainage problems in yards and playing fields to prevent rain and irrigation water from pooling for prolonged periods; report drainage problems in ditches or along roadways.
7. Fill holes or depressions in trees with sand.
8. Repair leaky pipes and outside faucets, and connect open waste-water drains to a sewage system or construct separate sump or leach lines.
9. Empty water containers for pets and check livestock watering troughs and tanks or add *Gambusia* (mosquito eating fish).
10. Larvacides: mosquito “dunks” use bacteria (*Bti*) that is harmless to humans, pets and the environment and will effectively kill mosquito larva in any breeding (non-consumptive) water source.

Though mosquitoes are a nuisance and some can be a health threat, the aquatic larvae have an important ecological role in marshes and wetlands. They feed on a variety of microorganisms, filtering the water as they do so, and both larvae and adults are an important source of food for fish, birds, frogs and dragonflies, to name only a few. With education and awareness, we can limit the health threat posed by these pests in our urban environment.

To read more about mosquito-borne viruses which can affect human and pet health, visit [www.westnileaz.com](http://www.westnileaz.com) or call the Vector Department at the AZ Department of Health & Public Services, 602-364-4562, to report mosquito hot spots.

#### **Information taken from:**

Bennett, Gary W., John M. Owens, and Robert M. Corrigan. *Truman's Scientific Guide to Pest Management Operations*. 6<sup>th</sup> ed. Purdue University, 2003. 574 pp.  
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Olkowski, William, Sheila Daar, Helgo Olkowski. *Common Sense Pest Control*. The Taunton Press, 1991. 715 pp.  
University of Arizona Cooperative Extension website: <http://cals.arizona.edu/urbanipm/insects/ants/ants.html>  
Womack, M. 1993. *The Yellow Fever Mosquito, Aedes aegypti*. Wing Beats, Vol. 5(4):4.

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Few bugs are bad! More than 95% of all insect species are beneficial to humans.



