

Thigmothermic behaviour on paved paths after sunset by the weasel skink *Saproscincus mustelinus*

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Most lizards acquire body heat by basking in sunlight (Pianka & Vitt, 2003; Wilson, 2012) and use behavioural mechanisms to increase or reduce heat gain (Wilson, 2012). Another way that lizards may acquire heat is by direct contact with warm surfaces, a behaviour termed thigmothermy (Pianka & Vitt, 2003; Wilson, 2012). Thigmothermic lizards are generally nocturnal or live in shaded habitats (Wilson, 2012). Shade skinks of the genus *Saproscincus* (Eugongylini) dwell in forests and sheltered suburban gardens in eastern Australia (Wilson, 2012). The weasel skink *Saproscincus mustelinus* is surface active and dwells among leaf litter (Swan et al., 2017; Wilson, 2012). Its daily activity pattern appears to be variable as this skink has been said to be diurnal (Downes & Shine, 1999; Wilson, 2012) but active at dusk or shortly after dark on warm nights (Swan et al., 2017;

Robertson & Coventry, 2019). Based on this information, recent revisions of several traits of the Scincidae classified the weasel skink as cathemeral, i.e. not strictly diurnal, nocturnal or crepuscular (Meiri, 2018; Slavenko et al., 2022).

Here I describe and illustrate weasel skinks lying on a warm paved path after sunset at a suburban site in south-eastern Australia, and suggest that this behaviour is a strong indication of nocturnal activity of this skink species.

I recorded skinks from 30 November 2022 to 15 April 2023, incidentally to my daily afternoon and evening walks on the Louise Sauvage pathway (33° 49'51" S, 151° 04'15" E, 7 m a.s.l. to 33° 50'30" S, 151° 03'56" E, 6 m a.s.l.), Newington, New South Wales, Australia. This track is bordered by woodlots and paved with bitumen and small stone chips, with traffic of walking or running people,



Figure 1. Weasel skink *Saproscincus mustelinus* activity and death on a previously warmed paved pathway in south-eastern Australia – **A.** One adult individual lies after sunset with body and partly regenerated tail in close contact with the path surface, **B.** A roadkill adult individual scavenged by unidentified black ants at night, **C.** An adult individual forages on leaf litter at the pathway edge at night, and **D.** Another adult individual forages on a mulch layer in the morning

bicycles and electric scooters. I walked a round trip of about 500 m twice daily at a steady pace and looked for skinks on the path, which was warmed earlier by the sun. To hand touch, the path was warmer than the surrounding ground, with leaf litter and vegetation. I recorded skinks on the path from sunset to nightfall (16:59–20:02 h, the first figure in mid-autumn and the second one in summer) and photographed them with a digital camera equipped with 55–350 mm telephoto lens from a distance of 1–2 m. Observation sessions ranged 3–10 min, totalling about 15 h. After 15 April no skinks were recorded lying on the pathway. Additional selected images of live and road kill skinks are on file in the Coleção de Imagens (ZUEC-PIC 0825-0833) at the Museu de Diversidade Biológica, Universidade Estadual de Campinas, Campinas, São Paulo, Brazil.

I sighted *S. mustelinus* motionless on the path after sunset 133 times. The mean (\pm sd) daily number of skinks sighted was 4.65 ± 2.73 (range 1–12 lizards) The postures displayed by the skinks while lying on the warm pathway varied little, their bellies and tails were in close contact with the path's surface and the head slightly elevated (Fig. 1A). As the path is bordered by woodlots, sometimes I mistook the lying skinks for sticks or dead curled leaves and the other way round. Occasionally an individual crossed the pathway, waving sinously the long tail. Most lying skinks seemed oblivious of passers-by, including those on bicycles and scooters and did not retreat even if they were in the middle of the path. Possibly due to the skinks' unwillingness to retreat I found 11 road kills (8.27 % of the total number of lying skinks sighted), the dead skinks being scavenged by ants on the same night or the next morning (Fig. 1B).

Besides those individuals applying themselves to the warm path, I observed two skinks foraging at night on the leaf litter at the pathway edge in the summer at 19:34 h and at 19:50 h (Fig. 1C), respectively. I also recorded four individuals active during the daytime. One adult foraged in the winter onset among leaf litter below a hunting perch of the Grey butcherbird *Cracticus torquatus* and was preyed upon by the bird (see Fig. 2D in Sazima, 2023) at 10:49 h. Another adult individual was moving on a shaded log in the autumn at 08:40 h, also in the autumn at 14:08 h a very small individual (apparently hatchling) laid on a shaded spot of the path, and in midsummer at 10:33 h an adult foraged in a mulch layer within a eucalypt stand (Fig. 1D).

As lying on a previously warmed pathway after sunset seems an unlikely behaviour for a diurnal lizard, acquisition of heat for nocturnal activity would be the simplest explanation for this behaviour in *S. mustelinus*. Another possibility would be that the skinks were asleep. I think that sleeping can be ruled out as all of them kept their eyes fully open and were alert. The skinks have semi-translucent eyelids and if they were asleep it would be expected that they do so with eyes closed. The observations reported herein document night and day activity of this skink species and qualify it as cathemeral (Meiri, 2018; Slavenko et al., 2022). From eight out of the nine subfamilies of scincid lizards that contain cathemeral species, Eugongylini has the smallest number (Slavenko et al., 2022), cathemerality being found in only 5 % of all lizard species (Meiri, 2018).

The variations in previous descriptions of the daily activity pattern of *S. mustelinus* (Meiri, 2018) most likely reflect the observational data of different authors under diverse circumstances and in different seasons of the year (Downes & Shine, 1999; Wilson, 2012; Swan et al., 2017; Robertson & Coventry, 2019). From my observations of individuals applying themselves to the warm path, plus those (admittedly scarce) recorded active at night and during the day, I suggest that this skink species is nocturnally active mostly in summer (warmer months), as indicated by Swan et al. (2017) and Robertson & Coventry (2019). It seems that it is diurnally active at least at the winter onset, but this remains to be verified. I was unable to confirm that this skink basks in sunlight (Downes & Shine, 1999), but I observed that it acquires body warmth by conduction (thigmothermy). However mosaic basking, using small patches of sunlight among otherwise shaded vegetation, has not been ruled out (Wilson, 2012).

The road kills I recorded support the statement of Wilson (2012) about shade skinks being unaware of passers-by and displaying little inclination to leave contact with warm surfaces. The number of skinks killed on the path is probably greater than I recorded, as early scavengers may spot and eat the carcasses in situ or carry them away. This view is exemplified by the scavenging behaviour displayed by the Australian raven *Corvus coronoides* (Sazima, 2020). Lastly, the small number of *S. mustelinus* individuals I recorded foraging at night or during daytime is probably due to their habit of dwelling among leaf litter (Swan et al., 2017; Wilson, 2012), which hampers direct visual observations. Information on this activity could be obtained in the future by using camera traps (Welbourne et al., 2020).

SUPPLEMENTARY NOTE

On 28 September 2023 I sighted a weasel skink on the paved path again, and since then I have seen skinks daily from 28 September to 19 October 2023. I saw skinks lying on the path after sunset 21 times, plus one road kill, and one individual lying on mulch at 09:27 h on a cloudy day (Fig. 2). Based on the previous observations and the recent ones, it seems that *S. mustelinus* is active at the study site mostly from Spring to Autumn.



Figure 2. Weasel skink *Saproscincus mustelinus* lying on mulch at a eucalypt stand on a cloudy morning

ACKNOWLEDGEMENTS

To Marlies Sazima for loving support in the field and at home. I acknowledge the CNPq for grant 300992/79-Z, which allowed me to study the natural history of vertebrates for about 30 years.

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Accepted: 4 August 2023