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The Desert Tortoise
by Robert Stebbins

According to the fossil record, the desert tortoise (*Gopherus agassizii*) has lived in the arid southwestern US for the last ten to twelve thousand years. It now faces its greatest challenge. What millennia of the vagaries of nature could not do, human activities may accomplish in a few decades. Once protected by its austere desert environment, the tortoise is threatened by human population pressures and environmental exploitation nearly everywhere in its range.

Caught between expanding human developments in southwestern Utah and southern Nevada and the growth of megalopolis in southern California, the tortoise and its desert stronghold are in a closing vise. Its survival now depends on how high a value humans are willing to place, not only on the tortoise, but on the desert ecosystem upon which it depends, and how quickly we will act to save both. What sacrifices or changes—economic, recreational, and behavioral—are we prepared to make to ensure the protection of nature? The plodding desert tortoise's survival in its desert homeland will be a measure of that commitment.

How is it that a "turtle" can survive in a desert where, in some places, rainfall averages less than five inches a year and ground surface temperatures will rise well over 130°F in the summer and go below freezing in the winter? Tortoises have strayed a long way from their aquatic ancestry. The desert tortoise is able to live in areas where there is no permanent surface water. When their plant food is adequate, some tortoises can go a year or so without a drink, drawing upon water stored in their capacious bladders. They go to familiar natural catchment areas for water or scrape out their own, sometimes sitting in them when rain is imminent, seemingly anticipating a chance to drink. They drink deeply when water is available.

The tortoise spends much time underground, usually in burrows it has excavated with its stout forelimbs. Some burrows in the northeastern part of the range, where winters can be severe, may be around 30 feet in length, sometimes occupied by groups of tortoises. Most burrows of adults are 6 feet or less in length and usually have a single occupant or mated pair.

It is the burrowing capability of the tortoise that makes its desert existence possible. In the stable environment of the burrow, where humidity and temperature are optimal for long periods of inactivity, the tortoise foregoes environmental stresses at the surface, avoiding wind storms, temperature extremes, desiccation, and many of its predators. In the western Mojave, adults may spend as much as 95 percent of their time in burrows! Their body temperatures drop to that of the burrow and metabolic rate slows. A tortoise expends its life force slowly and is able to live for a long time, perhaps 80 years or more.

The tortoise's survival in its harsh environment depends on great familiarity with its surroundings. Over its long life, an adult becomes thoroughly acquainted with its home range. It has learned when and where to find forbs, cacti, perennial grasses and other plants on which it feeds, the location of rain catchment basins, where to dig for calcium needed for normal bone and eggshell development, where to find its mates and burrows. To supply its needs, the individual adult may require more than one and a half square miles of habitat over its lifetime. Tortoises learn to recognize one another and males form dominance or peck-order hierarchies. Rivals may engage in prolonged head-to-head shell-butting fights, sometimes ending with the defeated individual on its back.

There is much yet to be learned about the social structure of tortoises. Given the large size of their home ranges and their sometimes lengthy forays, how do they communicate? They seem to use scent-tracking. Tortoises often sniff the ground and each other and males evidently determine females' readiness to mate by odor. Both sexes distinguish between the odor of familiar individuals and strangers. Enlarged chin glands in males release odoriferous secretions. Hearing is in the low frequency range. Infrasound detection should be investigated. Perhaps tortoises send vocal signals across the desert expanses that we do not hear.

Many people are charmed by tortoises and go out of their way to protect them. Around Las Vegas, Nevada, people move tortoises out of the way of expanding developments. A brief acquaintance with a tortoise may be all it takes to cement a life-long bond. In areas where these animals are rarely disturbed, they show little fear of humans. When a wild tortoise is first encountered in the field, it may quickly draw into its shell. However, if you crouch quietly nearby, it may soon emerge, then crawl directly toward you, sometimes nestling close to your body. Don't move quickly; a startled tortoise may void its bladder, losing its next few months' ration of water.

The desert tortoise is found throughout the Mojave and Sonoran Deserts. Its health as a species is a strong indicator of health of the natural ecology of the desert. As the tortoise goes so goes the desert.

The threats to the tortoise, and wildlife nearly everywhere, are caused mainly by human activities—dismemberment of habitats, species extinction, increasing pollution, and the spread of disease and pests. These human-caused threats to nature are also placing our own species at high risk. What then are the changes and sacrifices we must make to change our course? The course of action seems clear—change life styles to live less demandingly on the land, reduce the gulf between the rich and the poor, slowly and humanely reduce the size of the human population, and shift from a self-centered world view to an other-centered one. A utopian, unattainable, goal? Perhaps, but the alternative, our present course, is leading us to disaster.c

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