

## *Gopherus agassizii* (Mojave Desert Tortoise) and *Coleonyx variegatus variegatus* (Desert Banded Gecko). Spring Burrow Cohabitation

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The Mojave Desert is home to a surprising diversity of flora and fauna that is well adapted to the desert heat and aridity. A keystone species in the Mojave Desert is the Mojave Desert Tortoise (*Gopherus agassizii*; Cooper, 1863), which constructs multiple burrows in the sandy and caliche substrate. The burrows provide well-protected refugia with moderated temperature fluctuation and relatively high humidity (Zimmerman et al., 1994; Walde et al., 2009). Due to the scarcity of these microhabitat conditions in a desert setting, the Desert Tortoise burrows are often subsequently used and modified by a wide range of heterospecifics. Some species are well known for their regular occupation of Desert Tortoise burrows, such as Desert Woodrats (*Neotomalepida*), Burrowing Owls (*Athenecunicularia*), and rattlesnakes (*Crotalus* spp) (Woodbury and Hardy, 1948; Burge, 1978; Luckenbach, 1982; Lovich, 2011; Walde et al., 2014). However, despite the diversity of the Mojave Desert, and the ostensible importance of the Mojave Desert Tortoise burrows, there have only been a relative handful of burrow associates documented in the literature. Considering that the Mojave Desert Tortoise (listed as Threatened by the Endangered Species Act) has precipitously declined in abundance over the past 40 years (Tracy et al 2004, Esque et al. 2010, USFWS 2011), yet plays a critical ecosystem engineer role, it is imperative that notes on the variety of burrow associates be well documented. It stands to

reason that with the Mojave Desert Tortoise decline, there will be a subsequent decline in the number of shelter sites available to heterospecifics, which in turn could affect diversity in the Mojave Desert. The extent of Mojave Desert Tortoise legal protections and keystone species status can therefore be well supported through these noted obligate symbionts. One habitat heterospecific is the Western Banded Gecko (*Coleonyx variegatus*; Baird, 1858), often overlooked perhaps due to its illusive and nocturnal nature. Herein we report the first documented case of co-habitation of the subspecies Desert Banded Gecko (*C. v. variegatus*) with a Desert Tortoise in the south and western part of its range, and the first since 1940.

On 26 May 2008, we discovered a Desert Banded Gecko inside a burrow with a known adult male Desert Tortoise which was being tracked as part of a radio-telemetry study. The gecko was alert and active at the time of the encounter, and may have been displaced by the tortoise from a diurnal resting place further inside the burrow. At the time of encounter (14:16), we recorded air temperature at 23 °C, which is unseasonably cool for this time of year. **The habitat in the study area comprised** typical Mojave Desert Creosote (*Larrea tridentata*) and White Bursage (*Ambrosia dumosa*) scrub covering open sloping hills, with dry washes between and is previously described by Walde et al. (2007, 2009) and Harless et al. (2009, 2010).

Western Banded Geckos are nocturnal, often using smaller rodent burrows or cover objects as refugia during the daytime only to emerge in the cooler, more humid nighttime (Jones and Lovich, 2009). Their diet consists chiefly of arthropods, many species of which have previously been documented also using Desert Tortoise burrows (Woodbury and Hardy, 1948; Burge, 1978; Luckenbach, 1982). The Western Banded Gecko is known to aggregate in small groups or pairs,

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increasing the humidity of the selected refugia to help prevent evaporative water loss (Jones and Lovich, 2009). It is possible that this gecko sought out an active or inhabited Desert Tortoise burrow for the same reason. Prior to our report, the last (and only other) time any gecko was reported using a Desert Tortoise burrow was during the winter of 1939–1940 in Utah (Woodbury and Hardy, 1948). During that study, several geckos of the subspecies *C. v. utahensis* were found and suspected to be overwintering in the shelter of the respective burrows. Due to the time of year of our observation (late springtime), it is implausible that the gecko was using the burrow as a hibernaculum. Although our report was associated with a cool day, it is the first report of any gecko using a Desert Tortoise burrow outside the winter season, and therefore cannot be explained with the same behavioral justification. Other species documented to use Desert Tortoise burrows have been suspected of using them as a thermal refugia or as a place to forage (Walde and Lindey, 2009; Walde et al., 2009, 2014, 2015). Because the gecko we observed was active, the air temperature was cooler, and prey items such as arthropods have previously been documented using tortoise burrows, it is possible the animal sought out the tortoise burrow to forage. If so, this would be a novel ecological behavior for the species.

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