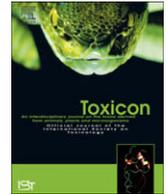




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Short communication

## Arachnids misidentified as brown recluse spiders by medical personnel and other authorities in North America

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## ABSTRACT

Misidentification of harmless or nearly benign arachnids as *Loxosceles* spiders by medical personnel and other authorities proliferates misinformation in regard to alleged loxoscelism and leads to decreased health care. This is especially true in areas of North America where *Loxosceles* spiders are rare or non-existent. A diverse assemblage of such misidentified arachnids is presented here. It is hoped that authorities will honestly assess their arachnological limitations and, instead, seek qualified arachnologists for spider identifications.

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For the last decade or so, my research has involved collecting data that can be used to counter incorrect notions regarding alleged bites by the brown recluse spider, *Loxosceles reclusa* (Family Sicariidae), and related species in North America (Vetter, 2008). Some of the misconceptions are that these medically important spiders are widespread throughout the continent, that they are common constituents of the local spider fauna and that they can be a tenable source of dermonecrotic lesions in any American state or Canadian province.

One of the components keeping these misconceptions extant is the misidentification of harmless or mostly benign spiders as *Loxosceles* spiders. Although this occurs frequently among the general public (Vetter, 2005), these misidentifications have greater gravity when made by medical personnel or other authority figures. First, and most obvious, it causes misdiagnoses of dermonecrosis where the actual etiology may have dire to fatal consequences, which are more deleterious than most

loxoscelism events could ever be. This can lead to the delayed discovery of the real affliction as well as improper and ineffective remedy (Vetter, 2008). Second, misinformation within the medical community reinforces the opportunity to misdiagnose a future dermonecrotic wound as loxoscelism. Third, misidentifications by authorities and transmission of this misinformation embolden members of the general public such that they become adamant and sometimes vehement when they confront arachnologists who offer contradictory yet more knowledgeable opinions; this prevents accurate education, further perpetuating the myth of the brown recluse spider in North America.

In addition to the data collected over more than a decade that was used for previous publications, also recorded were all arachnids that were misidentified as *Loxosceles* spiders by medical personnel and other authorities (Table 1). This data was derived from spiders submitted to the author for identification. These include a variety of categories from the most egregious (a verified biting spider misidentified by one or more physicians) to cases of lesser concern (a spider not associated with a lesion but the authority sought out a verification of identity for general knowledge). The purpose of this paper is to document the point that authorities who lack

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**Table 1**

Arachnids misidentified as brown recluse spiders by medical personnel and other authorities.

Arachnid	Spider family	State	Comment
<i>Verified bite, physician misidentification</i>			
<i>Agelenopsis aperta</i>	Agelenidae	California	3 Physicians
Immature, probably <i>Herpyllus</i> or <i>Scotophaeus</i>	Gnaphosidae	California	Bite near eye, moderate symptoms
<i>Cheiracanthium mildei</i>	Miturgidae	Pennsylvania	
<i>Verified bite, submitted to assure ID</i>			
<i>Trachela pacificus</i>	Corinnidae	California	Physician thought recluse but was unsure
<i>Patient presents with lesion and spider</i>			
<i>Agelenopsis pennsylvanica</i>	Agelenidae	West Virginia	2 Physicians
<i>Hololena nedra</i>	Agelenidae	Washington	In ear, physician identified it as recluse or hobo
<i>Eriophora ravilla</i>	Araneidae	Florida	Physician said "probably a recluse"
<i>Dysdera crocata</i>	Dysderidae	California	Physician
Immature wolf spider	Lycosidae	New Mexico	Physician
<i>Scytodes</i> sp. <sup>a</sup>	Scytodidae	Georgia	Physician
<i>Used as teaching specimens</i>			
<i>Kukulcania hibernalis</i>	Filistatidae	Texas	Used in medical school
<i>Mimetes hesperus</i>	Mimetidae	California	Used by respiratory instructor
<i>Holocnemus plucheii</i>	Pholcidae	California	Used by respiratory instructor
<i>Psilochorus</i> sp.	Pholcidae	Texas	Used in medical school
<i>General misidentification – medical person</i>			
<i>Araneus andrewsi</i>	Araneidae	California	Physician
<i>Kukulcania hibernalis</i>	Filistatidae	Georgia	Physician, saw violin on cephalothorax
<i>Kukulcania hibernalis</i>	Filistatidae	Virginia	Nurse
<i>Holocnemus plucheii</i>	Pholcidae	California	Physician, 2 spiders
<i>Other authorities</i>			
<i>Amaurobius ferox</i>	Amaurobiidae	Michigan	Veterinarian, 3 county health officials
<i>Amaurobius ferox</i>	Amaurobiidae	Ohio	Pest control operator
<i>Kukulcania arizonica</i>	Filistatidae	California	Pest control operator
<i>Kukulcania hibernalis</i>	Filistatidae	Alabama	Pest control operator, 7 spiders
<i>Mimetes puritanus</i>	Mimetidae	New Jersey	Dept. of Health field specialist
<i>Spermophora senoculata</i>	Pholcidae	Washington	Entomologist, 2 spiders
<i>Scytodes</i> sp. <sup>a</sup>	Scytodidae	Georgia	Pest control operator
<i>Selenops</i> sp.	Selenopidae	Florida	Home inspector, mold inspector
<i>Titiotus shantzi</i>	Tengellidae	California	University biologist
<i>Titiotus tahoe</i>	Tengellidae	California	Entomologist
<i>Steatoda triangulosa</i>	Theridiidae	California	Pest control operator
Solpugid (order Solifugae)		California	Pest control operator

<sup>a</sup> Same spider misidentified by physician and pest control operator.

sufficient arachnological skills, nonetheless, feel confident enough that they present misinformation to their patients or clients. This presents a real danger because the word of a physician, entomologist or a pest control operator carries great weight in patients' or clients' eyes, whereupon, they may take drastic and reckless remedies (medical and/or insecticidal) to incorrectly eliminate a perceived threat where the cure may be more dangerous than the disease, the latter of which then can proliferate unabated. The hope is that by documenting these misidentifications by authorities, it will give those with true arachnological skills a better position from which to convince others when challenged. This information is presented here not as negative admonishment but in a positive way might convince authority figures to more honestly question their spider identification skills and instead, seek out an arachnologist for an accurate assessment instead of inadvertently disseminating misinformation and contributing to negative health consequences.

As listed in Table 1, there were 38 arachnids misidentified as *Loxosceles* spiders by 35 authorities including 16 physicians and 7 other personnel with medical or health services training. The spiders belong to 18 genera from 15

taxonomically distinct families originating from 13 American states and the District of Columbia. There are no unifying physical features as the misidentified spiders vary divergently in coloration, eye arrangements and body shape. Of the 37 spiders, 32 had eight eyes; *Loxosceles* spiders have six eyes in pairs. This six-eye pattern is the best diagnostic trait for identification, in comparison to the frequently referenced violin marking on the cephalothorax (Vetter, 1999). Also one solifuge was submitted; solifuges are not even spiders, belonging instead to a separate arachnid Order (Solifugae). Eleven misidentifications (seven from one incident) occurred in Alabama, Georgia, and Texas (Table 1), i.e., states that have populations of *L. reclusa* (Vetter, 2008; Vetter et al., 2009). There are additional widespread *Loxosceles* species in the desert regions of California (*Loxosceles deserta*) and New Mexico (*Loxosceles apachea*), however, only two of the 13 California specimens came from areas where *L. deserta* is known to exist, the rest being from coastal California which lacks *Loxosceles* populations.

Some of the more noteworthy misidentifications are expanded upon further here to indicate the level of authority involved and the consequences that occurred

from the event. Of the verified bites with physician misidentification leading to misdiagnosis, the case with *Agelenopsis aperta* was published previously (Vetter, 1998), involved three physicians and led to unwarranted anxiety in the victim's parents who staged an all-night vigil to watch their sleeping son. The case with the immature gnaphosid spider resulted in a bite near the eye that led to temporary paralysis of eye musculature; the doctor identified the spider as "some kind of brown recluse".

In other cases, patients presenting with dermonecrosis simultaneously submitted a spider collected near the presumed envenomation locale but it was not actually involved in a verified bite; in most cases, the spider was submitted to authenticate *Loxosceles* identity and justify a loxoscelism diagnosis. In the case with *Hololena nedra*, the spider was removed from a patient's ear and the physician identified it as a "brown recluse or a hobo spider", further highlighting the rudimentary arachnological skills possessed by some physicians; recluse and hobo spiders are very dissimilar in appearance.

In two cases, four spiders were used as brown recluse teaching aids for medical students; in the episode with *Kukulcania hibernalis* and *Psilochorus* sp., these specimens were submitted from a Texas medical school (along with five *Loxosceles* specimens), indicating that physicians were getting misinformation during their initial training. The other case involved a California respiratory instructor who taught emergency medical technicians.

In incidents involving non-medical authorities, misidentifications were made by pest control operators ( $N = 6$ ) and entomologists or biologists ( $N = 3$ ). In Michigan, a veterinarian and three county health officials misidentified the same specimen of *Amaurobius ferox*. From Georgia, a communication to a co-author contradicted our data regarding the brown recluse distribution in the state (Vetter et al., 2009). Empowered by misidentifications by his physician and pest control operator, he emphatically stated that the "spider was clearly, surely, and definitely without a doubt a brown recluse. There was no question about it." It was actually a spitting spider, *Scytodes* sp. The tiny pholcid *Spermophora senoculata* (2 mm body length when mature) was misidentified by a highly competent entomologist as immature *Loxosceles* spiders due to the fact that they had six eyes, albeit in triads (two pairs of three eyes) not dyads; he erroneously deducted that the eyes

migrated from a triad to dyad arrangement as the spider matured. This underscores that even highly trained entomologists can make missteps in identification; spiders constitute a minor segment of entomology and, hence, spider taxonomy is justifiably not taught in depth in entomology courses in North America.

The general public looks to figures of authority in medicine, entomology and pest control for accurate information regarding medically important spiders. When harmless or almost benign spiders are misidentified as *Loxosceles* spiders by these authorities, in most cases, the implications are minor but consequences involving misdiagnoses of possibly lethal medical conditions could be grave. Some of the misdiagnosed conditions of loxoscelism include cancer, Lyme borreliosis, and infections of methicillin-resistant *Staphylococcus aureus* and group A *Streptococcus* (Vetter, 2008). Understandably, arachnologists are few in number and finding one quickly to make a spider identification may be difficult. Nonetheless, it would seem that considering the mistakes made by medical and other trained personnel involving a diverse number of disparately appearing spiders, that it would still be better to make the effort to contact an arachnologist than to make a hasty misidentification that could lead to dire clinical results or unnecessary psychological trauma.

### Conflicts of interest

The author declares that there are no conflicts of interest.

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