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PREDATION ON A WEASEL SKINK (*SAPROSCINCUS MUSTELINUS*) (SQUAMATA: SCINCIDAE: LYGOSOMINAE) BY A REDBACK SPIDER (*LATRODECTUS HASSELLTI*) (ARANEAE: ARANEOMORPHA: THERIDIIDAE), WITH A REVIEW OF OTHER *LATRODECTUS* PREDATION EVENTS INVOLVING SQUAMATES

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Small vertebrates occasionally fall victim to large or venomous invertebrates, one of the most frequently reported scenarios being that of a small lizard predated by a venomous arachnid (Bauer, 1990). The Redback Spider, *Latrodectus hasselti* Thorell, 1870, is an indigenous Australasian species belonging to the cosmopolitan genus *Latrodectus* Walckenaer, 1805, which also includes the black widow spiders of Europe (*L. tredecimguttatus* (Rossi, 1790); *L. lilianae* Melic, 2000); the widow spiders of North America (*L. mactans* (Fabricius, 1775); *L. hesperus* Chamberlin & Ivie, 1935; *L. bishopi* Kaston, 1838; *L. variolus* Walckenaer, 1837); the button spiders of Africa (*L. cinctus* Blackwall, 1865; *L. indistinctus* Cambridge, 1904; *L. karoensis* Smithers, 1944; *L. rhodesiensis* Mackay, 1872; *L. geometricus* Koch, 1841), and the endangered katipo spider (*L. katipo* Powell, 1871) of New Zealand (World Spider Catalogue, 2016).

Distributed throughout Australia, including Tasmania and many offshore islands, *L. hasselti* is also known from New Caledonia, and has been introduced into Japan, and New Zealand (Vink *et al.*, 2011), where it is feared to pose a threat to *L. katipo*, through inbreeding and displacement. *Latrodectus hasselti* is found in diverse habitats, from tropical forest to desert, where it inhabits dry, dark, and protected places, e.g., rock crevices, dead wood, and shrubs. It is especially common in anthropogenic environments. Female *L. hasselti* may achieve 14 mm in body length and possess a distinctive, eponymous red stripe

on the dorsal surface of the bulbous black abdomen and red hourglass on its ventral side, while males rarely exceed 3 mm (Brunet, 1994). Adult female *L. hasselti* possess a highly neurotoxic venom containing the presynaptic neurotoxin α -latrotoxin, which specifically targets vertebrates, causing considerable pain (Garb & Yaashi, 2013) and is capable of causing human fatalities, although no human deaths have been reported in Australia since the advent of antivenom in 1956 (Brunet, 1994).

Latrodectus hasselti feeds primarily on small invertebrates such as woodlice, flies, beetles, moths and cockroaches, but there are reports of it preying on larger venomous invertebrates, including centipedes (Roberts, 1941), and wandering male trapdoor and funnel-web spiders (Brunet, 1998). Vertebrates are also documented in the diet of female *L. hasselti*, and while some fishing spiders (*Dolomedes*: Pisauridae) feed on fish, fish fry, and frogs, and large orb-weaving spiders (*Nephila*: Nephilidae) occasionally trap birds, the vertebrate prey of *Latrodectus* is primarily reptilian (McCormick & Polis, 1982), although there exists a single historical record of a mouse being captured by *L. hasselti* (McKeown, 1943).

We report predation on a Weasel Skink, *Saproscincus mustelinus* (O'Shaughnessy, 1874), by a female *Latrodectus hasselti* in an urban environment in the suburbs of Melbourne, Victoria.

The scincid genus *Saproscincus* contains twelve species (Hoskin, 2013; Wilson & Swan, 2013; Cogger, 2014), distributed on the eastern seaboard of Queensland, New South Wales and Victoria. They are oviparous, diurnal, terrestrial, and shade loving, being rarely encountered far from cover, hence the commonly applied vernacular name 'shade skinks' (Cogger, 2014). The southern-most species in the genus is *S. mustelinus*, to which the vernacular name Weasel Skink is usually applied. *Saproscincus mustelinus* is a small species (SVL 45-55 mm) of the coast and ranges of eastern New South Wales and Victoria, where it inhabits wet and dry sclerophyll forest and coastal heathland, but it is also common in suburban gardens (Cogger,

2014). This small skink has many potential predators, including snakes (Webb *et al.*, 2003), birds (Anderson & Burgin, 2008), domestic cats (Dickman & Newsome, 2015), and predatory invertebrates (this paper).

The predation event was observed at 1214 hrs on Saturday 21 November 2015 by one of us (KK). The spider had constructed its web on the underside of a child's pram, which was normally stored folded in the garage at the family home in Carnegie, southeast Melbourne, but had been transported by car to a play centre in Warrigal Road, Moorabbin. Whilst the pram was at the play centre the spider was discovered in the act of biting and binding a *S. mustelinus*, although it was unclear whether the skink had been captured

Figure 1. Redback spider (*Latrodectus hasselti*) predation on a Weasel skink (*Saproscincus mustelinus*).



at the play centre, or earlier in the garage and relocated with the spider and the pram. The predation event was recorded on an iPhone 4 camera phone (Figure 1).

It is notable from the image that the spider is biting near the head, the usual target area (de Rebeira, 1981; Orange, 1989, 2007), and also that the tail has been elevated and bound to the body. It may be the case that elevation of prey items from the ground is intended to avoid the attentions of ants, which

could use prey in contact with the ground to overrun the web and potentially kill the spider. Certainly observations suggest that once a dropped prey item has been scavenged by ants the spider has little chance of recovering it and will seek to avoid contact with the ants (Orange, 2007).

A literature search revealed further accounts of small Australian reptiles being predated by *L. hasselti* (Table 1). Even snakes occasionally become victims (Anonymous, 1939;

Table 1: Australian records of lizards and snakes predated by *Latrodectus hasselti*.

Taxon	Location	Source
GEKKONIDAE		
<i>Christinus marmoratus</i> (as <i>Phyllodactylus marmoratus</i>)	Perth, WA	Konig, 1987
<i>Christinus marmoratus</i> (n=2)	Hammersley, WA	Orange, 2007
<i>Gehyra variegata</i>	Kambalda East, WA	Orange, 2007
SCINCIDAE		
<i>Anomalopus verreauxii</i>	n/a	Raven 1990
<i>Cryptoblepharus pulcher</i> (as <i>C. boutonii virgatus</i>)	n/a	Cook, 1973
<i>Cryptoblepharus pulcher</i> (as <i>C. virgatus</i>) (n=2)	n/a	Raven 1990
<i>Hemiergis quadrilineata</i> (n=3)	Hammersley, WA	Orange, 2007
<i>Lampropholis delicata</i>	SW Sydney, NSW	Metcalfe & Ridgeway, 2013
<i>Lampropholis guichenoti</i> (as <i>Leiolepisma guichenoti</i>)	Kangaroo Valley, NSW	Copland, 1953
" <i>Lygosoma</i> sp."	Narrabeen, NSW	McKeown, 1953
<i>Saproscincus mustelinus</i>	Moorabbin, Vic.	this paper
unidentified skinks (n=2)	n/a	Roberts, 1941
unidentified skinks (n=2)	n/a	McKeown, 1952
ELAPIDAE		
<i>Parasuta dwyeri</i>	Lockhart, NSW	Durigo, 2010
<i>Parasuta monachus</i> (as <i>Rhinoplocephalus monachus</i>)	Kambalda East, WA	Orange, 1990
<i>Parasuta nigriceps</i>	Gooroc, Vic.	Malpass, 2015
<i>Pseudonaja affinis</i> (unsuccessful)	Helena Valley, WA	De Rebeira, 1987
"black snake"	Roma, Qld	McKeown, 1943

McKeown, 1943; de Rebeira, 1981; Orange, 1990), although given the public shock value of these encounters they are now more likely to be found on newspaper websites (Durigo, 2010; Malpass, 2015) than in peer-reviewed publications, and are therefore lacking in scientific data. Attacks by female *L. hasselti* on snakes are not always successful. A juvenile dugite (*Pseudonaja affinis*) survived almost 7.5 hours of repeated attacks in a web before being removed, kept under observation for three days, and subsequently released (de Rebeira, 1981).

By far the largest proportion of reptiles found in the webs of *L. hasselti* are small lizards, and they are probably more vulnerable to predation than snakes because, in addition to being smaller and more abundant, they are often found in the same discrete, confined corners of outbuildings, workshops, or the natural environment as *L. hasselti*. Most of these reports concern skinks (McKeown, 1936; Roberts, 1941; McKeown, 1943, 1952; Copland, 1953; Cook, 1973; Raven, 1990; Orange, 2007; Metcalfe & Ridgeway, 2013), with fewer instances of geckos as prey

Table 2: Records of lizards and snakes predated by *Latrodectus* spp. outside of Australia.

Taxon	<i>Latrodectus</i> sp.	Location	Source
GEKKONIDAE			
<i>Tarentola mauritanica</i>	<i>L. lilianae</i>	Granada, Spain	Hódar & Sánchez-Piñero, 2002
LACERTIDAE			
<i>Acanthodactylus erythrurus</i>	<i>L. lilianae</i>	Granada, Spain	Hódar & Sánchez-Piñero, 2002
<i>Mesalina guttulata</i>	<i>L. revivensis</i>	Negev, Israel	Zilberberg, 1988
<i>Mesalina guttulata</i>	<i>L. pallidus</i>	Judean Desert, Israel	Blondheim & Werner, 1989
<i>Podarcis melisellensis fiumana</i>	<i>L. tredecimguttatus</i>	Krk Island, Croatia	Schwammer & Daurecht, 1988
<i>Psammodromus hispanicus</i> (n=3)	<i>L. lilianae</i>	Granada, Spain	Hódar & Sánchez-Piñero, 2002
SCINCIDAE			
<i>Scincella lateralis</i> (as <i>Leiopisma laterale</i>) (n=2)	<i>L. mactans</i>	Georgia, USA	Neill, 1948
COLUBRIDAE			
<i>Liochlorophis vernalis</i> (as <i>Opheodryas vernalis</i>)	<i>L. mactans</i> , probably <i>L. variolus</i>	USA	Neill, 1948
NATRICIDAE			
<i>Storeria dekayi</i>	<i>L. mactans</i> or <i>L. variolus</i>	USA	Neill, 1948

(König, 1987; Orange, 2007). Table 1 lists 14 skinks and four geckos predated by *L. hasselti*.

Latrodectus hasselti predation of skinks, and to a lesser degree of geckos, is probably a much more frequent occurrence than the scattered literature would suggest. Orange (2007) observed three *Hemiergis quadrilineata* (Scincidae) and two *Christinus marmoratus* (Gekkonidae) in the webs of *L. hasselti*, or as discarded remains beneath the webs. Two of the *H. quadrilineata* were captured by the same female spider over a five day period and all observations were made in the same 900 m² suburban garden in the outskirts of Perth, WA. Orange (2007) additionally noted that neither of the other skink taxa present in the garden, *Cryptoblepharus plagiocephalus* and *Menetia greyii*, had been observed as *L. hasselti* prey, despite all being small species, well within the capabilities of the spider. *Hemiergis* and *Menetia* are terrestrial while *Cryptoblepharus* and *Christinus* may be terrestrial or arboreal. However, Orange also noted that while *Cryptoblepharus* and *Menetia* are diurnal lizards, *Hemiergis* and *Christinus* are more crepuscular or nocturnal, and therefore active at the same time as *L. hasselti*, a factor which may bring small active lizards into contact with spiders with more regularity.

The diel activity of lizards in the Perth garden may have an effect on their likelihood to fall prey to *L. hasselti*, but elsewhere diurnal *Cryptoblepharus* have been caught and killed by *L. hasselti* (Cook, 1973; Raven, 1990). A more unusual capture concerns a specimen of *Anomalopus verreauxii*, a fossorial skink with greatly reduced limbs (Raven, 1990). The lizard appears to have lifted its head into the sticky lower strands of an almost ground-level *L. hasselti* web, the spider securing the skink's head and hauling it off the ground before repeatedly biting it on the underside to immobilize it. Raven (1990) reports that this skink was not eaten, only immobilized and killed. From the illustration provided, it would seem likely that the skink was too large and heavy

for the spider to haul into the web as food and the attack was more defensive than predatory.

Roberts (1941) provides a detailed account of two small lizards, which from the black and white photograph can be identified as skinks, captured in the web of a large female *L. hasselti*, and of the process that followed as the spider bound and killed her quarry. He reports that although the lizards were captured at 0800 hrs, they were still able to struggle ten hours later at 1800 hrs, from which he concluded that *Latrodectus* venom acted more slowly on ectotherms than endotherms. Orange (1990) reports on a small (SVL 114 mm) neonatal Monk Snake (*Parasuta monachus*, as *Rhinoplocephalus monachus*) discovered in the web of *L. hasselti* at 1345 hrs, which was removed from the web but found to be dead 4 hours and 25 minutes later.

Latrodectus species outside Australia have also been documented to occasionally prey on small lizards, e.g. *L. tredecimguttatus* in Croatia (Schwammer & Baurecht, 1988), *L. lilianae* in Spain (Hódar & Sánchez-Piñero, 2002), and both *L. revivensis* (Zilberberg, 1988) and *L. pallidus* (Blondheim & Werner, 1998) in Israel. Curiously most of these records concern lacertids, with only one gecko reported as prey (see Table 2). From North America Neill (1948) provides personal observations of two diurnal skinks in the web of a *L. mactans*, and unverified newspaper accounts of two diurnal snakes predated by either *L. mactans* or *L. variolus* exist (Neill, 1948).

The presynaptic neurotoxin α -latrotoxin is just one of a number of toxins found in *Latrodectus* venom. Whilst α -latrotoxin specifically targets vertebrates, there are other toxins that target insects (latroinsecto-toxins) and crustaceans, presumably woodlice (latrocrustatoxin) (Garb & Hayashi, 2013). Because α -latrotoxin is ineffective for killing insects or crustaceans, the primary prey of *Latrodectus* species, its presence in the venom of *Latrodectus* species suggests there must be

an important functional requirement for a vertebrate-specific toxin. If α -latrotoxin is not present in the venom for defensive purposes, it is possible that small vertebrates form a larger part of the diet of *Latrodectus* than previously realized.

Today almost every adolescent or adult in developed countries carries a camera-phone and has the ability to photograph seemingly unusual natural history observations. Unfortunately, the advent of social media means those incidents that are observed and photographed are more likely to be posted on Facebook or Twitter, where they will soon become history as they moved down the page and are lost, than properly documented and submitted for publication as a permanent record. Only by reporting such events in permanent media (i.e. scientific journals) can the frequency of these occurrences be discerned.

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REFERENCES

- Anderson, L. & Burgin, S. 2008.** Patterns of bird predation on reptiles in small woodland remnant edges in peri-urban north-western Sydney, Australia. *Landscape Ecology* 23: 1039-1047.
- Anonymous 1939.** Rare case of spider capturing snake in web reported from west. *The Telegraph*, Brisbane. January 31. p. 2.
- Bauer, A.M. 1990.** Gekkonid lizards as prey of invertebrates and predators of vertebrates. *Herpetological Review* 21: 83-87.
- Blondheim, S. & Werner, Y.L. 1998.** Lizard predation by widow spiders. *British Herpetological Society Bulletin* 30: 26-28.
- Brunet, B. 1994.** *The Silken Web: A Natural History of Australian Spiders*. New Holland, Sydney.
- Brunet, B. 1998.** *Spiderwatch: A Guide to Australian Spiders*. New Holland, Sydney.
- Cogger, H.G. 2014.** *Reptiles and Amphibians of Australia*. Seventh Edition. Reed New Holland, Chatswood, NSW.
- Cook, R. 1973.** The wall lizard *Cryptoblepharus boutonii virgatus*. *Herpetofauna* 6(2): 15-16.
- Copland, S.J. 1953.** Presidential address, delivered at the Seventy-eighth Annual General Meeting, 25th March 1953, Recent Australian herpetology. *Proceedings of the Linnean Society of New South Wales* 78: i-xxxvii.
- de Rebeira, P. 1981.** A redback spider attacking an immature dugite. *Western Australian Naturalist* 15: 33-34.
- Dickman, C.R. & Newsome, T.M. 2015.** Individual hunting behaviour and prey specialisation in the house cat *Felis catus*: Implications for conservation and management. *Applied Animal Behaviour Science* 173: 76-87.
- Durigo, B. 2010.** This snake's prey became the predator. *The Daily Advertiser*, Wagga Wagga. March 31. p. 2. <http://www.dailyadvertiser.com.au/story/732996/this-snakes-prey-became-the-predator/>
- Garb, J.E. & Yaashi, C.Y. 2013.** Molecular evolution of α -latrotoxin, the exceptionally potent vertebrate neurotoxin in black widow spider venom. *Molecular Biology and Evolution* 30: 999-1014.
- Hódar, J.A. & Sánchez-Piñero, F. 2002.** Feeding habits of the black widow spider *Latrodectus lilianae* (Araneae: Theridiidae) in an arid zone of south-east Spain. *Journal of Zoology* 257: 101-109.
- Hoskin, C.J. 2013.** A new skink (Scincidae: *Saproscincus*) from rocky rainforest habitat on Cape Melville, north-east Australia. *Zootaxa* 3722: 385-395.

- König, R. 1987.** Die Schwarze Witwe (*Latrodectus mactans hasseltii* Thorell) als Fressfeind von Reptilien in Australien. *herpetofauna* (Weinstadt) 9(48): 6-8.
- Malpass, L. 2015.** Spider v snake: Redback spider wins, snake dies from likely poisoning, Sydney Morning Herald, Sydney. March 3. <http://www.smh.com.au/environment/animals/spider-v-snake-redback-spider-wins-snake-dies-from-likely-poisoning-20150303-13tgdf.html>
- McCormick, S. & Polis, G.A. 1982.** Arthropods that prey on vertebrates. *Biological Reviews* 57: 29-58.
- McKeown, K.C. 1936.** Spider Wonders of Australia. Angus and Robertson, Sydney.
- McKeown, K.C. 1943.** Vertebrates captured by Australian spiders. *Proceedings of the Royal Zoological Society of New South Wales* 63: 16-30.
- McKeown, K.C. 1952.** Australian Spiders. Angus and Robertson, London.
- Metcalfe, D.C. & Ridgeway, P.A. 2013.** A case of web entanglement and apparent predation of the skink *Lampropholis delicata* (De Vis, 1888) by the red-back spider *Latrodectus hasseltii* Thorell, 1870 in an autochthonous mesic habitat in coastal southeast Australia. *Herpetology Notes* 6: 375-377.
- Neill, W.T. 1948.** Spiders preying on reptiles and amphibians. *Herpetologica* 4: 158.
- Orange, P. 1989.** Incidents of predation on reptiles by invertebrates. *Herpetofauna* 19(1): 31-32.
- Orange, P. 1990.** Predation on *Rhinoplocephalus monachus* (Serpentes: Elapidae) by the redback spider, *Latrodectus mactans*. *Herpetofauna* 20(1): 34.
- Orange, P. 2007.** Predation on lizards by the red-back spider, *Latrodectus hasseltii*. *Herpetofauna* 37: 32-35.
- Raven, R. 1990.** Spider predators of reptiles and amphibia. *Memoirs of the Queensland Museum* 29: 448.
- Roberts, N.L. 1941.** Some notes on Australian spiders. *Proceedings of the Royal Zoological Society of New South Wales* 61: 38-41.
- Schwammer, H. & Baurecht, D. 1988.** Der Karstläufer, *Podarcis melisellensis fiumana* (Werner, 1891), als Beute der Europäischen Schwarzen Witwe, *Latrodectus mactans tredecimguttatus* (Rossi, 1790). *Herpetozoa* 1: 73-76.
- Vink, C.J., Derraik, J.G.B., Phillips, C.B. & Sirvid, P.J. 2011.** The invasive Australian redback spider, *Latrodectus hasseltii* Thorell 1870 (Araneae: Theridiidae): current and potential distributions, and likely impacts. *Biological Invasions* 13: 1003-1019.
- Webb, J.K., Brook, B.W. & Shine, R. 2003.** Does foraging mode influence life history traits? A comparative study of growth, maturation and survival of two species of sympatric snakes from south-eastern Australia. *Austral Ecology* 28: 601-610.
- Wilson, S.K. & Swan, G. 2013.** A Complete Guide to the Reptiles of Australia. Fourth Edition. New Holland, Sydney.
- World Spider Catalog 2016.** World Spider Catalog. Natural History Museum, Bern. Version 17.5. <http://wsc.nmbe.ch>. Accessed 6 December 2016.
- Zilberberg, G. 1988.** Behavioural ecology of the widow spider *Latrodectus revivensis*. *Shapirrit* 6: 52-77.