

Wild Wednesday 6 January 2021, Porcupine by Walt Anderson

Arizona is noted for its spiny, prickly, wait-a-minute plants, but there is a mammal that follows that strategy too, the Porcupine. With its armament of around 30,000 sharp quills, it is relatively safe from most predators, though it is occasionally taken by mountain lions, bobcats, coyotes, bears, owls, and the fisher, a mustelid that is particularly adept at killing them. However, inexperienced predators may get quills in the face or some that penetrate vital organs, so porcupines have no need for speed and live a low-energy lifestyle. Dogs bred more for looks than common sense may end up with a face full of quills, which are very painful to remove and which tend to move deeper with time because of tiny barbs that resist backward movement.

Scientists have found that porcupine quills penetrate skin with half the force needed for a hypodermic needle and resist pulling out by four times the force. This has potential medical application, another case where mimicry of nature can improve our technology.

North American porcupines are very distantly related to Old World porcupines, a case of evolutionary convergence. The African porcupine is the second largest rodent in the world after the capybara. It is terrestrial and nocturnal, whereas our porcupine is arboreal and variable in its activity—nocturnal, diurnal, or crepuscular (active dawn and dusk) at different times of year.

Ours is the second largest rodent in North America after the beaver. While the beaver is eager (that is, a hard worker by human standards), the porcupine is a relative sluggard, but that again is a human judgment; the porcupine lives long by rodent standards and is adaptable enough to live throughout North America south of Arctic tundra except in the southeastern US and the driest deserts of the Southwest.



Porcupines have long guard hairs that conceal the erectile quills beneath, but the guard hairs are very sensitive to touch, so the quills can be raised instantly in defense if touched by a potential predator. That ability to control the quills comes in very handy during the few hours each summer when a female is open to mating, as she can relax the quills and shift her tail to cooperate with the male. Males compete for access to a receptive female, and they may have serious fights during that time, likely leading to the higher mortality rate of males. The courtship process is prolonged and rather bizarre by human standards, but hey—porcupines do not live by human standards!



Here some of the 30,000 quills are quite visible. The face and underbelly are relatively quill-free and thus are the most vulnerable parts of a porcupine's body. To defend itself, a porcupine turns away from its attacker and may lash its tail vigorously, releasing its spines readily (they do not throw their quills). Unlike most animals, the porcupine attacks by moving backwards and retreats by going forward.

Gestation is 7 months, and the single precocial baby porcupine is larger at birth than an altricial baby bear! Its quills harden fairly quickly, and then it is on its own as far as defense. The mother nurses it for a few weeks, but it starts eating vegetation soon, supplementing it with milk for several months. Young females disperse; mothers are pregnant or lactating for most of the year, so this reduces food competition.



Porcupines are vegetarians, eating the inner bark (cambium) of trees, leaves, forbs, fruits, acorns, dwarf mistletoe, and other plant material, which is typically low in nutrients, high in fiber, and often full of tannins or alkaloids that interfere with digestion. While they do not have the four-chambered stomach of a ruminant, they do have a pouch (cecum) with filled with beneficial microbes that aid digestion of plant fiber, and their digestive efficiency rivals that of many ruminants. Since food quality is typically very low, they can be choosy. For example, in Alaska, I witnessed one "ice-cream spruce" completely stripped by a porcupine while all neighboring spruces were intact. This suggests that porcupine foraging may be a selective factor for better chemical protection by trees or shrubs. Porcupines love apples in the fall where they are available, but even then, they choose sweet over tart ones. In the SW, they relish prickly pear fruits. Matched up with a cactus, they are truly a prickly pair.

If a Porcupine's mate gets a headache (or becomes one), it's time to chew some willow bark for the salicylic acid. If there's a willow, there's a way.



The family of our North American porcupines evolved and diversified in the South American tropics. Related families include such familiar southern rodents as capybaras, agoutis, chinchillas, guinea pigs, and nutrias. When North and South America were united by the Panamanian land bridge a few million years ago, the ancestors of our porcupines moved north, as did armadillos and opossums. As they expanded north into land vacated by the glaciers, there ended up being a gap in Mexico between our porcupine and all their tropical relatives. I think we should recognize their special biogeographic significance, perhaps replacing Groundhog's Day (those are only fat squirrels anyway) with a Porcupine Day!



Porcupines are not trapped for their fur or shot for food (though they are considered emergency fare if you are lost in the woods), but they are persecuted when they damage trees with their chewing, and they are very vulnerable to cars as they waddle across highways. Because of their low-quality food, they often have a craving for salt to get needed sodium, so they get in trouble with people when they chew ax handles, plywood, tires, boots, and other human belongings. They are quite unusual among rodents by often living to a ripe old age (perhaps 20 years or more) and dying of natural causes.