

Woodpeckers and Saguaros

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In the Sonoran Desert, the two species of woodpecker that most often excavate cavities in saguaros are the Gila Woodpecker and the larger Gilded Flicker. In the more urbanized areas of Phoenix, most excavations in saguaros are done by Gila Woodpeckers. Unlike Gila Woodpeckers that nest in the desert as well as in town, Gilded Flickers often avoid the more densely populated urban neighborhoods, even those with landscape saguaros. The Gila Woodpecker's smaller size doesn't require as large a nest cavity as required by the Flicker, permitting it to excavate its cavity at about mid-level on saguaro trunks and within the fleshy part of the stem but mostly outside of the woody ribs (see illustration A). These cavities usually result in only cosmetic damage to the cactus. The saguaro protects itself from the woodpecker's cavity excavation by walling off the area by forming a hardened shell. This hardened shell resembles a boot after the rest of the saguaro has died and decomposed.

How are saguaro "boots" formed? University of Arizona chemist Roger Lee Caldwell concluded that when woodpeckers begin pecking, a chemical defense is unleashed by the saguaro, enabling the cactus to defend itself from infection. He identified one of the strategic defenders as the adrenalin-like compound dopamine. A "metabolic alarm" rapidly steps up the production of this compound and dopamine rushes outward to surround the site of the stress and causes a buildup of thick cork-like callus that serves to seal off the cactus from further harm. The astonishingly durable callus "boots" linger intact on the ground years after the woody saguaro ribs have turned to dust.

Do woodpeckers reuse their nesting cavities? Yes, the same cavity is often used in subsequent years by Gila Woodpeckers; however, if the nest location is changed, the cavity for the next year's nest is excavated after the current breeding period is over. Holes excavated in saguaros typically are not used for several months; drying time is required for the inner pulp of the cactus to form a solid casing around the cavity. In Spanish, woodpeckers are appropriately referred to as "carpinteros" since they inadvertently build homes for many desert creatures. Abandoned woodpecker cavities in saguaros are often re-used by European Starlings, Purple Martins, Ash-throated Flycatchers, Rosy-faced (formerly called Peach-faced) Lovebirds, Kestrels, Western Screech and Elf owls, and other birds, animals, and invertebrates

Do some woodpecker excavations harm saguaros? Unfortunately, yes. The larger Gilded Flicker can't fit in the narrow space outside of the woody ribs like its smaller cousins do; it needs a larger area for its nesting cavity. However, it's weaker beak (adapted for eating ants on the ground; and not well suited for serious excavation work) prohibits it from pecking through those mature ribs on the lower parts of the saguaro where it might do less harm, so it is often forced to excavate its nest cavity through the softer ribs that are just developing closer to the top of the saguaro (see illustration B). Unfortunately for the saguaro, this damage so near to its sensitive growing tip can sometimes lead to the eventual death of the saguaro according to studies conducted by Drs. Joe McAuliffe and Paul Hendricks.

What causes those small, contorted cylinders of callus tissue we find in saguaro remains? According to Mike Plagens of the Arizona Native Plant Society, some of them are formed by the cactus in defense against the tunneling caterpillar of the moth *Cactobrosis fernaldialis*. Just before the caterpillar reaches maturity it chews a 1/4 inch-wide escape hatch through the outer cortex of the saguaro – this is the origin of the flattened disc structure usually seen at one end of the callus. Dr. Mark Dimmitt at the Arizona Sonora Desert Museum points out that there are, however, other unexplained shapes and sizes of saguaro calluses in between these “worm holes” and woodpecker boots. Unsolved mysteries!