SHORT COMMUNICATION

Black widow spiders, *Latrodectus* spp. (Araneae: Theridiidae), and other spiders feeding on mammals

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Abstract. A survey of reports on spiders preying on small, non-flying mammals (i.e., mice, deer mice, voles, rats, heteromyid rodents, shrews) published in the literature and in the social media yielded a total of 42 naturally occurring incidents. Spiders from five families (Agelenidae, Ctenidae, Sparassidae, Theraphosidae, and Theridiidae) were reported capturing small mammals under natural conditions. Additionally, spiders from four more families (Atracidae, Lycosidae, Pisauridae, and Porrhothelidae) are known to kill small mammals in captivity. Approximately 80% of the reported incidents were attributable to theridiid spiders, especially the Australian redback spider (*Latrodectus hasselti* Thorell, 1870) and three species of North American widow spiders (*Latrodectus geometricus* C.L. Koch, 1841, *Latrodectus hesperus* Chamberlin & Ivie, 1935, and *Latrodectus mactans* (Fabricius, 1775)) that have been shown to be expert mouse-catchers. The success of widow spiders in subduing small mammals can be explained by their ability to spin strong webs made up of tough silk, and producing a very potent toxin (α-latrotoxin) specifically targeting the vertebrate nervous system.

Keywords: Comb-footed spiders, strong webs, vertebrate-specific toxin, predation, broad diets

While predation on frogs, lizards, snakes, fish, and birds by spiders has been extensively reported and discussed in the scientific literature (see McKeown 1943; McCormick & Polis 1982; Menin et al. 2005; Toledo 2005; Brooks 2012; Nyffeler & Pusey 2014; Walther 2016; Nyffeler et al. 2017a), predation on mammals has attracted much less attention – apart from the fact that many tarantula keepers feed their animals with small mice and that mice, rats, and guinea pigs are used as experimental animals to test the effects of spider venoms on the mammalian nervous system (Bücherl 1971; Marshall 2001). In the year 2016, an unusually large huntsman spider was filmed in Coppabella, Queensland (Australia), carrying around a presumably freshly killed mouse before attempting to eat it (see Whyte & Anderson 2017). Although skeptics may question the likelihood that a huntsman spider is capable of subduing and carrying around prey the size of a mouse, in our opinion this video is authentic, first because McKeown (1952) had already described an almost identical incident of a mouse-eating huntsman spider likewise witnessed in a house in Queensland, and second because large huntsman spiders (i.e., *Heteropoda* spp.) were observed killing and devouring vespertilionid bats and cane toads the size of small mice (see Nyffeler & Knörnschild 2013, and https://imgur.com/lwQxbSt). After the videographer had posted a video of this scene on facebook, the news media and social media spread the story around the world – and this inspired us to review the topic "spider predation on mammals" on a global scale. The senior author approached this task by conducting an extensive bibliographic search to identify all published reports of predation on small mammals by spiders using the ISI Web of Science Thomson-Reuters database, Scopus database, Google Scholar, Google Books, and Google Pictures. Social media sites were also searched for content indicating predation on small mammals by spiders.

In total, 42 reports of naturally occurring predation on small, non-flying mammals by spiders were found, about half of which had previously been published in the scientific or popular literature (Appendix 1). In addition to this, four reports dealing with staged events observed under laboratory conditions (spiders and small mammals being confined in cages) are included in Appendix 1. In about half of all documented naturally occurring incidents, evidence in the form of photos or videoclips was available. From the 42 documented incidents, 52% originate from the 21th century, 36% from the 20th century, and 12% from the 19th century. The rapid increase in the number of incidents reported since the beginning of the 21th century is most certainly because of the uploading of photos and media to the internet (compare Nyffeler et al. 2017b). In cases referring to unidentified web-building spiders, these could be classified as belonging to the family Theridiidae based on their prey capture behavior of (1) using extraordinarily strong, irregular webs capable of retaining prey of large size relative to the spider's size, (2) lifting prey organisms above the floor by the spider using spider silk, and (3) being small-sized spiders equipped with potent venom very effectively targeting the vertebrate nervous system (see Blackledge et al. 2005; Blackledge & Zevenbergen 2007; Garb & Hayashi 2013). In cases where popular literature was consulted, this referred to chance observations made between 1836 and 1926, that is, at a time when hardly anything on vertebrate-eating spiders was known that could have served as an inspiration to invent a story on mouse-catching spiders. Also, the fact that it had been mentioned already in these early reports that the spiders were lifting captured mice or rats some distance above the floor prior to killing them seems to us to be proof that these were authentic occurrences. In one of the popular reports, the predation event had been documented by a photo.

In this paper, we present incidents of spider predation (or predation attempts) on small mammals represented by mice (*Mus musculus*; Muridae), rats (e.g., *Rattus* sp.; Muridae), deer mice (*Peromyscus maniculatus* and *P. leucopus*; Cricetidae), voles (*Microtus californicus*; Cricetidae), shrews (*Microsorex hoyi*; Soricidae), and heteromyid rodents (Heteromyidae) (Appendix 1). In addition to this, a predation attempt by a spider on a mouse lemur (*Microcebus lehilahytsara*; Cheirogaleidae) was reported (see below). Furthermore, predation on immature hamsters (Cricetidae) by captive, large theraphosids is known (e.g., see online at https://www.youtube.com/watch?v=yanYZwO474E). In 86% of the naturally occurring incidents, the victims were deer mice, mice or rats (family Cricetidae and Muridae). In or near human dwellings in Australia, mammalian prey captured by the redback spider were found to be exclusively house mice, whereas the victims of North American widows were deer mice, rats, and probably also house mice. Even bats have been found entangled in North American widow webs (O'Meara 2011, p. 463); spider predation on bats, however, has been reported elsewhere (see Nyffeler & Knörnschild 2013). The exclusiveness of the capture of

Figure 1.—A theraphosid, *Aphonopelma chalcodes* Chamberlin, 1940, preying on a heteromyid rodent in Tuczon, Arizona (photo by Michael Skinner).

house mice by spiders in or near houses in Australia might be explained by the fact that in this part of the world only non-native rodents (i.e., in particular house mice) closely associate with humans, while native Australian rodents very rarely get close to human settlings (B. Breed, pers. comm.; K. Rowe, pers. comm.; K. Vernes, pers. comm.).

Naturally occurring incidents of predation on non-flying mammals have been reported from the USA (22 incidents), Australia (16 incidents), and 1 incident each from India, the United Kingdom, Mexico, and Madagascar. Thus, reports from the USA and Australia account for ~90% of all cases (Appendix 1). In the USA, incidents of mammal predation by spiders have been reported from the Northeast (Maryland, Massachusetts), the South (Alabama, Florida, Kentucky, Louisiana), the Midwest (Indiana, Ohio), and the West (Arizona, California, Colorado, Oregon), thus, one can say from throughout the country (see references in Appendix 1).

Spiders from five families (Agelenidae, Ctenidae, Sparassidae, Theraphosidae, and Theridiidae) were reported capturing small mammals under natural conditions. In addition to this, spiders from four families (Atracidae, Lycosidae, Pisauridae, and Porrhothelidae) have been documented killing small mammals in captivity (see online at https://www.youtube.com/watch?v=fGZ9jOrVwk0; Schmidt 1953, 1957; Kaston 1965; Bücherl 1971; Laing 1975). Furthermore, a mouse lemur (*Microcebus lehilahytsara* Roos & Kappeler, 2006) was trapped in a large, dense web constructed by a spider of an unspecified taxon; this lemur, however, was rescued by human observers before the spider had the opportunity to kill and devour it (Crane & Goodman 2013). Because the lemur was inextricably entangled in the strong web, it ultimately would have died of starvation and desiccation regardless of whether the spider killed it by envenomation or not. Based on a photo of the web, the unidentified web owner was suspected to be either a theridiid or a large pisaurid (Crane & Goodman 2013), and since spiders from these families are known to prey on small mammals (see McKeown 1943, 1952; Schmidt 1953, 1957), it is likely that the spider in question would have killed and devoured the lemur, had this one not been rescued. In Western Australia, a marsupial mouse (*Antechinomys* sp.; Dasyuridae) was caught in a trapdoor spider's burrow (probably Idiopidae) but nothing is known about whether the spider was attacking the captive (Frauca 1982). Idiopids are known to occasionally kill and consume vertebrate prey (Butler & Main 1959; Main 1996). Only 12% of the naturally occurring predation events were attributable to web-less hunting spiders. These refer to two incidents in which huntsman spiders (Sparassidae) were feeding on mice in houses in Queensland, Australia, one incident from India where a *Poecilotheria regalis* Pocock, 1899 (Theraphosidae) was found devouring a rat, one incident from Arizona (USA) where an *Aphonopelma chalcodes* Chamberlin, 1940 (Theraphosidae) was seen feeding on a heteromyid rodent (see Fig. 1), and one report from South America according to which *Phoneutria* sp. (Ctenidae) is occasionally feeding on rats (Bücherl 1971). These web-less spiders are powerful, ferocious predators weighing $\geq$10 g in the case of the theraphosids and >2 g in the case of the huntsman and ctenid spiders (Carrel 1987; Rind et al. 2011; Lapinski & Tschapka 2013). The question arises as to why records of mammal predation by web-less spiders are so scarce. This might be explained at least in part by difficulties in witnessing the feeding activities of web-less spiders in the wild, as compared to the more easily observed synanthropic web-building spiders (e.g., *Latrodectus* spp.). Ctenid, sparassid, and theraphosid spiders are predominantly nocturnal and therefore difficult to observe while hunting prey during the hours of darkness. In addition, theraphosids often feed in their burrows, out of human sight (Nyffeler et al. 2017c). Apart from mammals, additional vertebrates such as frogs, toads, lizards, snakes and—in the case of the theraphosids—even birds are preyed upon by web-less spiders (Bücherl 1971; Menin et al. 2005; Vieira et al. 2012; Nyffeler & Knörnschild 2013; Borges et al. 2016; Neogi & Islam 2017). At least in the case of the theraphosids and ctenids, it is proven that these spiders are equipped with potent venoms targeting invertebrate and vertebrate nervous systems (Bücherl 1971; Isbister et al. 2003; García-Arredondo et al. 2015). In cage experiments, it has been shown that within 24 hours, a hungry theraphosid can reduce a mouse to nothing but a hard, dry mass of skin, hair, and bones (Rau 1931).

Figure 2.—Dead rat (*Rattus* sp.) trapped in the web of a brown widow, *Latrodectus geometricus* C. L. Koch, 1841, on a building in North Port, Florida (photo by Linda Nau).

The remaining predation events were attributable to web-building spiders, with the comb-footed spider family (Theridiidae) accounting for the vast majority of the documented incidents (roughly 80%; Fig. 2). Among these, the following species have been identified: the Australian redback spider (*Latrodectus hasselti* Thorell, 1870), three species of North American widow spiders (*Latrodectus geometricus* C. L. Koch, 1841, *Latrodectus hesperus* Chamberlin & Ivie, 1935, and *Latrodectus mactans* (Fabricius, 1775)) and the cosmopolitan house spider *Parasteatoda tepidariorum* (C. L. Koch, 1841). All these spiders are synanthropic, occurring in or near human dwellings, that is, in places such as houses, garages, garden sheds, barns, on outside furniture, farm equipment etc. (Garb et al. 2004). Indoors, they are often found in the corners of cupboards, behind furniture or under desks. Accordingly, all documented incidents of the capture of small mammals by this type of spiders occurred in or near human dwellings in urban, suburban or rural areas. Black widows accounted for roughly 60% of the reported incidents of predation on small mammals (Appendix 1).

The four widow species reported in our study are of similar size (usually weighing ~0.35-0.50 g as adult females; McKeown 1943; Anderson 1994; Shao & Vollrath 1999) with maximum weights of up to ~0.90 g (Anderson 1994). Exclusively females of *Latrodectus* spp. are engaged in the killing of small mammals, which can be explained by the fact that only full grown female spiders have large enough venom glands to produce a sufficient amount of venom needed to successfully envenomate a mouse or rat (i.e., sexual dimorphism in body size; Rash & Hodgson 2002). Black widow spiders construct irregular, three-dimensional space webs composed of extraordinarily tough silk, from which vertical sticky gum-footed threads extend to the floor (Blackledge et al. 2005; Blackledge & Zevenbergen 2007). These webs, located ~10-100 cm above the floor, are very strong, enabling the spiders to capture prey many times larger and heavier than themselves (see Shao & Vollrath 1999; Blackledge et al. 2005; Swanson et al. 2006). When a small mammal walks into such a web, it gets stuck to the sticky threads. Alerted by the prey-generated web vibrations, the spider rushes to the victim attempting to immobilize it by throwing with its hind legs sticky silk masses over it (Vollrath 2000). Once this has been accomplished, the spider administers one or several venomous bites thereby injecting a very potent vertebrate-specific toxin (α-latrotoxin) that is highly lethal to small mammals (Gendreau et al. 2017). The spider bites its victim either at the base of the tail where the skin is tender or on another soft spot such as the nose (e.g., Baerg 1954; YouTube videos cited in Appendix 1). Subsequently, the spider pulls its victim off the ground, raising it between 8 and 20 cm above the substrate (see Clagget 1914; McKeown 1943, 1952). In one study, a mouse was dead about 3 hours after its entrapment in a black widow spider web (Clagget 1914). For comparison, mice bitten by adult *L. tredecimguttatus* (Rossi, 1790) and *L. mactans* spiders in laboratory experiments were killed within ~20 minutes (Zumpt 1968; Maretić 1987). Black widows have been observed to not only kill mice but to also actually feed on them (see McKeown 1943). In several instances, the full predation process (mammal becoming entangled, swathed in silk, bitten, and suspended in the web by the spider) was witnessed by the reporting authors (e.g., Blair 1934), and in most YouTube videos dealing with this topic (see Appendix 1), the mice snared in spider webs were still alive at the time of filming, indicating that the incidents reported in this paper were in most cases real predation events and not cases of scavenging. In the United Kingdom, Felton (1968) reported a case in which a house mouse got stuck after falling down through a series of *Tegenaria* cob webs placed on top of one another. In this latter case, there is no evidence that the mouse was attacked and consumed by the spider so that this presumably was a case of accidental death by web entanglement. The victims were usually immature mice or rats of small size and in one instance an adult pygmy shrew of small size (Clagget 1914; Saunders 1929; Blair 1934; D'Amour et al. 1936; McKeown 1943). One immature mouse trapped and killed in a *L. hasselti* web weighed 4.7 g which was 14.4 times the spider's body mass (McKeown 1943). For comparison, fishing spiders of the genera *Dolomedes* Latreille, 1804 and *Nilus* O. Pickard-Cambridge, 1876 (Pisauridae), with a body mass of 0.5–2 g, can catch fish prey up to 4.5 times the spider's body mass (Nyffeler & Pusey 2014).

The potency of *Latrodectus* venom on mammals would indicate that it is more than capable for the spiders to have the potential to subdue mammals with their toxic bites. Venom from the Eurasian *L. tredecimguttatus* has an LD_{50} of 0.013 mg of dried gland extract per mouse translating to an overall LD_{50} of 0.9 mg/kg (Bettini & Marioli 1978). It is estimated that the venom of one spider had enough potency to kill 40 mice (Maretić & Lebez 1979). Venom from four species of Argentinian *Latrodectus* spiders produced LD_{50} values ranging from 3.1 to 22.5 µg/animal in 18–22 g CF-1 mice (de Roodt et al. 2017) translating to approximately 0.15 to 1.23 mg/kg for the average 20 g mouse. Using whole gland extract, D'Amour et al. (1936) estimated the LD_{50} in rats as 0.032 mg which they considered as 25% of the widow's venom quantity. As they used rats of 50 to 60 g weight, this would translate to an LD_{50} of 0.53 to 0.64 mg/kg. These LD_{50}s are similar to that for American rattlesnakes (Glenn & Straight 1978). Autopsy of mammals (e.g., rats, cats, mice) injected with *Latrodecus* venom in the lab exhibit multiple organ aberrations with edema (swelling) and hyperemia (increased blood flow to tissues) being common (Maretić & Lebez 1979).

The house spider *Parasteatoda tepidariorum* constructs the same web type as the black widow spiders and the prey capture behavior of these two spider groups is essentially the same (see Ewing 1918). Like the black widows, *P. tepidariorum* pulls prey off the ground, raising them ~8–10 cm above the substrate (e.g., McCook 1889; Davis et al. 2017). Nonetheless, as Appendix 1 reveals, *P. tepidariorum* apparently is much less successful in catching small mammals. This may be due to the fact that the species is considerably smaller and weaker than *Latrodectus* spp., with a body mass of ~0.05–0.17 g (Anderson 1994; Boutry & Blackledge 2008) and lacks the vertebrate-specific toxin (α-latrotoxin; Gendreau et al. 2017). The lower potency of the *P. tepidariorum* toxin seems to be evidenced by the fact that it took a mouse at least ten hours to die after being trapped and bitten by a *P. tepidariorum* (see McCook 1889).

Apart from preying on small mammals, black widows have been reported to also capture and devour other types of vertebrates including amphibians, reptilians, and birds (e.g., Raven 1990; Anderson 2011; Brooks 2012; Metcalfe & Ridgeway 2013; Shine & Tamayo 2016; Rocha et al. 2017). So far, 9 different *Latrodectus* spp. (*L. geometricus*, *L. hasselti*, *L. hesperus*, *L. katipo* Powell, 1871, *L. lilianae* Melic, 2000, *L. mactans*, *L. pallidus* O. P.-Cambridge, 1872, *L. revivensis* Shulov, 1948, and *L. tredecimguttatus*) in various geographic regions such as Australia, Brazil, Canary Islands, Croatia, Dominican Republic, Israel, Italy, Mexico, New Zealand, Romania, South Africa, Spain, and USA have been reported to be engaged in preying on vertebrates (e.g., Blair 1934; Newlands 1978; Schwammer & Baurecht 1988; Blondheim & Werner 1989; Hódar & Sánchez-Piñero 2002; Lettink & Patrick 2006; Jones et al. 2011; Colombo 2013; Hamilton et al. 2016; Shine & Tamayo 2016; Rocha et al. 2017). The fact that preying on vertebrates by *Latrodectus* spp. apparently is widespread and not uncommon, is strong evidence for the ecological significance of α-latrotoxin as a vertebrate-specific toxin. It is unlikely that α-latrotoxin evolved as a defensive compound due to the difficulty of inflicting a bite from small fangs to the minuscule amount of exposed dermal area of an attacking mammalian predator protected by a coat of fur. When the western black widow, *L. hesperus*, was attacked by *Peromyscus* mice in laboratory trials, the spiders responded by expelling sticky aggregate gland silk, which was an efficacious, physically irritating repellent that increased spider survival (Vetter 1980). Additional evidence arguing for the purposeful evolution of a mammalian-specific *Latrodectus* venom component is the specificity of these components. Currently, seven latrotoxins have been isolated from *L. tredecimguttatus*; two are latroinsectotoxins which are strongly deleterious to insects but innocuous for vertebrates, a latrocrustatoxin which affects crustaceans but not insects or mammals and α-latrotoxin which causes trauma in many mammals but has no effect on insects or crustaceans (Ushkaryov et al. 2004). Black widows *Latrodectus* spp. and the house spider *P. achaearanea* are generalist predators which predominantly feed on arthropods such as ants, beetles, and even scorpions (D'Amour et al. 1936; Nyffeler et al. 1988; Hódar & Sánchez-Piñero 2002). However, it seems quite remarkable that, considering how rare it probably is for a widow spider to subdue a mammal or other vertebrate, that there would be sufficient evolutionary pressure to generate a venom component specifically for this purpose. Their capability to additionally subdue mammals and other vertebrates broadens their diets, and this is presumed to improve the survival of these spiders (also see Nyffeler et al. 2017a,c).

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Appendix 1.—Spiders predaceous on small mammals (42 records from the field and 4 records from spiders in captivity). * Unidentified web-building spiders have been classified as theridiids based on their reported prey capture behavior. ** Indicates predation attempts (a victim inextricably entangled in a spider web was freed by human observers). Type of evidence: OE = Observational evidence; P = Photo; V = Video. Type of prey: DM = Deer mouse; H = Hamster; HM = House mouse; HR = Heteromyid rodent; ML = Mouse lemur; M = cited as "mouse"; R = Rat; S = Shrew; VO = Vole; A = ambiguous (DM or HM).

Predator taxon	Country	Type of evidence	Type of prey	Source
MYGALOMORPHAE				
Theraphosidae				
Aphonopelma chalcodes Chamberlin, 1940	USA	P	HR	Social Media[A]
Grammostola rosea (Walckenaer, 1837)	In captivity	P	S	Social Media[B]
	In captivity	V	H	Social Media[C]
Poecilotheria regalis Pocock, 1899	India	OE	R	Pocock 1899
ARANEOMORPHAE				
Agelenidae				
Tegenaria domestica (Clerck, 1757)	UK	OE	HM	Felton 1968
Ctenidae				
Phoneutria **sp.**	Brazil	OE	R	Bücherl 1971
Lycosidae				
Unspecified	In captivity	OE	M	Kaston 1965
Pisauridae				
Dolomedes fimbriatus (Clerck, 1757)	In captivity	OE	HM	Schmidt 1953, 1957
Sparassidae				
Unspecified	Australia	OE	M	McKeown 1952
	Australia	P, V	M	Whyte & Anderson 2017
Theridiidae				
*Latrodectus geometri*cus C. L. Koch, 1841	USA	V	DM	Social Media[D]
	USA	P	R	Social Media[E]
Latrodectus hasselti Thorell, 1870	Australia	V	HM	Social Media[F]
	Australia	V	HM	Social Media[G]
	Australia	V	HM	Social Media[H]
	Australia	P	HM	McKeown 1943
	Australia	P	HM	McKeown 1952
	Australia	OE	HM	McKeown 1952
	Australia	P	HM	Social Media[I]
	Australia	P	HM	Social Media[J]
	Australia	V	HM	Social Media[K]
	Australia	V	HM	Social Media[L]
	Australia	V	HM	Social Media[M]
	Australia	OE	HM	Social Media[N]
	Australia	P	HM	Social Media[O]
Latrodectus hesperus Chamberlin & Ivie, 1935	USA	OE	M	Anderson 2011
	USA	OE	M	D'Amour et al. 1936
	USA	P	M	Heyn 1940
	USA	OE	M	Social Media[P]
	USA	OE	VO	Neitzel 1965
Latrodectus mactans (Fabricius, 1775)	USA	OE	M	Blair 1934
Latrodectus sp.	USA	V	DM	Social Media[Q]
	Mexico	V	DM?	Social Media[R]
Latrodectus sp.?	USA	OE	M	Clagget 1914
	USA	OE	M	Clagget 1914
Parasteatoda tepidariorum (C. L. Koch, 1841)	USA	OE	M	McCook 1889
Parasteatoda tepidariorum?	USA	P	M	Popular Magazine[S]
Unidentified theridiids*	USA	OE	M	Popular Magazine[T]
	USA	OE	M	Popular Magazine[U]
	USA	OE	M	Popular Magazine[V]
	USA	OE	R	Popular Magazine[W]
	USA	P	A	Social Media[X]
	USA	V	DM?	Social Media[Y]
	USA	V	A	Social Media[Z]

Appendix 1.—Continued.

Predator taxon	Country	Type of evidence	Type of prey	Source
Unidentified				
Unidentified web-builder	USA	OE	S**	Saunders 1929
Unidentified (Theridiidae or Pisauridae?)	Madagascar	P	ML**	Crane & Goodman 2013

[A] https://www.flickr.com/photos/12921146@N04/3862145569
[B] https://www.sciencesource.com/CS.aspx?VP3=SearchResult&ITEMID=SS2286340
[C] https://www.youtube.com/watch?v=yanYZwO474E
[D] https://www.youtube.com/watch?v=IMWQxlwjiFo
[E] https://www.flickr.com/photos/15250800@N03/7986061905/in/photostream/
[F] https://www.youtube.com/watch?v=vMh50PRCLvI
[G] https://www.youtube.com/watch?v=rl2CngnT_sw
[H] https://www.youtube.com/watch?v=R-uC2gr97uU
[I] http://www.over50sforum.com/showthread.php?p=868784
[J] http://www.abc.net.au/news/2016-02-11/spider-vs-mouse/7158520
[K] https://www.youtube.com/watch?v=dfriTzNhuvg
[L] https://www.youtube.com/watch?v=kaUQj3NE0FQ
[M] Video posted on the 'YouTube' website https://www.youtube.com/watch?v=V4rzIClWQUE but subsequently removed.
[N] https://answers.yahoo.com/question/index?qid=20100804140057AAPZUc1
[O] http://gardenglut.blogspot.ch/2012/02/weird-scenes-inside-backshed.html
[P] http://www.mypmp.net/2015/07/01/pest-trends-brown-widow-knows-how-to-deal-with-unusual-prey/
[Q] https://www.youtube.com/watch?v=rikAI_V2y1M
[R] https://www.youtube.com/watch?v=9SVwP2vo86o
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[T] Nature Magazine Vol. 7-8, p. 58 (1926)
[U] Fancier's Journal & Poultry Exchange Vol. 3, p. 363 (August 7, 1876)
[V] Popular Science Monthly Vol. 40, pp. 575-576 (February 1892)
[W] New England Farmer Vol. 14, p. 32 (1836)
[X] http://bythedrop.com/gallery/insects/spiders/Mouse-Caught-in-Spider-Web-Ohio
[Y] https://www.youtube.com/watch?v=cBkhQh5gOqo
[Z] https://www.youtube.com/watch?v=kgT35ej1YDA