
Tortoise Tracks

The Desert Tortoise Preserve Committee, Inc.

Summer 2002 22:2



The spread of diseases has been a significant factor in the decline of the desert tortoise in many parts of its range. One group of diseases, the shell diseases (cutaneous dyskeratosis), is described further on page 3. This animal exhibits many of the outward signs of a healthy tortoise: clear, bright eyes and dry, non-occluded nares. **Photograph by Mark Massar**

Fun Times at the 2002 Spring Work Party

There were 29 attendees at this year's Spring Work Party, including a group of University of Redlands students lead by Drs. Jill Heaton and Wendy McIntyre, and members of the California Turtle and Tortoise Club. Accomplishments included digging out and moving the heavy, white-painted, steel sign from inside the DTNA fence to a more visible site in the parking area. This required a considerable degree of effort and took about 12 pairs of hands to move. The naturalist later reported that the new sign location was working very well. He was pleased with the ease with which he could now point out regulations by referring visitors to it; off-road vehicle enthusiasts were stopping to read it, other visi-

(Continued on page 4)

DESERT TORTOISE PRESERVE COMMITTEE FALL WORK PARTY 12-13 October 2002

Please consider joining us at the Desert Tortoise Preserve Committee's annual fall work party, which will be held on the weekend of October 12-13, 2002.

We will assemble at the Desert Tortoise Natural Area and later move along the historic 20 Mule Team Parkway to the remote and beautiful Blackwater Well on the Pilot Knob grazing allotment.

What You Should Bring: Sunscreen, hat, work gloves, stout shoes or walking boots, drinking water, and food. If you plan to stay overnight for the traditional campfire and campout, you will need to bring camping equipment, flashlights, and food.

Please call Michael Connor at (909) 683-3872 or e-mail <dtpc@pacbell.net> to confirm.

Study Looks at Comparative Flowering Phenology at the Desert Tortoise Natural Area

A study conducted at the DTNA has revealed a previously unsuspected flowering phenomenon—annuals in the western Mojave Desert may have different germination requirements than their counterparts in the eastern Mojave.

In his study, recently published in the botanical journal *Madrono**, Dr. W. Bryan Jennings examined the comparative flowering phenologies of 58 annual species at the Desert Tortoise Natural Area. Dr. Jennings recorded the timing of flowering for each of the species into four categories: first flowering, peak flowering (when the majority of individuals were in flower), past-peak flowering, and dried.

The timing of flowering for the various families of annuals followed a very predictable sequence throughout spring, with species in the family Brassicaceae and Boraginaceae flowering in early spring, whereas species in the Fabaceae, Asterceae, and Polygonaceae, blooming from mid-May to late spring. An analysis of flowering dates between years suggests that timing of flowering for these species is highly consistent from year to year.

Jennings conducted his studies at the DTNA in 1991 and 1992, two years in which almost no rain occurred between September and December. Conventional thinking was that successful germination of winter annuals in the Mojave Desert was contingent upon a “critical autumn rain” of at least 25 mm. What was surprising was that a mass germination of annuals at the DTNA resulted from above-average precipitation in February and March, despite the lack of this “critical autumn rain.”

The previous observations of a “critical autumn rain” were done mostly in the eastern Mojave Desert. Is it possible that the winter annuals in the western Mojave have a different germination requirement than their counterparts in the eastern Mojave? Jennings has hypothesized that geographic variation in climate may help explain this paradox. The eastern Mojave experiences considerable summer rains. Winter annuals in this region likely have more restrictive germination requirements that prevent them from germinating during a heavy summer downpour. Winter annuals in the western Mojave, on the otherhand, not faced with this problem



Desert dandelions, Malacothrix glabrata, during the peak of flowering at the DTNA in April.

less restrictive germination requirements.

Bryan Jennings served as the DTPC's naturalist at the DTNA in 1991.

*Jennings, W. B. 2001. Comparative Flowering Phenology of Plants in the Western Mojave Desert. *Madrono*, 48(3): 162-171.

The Desert Tortoise Preserve Committee, Inc.



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Shell Disease: A Possible Contributor To Catastrophic Losses in Desert Tortoises?

Dr. Kristin H. Berry, USGS Western Ecological Research Center

In the last decade, two shell diseases have been identified and described in desert tortoises. One disease is often called "flaky shell" disease. The plates or scutes that cover the bone on tortoise shells discolor, lighten, and flake away, often exposing small or large areas of bone. Internal organs are often undergoing changes at the same time, exhibiting degenerative processes. In the second disease, parts of the shell die or necrose.

Shell diseases are associated with higher than normal death rates in tortoise populations in eastern California. Tortoises at four long-term study plots monitored by the USGS Western Ecological Research Center have shown increasing severity of shell diseases since the late 1970s and early 1980s. The first such population affected with high mortality rates was in the eastern Colorado and is in one of the Jewels of the Nation, an Area of Critical Environmental Concern called the Chuckwalla Bench. Populations plummeted between 1982 and 1988 and have continued to decline.

By 1996, the population that was estimated at 500 tortoises per square mile in 1979 had declined by more than 70 percent. Particularly alarming was the loss of breeding females. About two times as many females died compared with males, leaving very few females alive in the population.

A similar pattern appeared in the Chemehuevi Valley. The population declined by more than 80 percent in the seven-year period between 1992 and 1999. Last year, in 2000, still another population showed a large decline. The population near Goffs in the eastern Mojave Desert, once considered the "Gold Standard" of all tortoise populations because of its stability, was surveyed.

In just a six-year period, the population had de-

clined by more than 85 percent. Very few adult females remain at this site, similar to the situation at Chuckwalla Bench. At the Goffs and Chemehuevi sites, one or two other disease processes may be simultaneously affecting some tortoises: herpesvirus and mycoplasmosis.

Why are such rapid declines of such concern? Tortoises require from about 15 to 25 years to reach sexual maturity, and young adult females lay fewer eggs than larger, older females. When a large portion of the breeding population of males and females is decimated, decades, if not centuries, may be required for recovery.

Also, we do not know what is causing the shell diseases. Scientists on our disease research team have ruled out infectious diseases caused by bacteria and viruses. We suspect elemental or other toxicants and nutritional disorders, possibly caused by heavy metals. We know that ill tortoises have higher levels of potential toxicants than healthy tortoises do, but our research database is in its infancy.



This desert tortoise, Gopherus agassizii, from the Central Mojave Desert, has a healthy shell and integument.

The scientists on the tortoise

d i s e a s e

research team include Dr. Bruce Homer, a veterinary research pathologist at the University of Florida, and Dr. Elliott Jacobson, a veterinary research scientist also at the University of Florida; and USGS research scientists include Dr. Kristin Berry, a wildlife biologist, Dr. Maurice Chaffee, a geochemist, and Dr. Gordon Haxel, a geologist.

Reprinted from USGS story in People, Land & Water, the U.S. Department of the Interior employee news magazine (September/October 2001 issue).

tors were parking near it to read it, and some visitors on bicycles were using it as an anchor. Other work accomplished included rocking a stretch of the plant loop trail that was difficult to follow, repairing the Discovery Center's generator and brushing out OHV tracks which crisscrossed the areas alongside the entrance road. At Pilot Knob, more of the Crawford fence was removed from inside the wilderness, trails were rocked in and trash was collected. One of the work party volunteers, Jim Conyers from San Diego, wrote the following article.

I Was A Desert Tortoise Preserve Committee Work Party Volunteer

By Jim Conyers

Each spring and fall the DTPC hosts its popular work parties. Groups of 20-30 volunteers from all over California gather to spend a weekend maintaining tortoise preserve facilities and to enjoy a close encounter with the Mojave Desert. The most recent work party took place over the weekend of March 16-17, 2002.

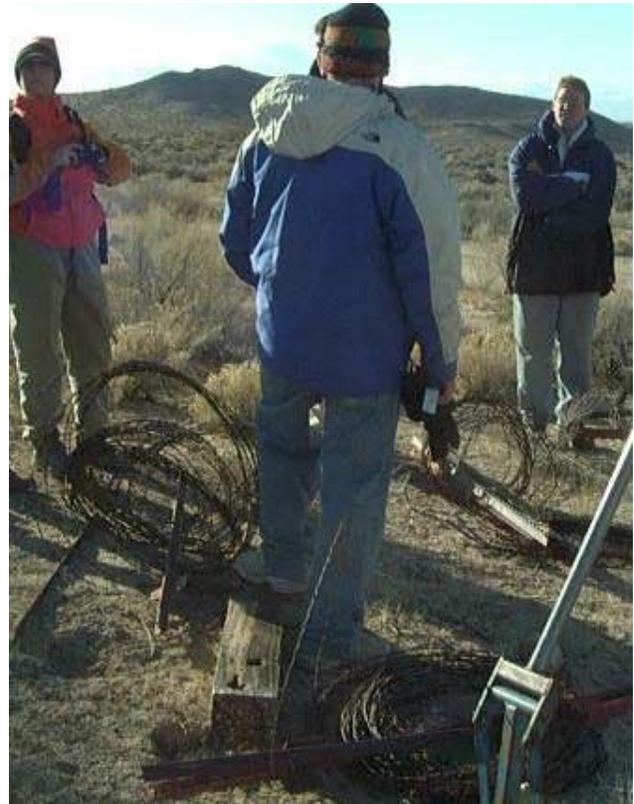
This year for the first time I drove up to the Desert Tortoise Natural Area for two days of hard work. I brought my gloves, warm clothes, meals and camping gear. I also brought a bottle of Advil just in case. I arrived at the DTNA at 9 AM on a clear, windy, cold morning. I would experience two days of saltbush scrub, creosote bush scrub, desert needlegrass steppe, and Joshua tree woodland.

At the DTNA, I was greeted by Dr. Michael J. Connor, Ph.D., the Executive Director of the DTPC. He was an energetic, earnest and effective facilitator who organized and directed us throughout the weekend. Laura Stockton, a founder of the DTNA and current trustee and board member, gave a presentation at the Interpretive Kiosk and described the trails and the history of the DTNA. Her ancestor of five generations ago was Commodore Robert Stockton who is the namesake for Stockton, California. We were also introduced to Mark Clark the Desert Tortoise Preserve Committee's DTNA Naturalist for this spring season.

Among the 29 volunteers were Joyce Schlachter and Bob Parker, biologists with the Bureau of Land Management (BLM); eight volunteers from the University of Redlands (including six Environmental Studies students and two professors, Drs. Wendy McIntyre and Jill Heaton); Chuck Hemingway, a DTPC volunteer; Ron Martin, the president of the Inland Empire Chapter of the California Turtle and Tortoise Club; Jim Misiak, the president of the Chino Valley Chapter of the California Turtle and Tortoise Club; and, Katherine Dickert of the Southern Sierra

Region of the California Fish and Game in Los Banos.

There was also a tortoise survey team there to mark two permanent survey plots. Data from these same DTNA study plots was crucial in identifying the tortoise population decline in the late 80's due to outbreaks of upper respiratory tract disease. The DTPC will use these plots to evaluate the current tortoise population. The team members were busy erecting marker posts to delineate a tenth of a mile grid over a three square mile area.



Some of the day's barbed wire, metal fence posts and a post puller.

jobs that were needed and divided us into groups. Several of us raked out tire tracks around the Interpretive Center and kiosk, while another group hopped into a truck to collect rocks. These were then hand carried into the DTNA and placed to better mark poorly defined areas of the trails to minimize cross-country travel by visitors. A group dug three large holes by the parking lot to hold a large welcome sign. They dug up the sign from the old location and with help from many of the other volunteers moved it to the new location.

At noon we drove the 40 mile dirt road across Cuddleback Dry Lake to the Pilot Knob allotment. Pilot Knob includes the Blackwater Well windmill, an abandoned cabin and barn, and distant views of the dry lakebed to the West and Rock Mountain to the

south. The 49,000 acre Pilot Knob allotment is within desert tortoise Critical Habitat, in the central Mojave Desert. Blackwater Well itself has played an important role in California's past. The well, now the site of the windmill, is on a natural seep created by the Blackwater Fault. It provides one of the few year-round water sources in an otherwise arid region. Human use of the area spans a period from 1200 B.C. to the present.

In the afternoon, we did what's called "vertical mulching" which is a process used to accelerate rehabilitation of the desert in areas abused by off-highway vehicles and livestock. Along several old dirt roads we transplanted bushes, placed sticks and dug small holes in the dirt. This process slows rain runoff, allowing seeds to collect and grow, and camouflages the old roads. This discourages future off-highway vehicle use.

That afternoon we also removed about a hundred and fifty meters of old barbed wire fencing. Off Highway Vehicle enthusiasts seem to be attracted to and drive along fences. For this reason, removal of the fences also discourages unauthori

Just before sunset we returned to the camp and were joined by BLM Ranger Ed Patrovsky. We built a large, roaring campfire and prepared dinner. The college group even prepared shish-kabobs. Around the fire, Dr. Connor told us the history of the DTPC and DTNA. We pitched tents in the lee of the barn, and slept soundly after the day of work.

We woke Sunday morning to a beautiful 40 degree, clear day with reduced winds. Rebuilding the fire, we feasted on pancakes, oatmeal, muffins and coffee. Work for the day included removing more barbed wire and digging up fence posts. We returned to the cabin and ate sandwiches and Advil for lunch. We packed up and drove back across the dry lakebed and got onto the highway. I felt very satisfied that I had spent an entire weekend doing something to improve our environment and to help the desert tortoise.

DTPC Outreach To Schools at Edwards Air Force Base & Mojave

During March 2002, as part of the Desert Tortoise Preserve Committee's educational outreach efforts, board member, Rae Packard, traveled to schools at Edwards Air Force Base and the community of Mojave.

Teachers were provided with a teacher's packet, which included a DTPC mousepad, a color brochure on the natural history of the tortoise, a coloring sheet, a DTPC sticker, and the Desert Tortoise Natural Area brochure. The teachers were encour-

aged to take their classes on field trips to the DTNA, and an overview of the preserve, with directions, was provided. The teachers were also provided DTPC website information as a further resource.

The educational program included information about the current threatened status of the desert tortoise;

the difference between; why it is important never to bother a desert tortoise in the wild. Also discussed was how to properly move a tortoise out of the road and how to protect the tortoise and its desert habitat.

Captive tortoises were introduced to the children, and desert tortoise natural history was explained in detail. The upper respiratory tract disease was highlighted, as was the importance of never releasing captive desert tortoises into the wild.

The results of this outreach was very successful and DTPC was invited to return to the three schools again next year.

If you would like to request a DTPC program presentation for your group or school, please contact the office by telephone at (909) 683-3872 or by e-mail at <dtpc@pacbell.net>.



DTPC has been and about in the West Mojave desert...

Desert Tortoise Preserve Committee Receives National Fish and Wildlife Foundation Grant

Early this year, the National Fish and Wildlife Foundation awarded a challenge grant to DTPC to help fund it's conservation activities at the Desert Tortoise Natural Area. National Fish and Wildlife Foundation challenge grants require that the recipient match the grant dollar for dollar. The Desert Tortoise Preserve Committee was delighted to become eligible for matching fund of \$76,000 for projects directly benefiting the desert tortoise. The funds will support outreach, research, and monitoring at the Desert Tortoise Natural Area. We are asking you for your support to provide matching dollars to ensure that DTPC can take full advantage of this grant.

The funding will support staffing of the Naturalist at the Desert Tortoise Natural Area for spring 2002 and 2003. It will provide funds for much needed maintenance and upkeep of the Discovery Center (motor-home) in spring 2002 and 2003. It will fund development of a feasibility proposal for a desert tortoise head-starting project and the Desert Tortoise Natural Area. Most significantly it provides funding for the all-important tortoise surveys at the Desert Tortoise Natural Area by funding surveys on the Interpretive Center permanent study plot. In conjunction with efforts being made by California Department of Fish and Game and the United States Geological Service, this grant has made it possible to survey all the plots at the Desert Tortoise Natural Area in a single year.

The 60-day study plots at the Desert Tortoise Natural Area were established in the late 1970s, and have been read every 4 years or so, until recently, when funding for these was cut back. Matching funds were provided to survey the three square mile Interpretive Study plot. The Desert Tortoise Preserve Committee contracted a team of biologists to completely survey the plot, trying to find every tortoise there. They recorded data on individual tortoises, generating demographic data for life history records and health profiles of each tortoise. Deceased animals were removed and processed to determine cause of death where possible, and a database created to facilitate analysis of the shell data. The latter will prove valuable in disease management. The biologists also surveyed habitat condition, looking at human impacts and at the plant community.

This grant was made possible by the work of Bob Parker and Jeff Aardahl at the Bureau of Land Management, Ridgecrest Field Office, and by the help and support of Darrell Wong and Becky Jones of the California Department of Fish and Game. We are truly grateful for the support and the efforts they made to help DTPC secure this National Fish and Wildlife Foundation grant.

If you would like to help DTPC match the National Fish and Wildlife Foundation by supporting any aspect of these important programs, please send your tax-deductible donation to:

**DTPC Challenge Grant Fund
Desert Tortoise Preserve Committee
4067 Mission Inn Avenue
Riverside, CA 92501**

**Questions?: E-mail <dtpc@pacbell.net>
Or call (909) 683-3872**

Dr. Jill Heaton Joins Desert Tortoise Preserve Committee Board of Trustees

At its June 2 meeting, the Board of Trustees voted to appoint Dr. Jill S. Heaton to fill a vacancy on the Board. Dr. Heaton is currently a professor in the Environmental Studies Program at the University of Redlands. She received a M.S. in biology from the University of North Texas in 1996, and a Ph.D. in geography from Oregon State University in 2001. In addition to her professorship, she is the Principal Investigator for the Redlands Institute Desert Tortoise Project.

Obviously, as the Principal Investigator for the Desert Tortoise Project, she is strongly interested in the desert tortoise. However other projects include Mojave Fringe-toed lizard, overall patterns of lizard species change in the West Mojave and endemics in the Panamint Mountains.

Jill became interested in joining the DTPC upon her arrival in Southern California. The qualities that she most admired in the organization were its long-term stability (as evidence from its 28 year history), strong commitment to education and outreach (very important to a professor), aggressive land acquisition program, and finally the opportunity to involve students in research, education, and restoration programs.

DESERT TORTOISE PRESERVE COMMITTEE

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The Desert Tortoise Preserve Committee is an IRS recognized, tax exempt 501(c)(3) nonprofit corporation. All contributions above the basic \$15 annual membership dues are tax deductible to the full extent allowed by law.

All members and donors receive the quarterly newsletter *Tortoise Tracks*.

Membership and donor information are kept confidential and are never disclosed to third parties.

Please make checks payable to: **DTPC** and mail to: **DTPC, 4067 Mission Inn Avenue, Riverside, CA 92501**

Natural History Notes

Genus: *Gopherus*

Desert tortoises belong to the turtle family Testudinidae—the tortoises—perhaps the most terrestrially adapted family of turtles. Indeed, some species of tortoises, notably the desert tortoise, have taken this adaptation to the extreme, living in some of the harshest, most arid landscapes on earth. The family Testudinidae consists of about 50 species in ten genera, and are distributed across all the continents except Australia and Antarctica. Four species are found in North America, all of which belong to the genus *Gopherus*. These are the gopher tortoises, so named because of their unique adaptations to a burrowing and digging lifestyle. The gopher tortoises (their distributions illustrated above)



Distribution of the 4 North American tortoises: **A.** *G. agassizii*, **B.** *G. flavomarginatus*, **C.** *G. berlandieri*, **D.** *G. polyphemus*.

include the desert tortoise (*G. agassizii*), the Mexican Bolson tortoise (*G. flavomarginatus*), the Texas tortoise (*G. berlandieri*), and the Florida gopher tortoise (*G. polyphemus*). These tortoises inhabit a wide range of habitats, from the hot, humid southeast to the arid environments of northeastern Mexico, southern Texas, and southwestern North America.

Over the years, experts in the field have come to realize that the genus *Gopherus* includes two sorts of tortoise, separable on the basis of differences in their bone and shell structure. The desert and Texas tortoise fall in one group and the gopher and Bolson tortoise in the other. It has been suggested that these differences were great enough to warrant recognition of two separate genera.

It has long been known that the desert tortoise consists of at least two distinct sub-populations, those west of the Colorado River (the Mojave Population) and those east (the Sonoran Population). But recent genetic information suggests that the Sonoran population may be more closely related to the Texas tortoises (about a 1000 miles distant) than they are to the Mojave tortoises just on the other side of the River!



Tortoise Tracks

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DTPC CALENDAR OF EVENTS

12-13 October 2002
Desert Tortoise Preserve Committee's
Fall Work Party

2-3 November 2002

Desert Tortoise Council's

Annual Surveying, Monitoring, and

Handling Techniques Workshop

Ridgecrest, California

25 January 2003

Desert Tortoise Preserve Committee's

Annual Meeting & Banquet