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Seasonality of brown recluse populations is reflected by numbers of brown recluse envenomations

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Abstract

A significant seasonal correlation was recently shown for brown recluse spider activity. Vetter (2011) observed brown recluse spiders were submitted by the general public predominantly during April–October. For patients with suspected brown recluse spider bites (BRSB), we have observed the same seasonality. Among 45 cases with features consistent of a BRSB, 43 (95.6%) occurred during April–October. Both the Vetter study and our study serve to demonstrate seasonal activity for brown recluse spiders.

Keywords

Seasonality; brown recluse spiders; loxosceles; spider bite; diagnosis

Physicians evaluating the possibility of a bite by the brown recluse spider *Loxosceles reclusa* as the cause of a local wound are advised to consider the seasonality of this spider as reported by Vetter (2011). In the rural Midwest, patients often believe that they have experienced a brown recluse spider bite, but only a minority of these fulfill the historical criteria for a probable or documented brown recluse spider bite (BRSB) (Sams et al., 2001).

We have modified the original Sams criteria to give weight to known geographical habitats of brown recluse spiders. Geographical location should be taken into consideration when a BRSB is suspected, as there have been reports of physicians misdiagnosing BRSBs in areas where *L. reclusa* is not known to be endemic (Vetter and Bush, 2002). The exam features, mentioned in these criteria below, that are indicative of a BRSB (positive exam features) and indicative of an alternative diagnosis (negative exam features) are listed in Table 1.

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Conflict of Interest Statement: Dr. Stoecker has a patent in ELISA detection of brown recluse spider venom.

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This revised four level classification of spider bite probability follows:

Putative: Patient with subjective diagnosis, geographic location of putative bite outside known brown recluse spider habitat, lesion lacks features typical of brown recluse spider bites (positive exam features).

Presumptive: Geographic location of putative bite within known brown recluse spider habitat, lesion has one or more positive exam features.

Probable: Geographic location of putative bite within known brown recluse spider habitat, lesion has one or more positive exam features and no features indicative of an alternative diagnosis (negative exam features).

Documented: Lesion fulfills at least one positive exam feature, brown recluse spider captured in vicinity and identified by arachnologist.

Data on patients with possible brown recluse envenomations were collected from five clinical sites. Data were collected from 2002 to 2011 from the Dermatology Center and Phelps County Regional Medical Center, Rolla, Missouri (N = 86); from 2010 to 2011 from the Oklahoma Physicians Resource / Research Network, Oklahoma City, Oklahoma (N = 16), in 2011 from the Department of Dermatology, University of Missouri Hospitals and Clinics, Columbia, Missouri (N = 12) and from 2009 to 2011 from the Texas County Memorial Hospital, Houston, Texas (N = 2). Patients were enrolled if the patient or a physician believed that a lesion was caused by a BRSB. Photographs and clinical information were collected according to a protocol approved by the Institutional Review Board, Phelps County Regional Medical Center in accordance with the Belmont Report. From a total of 116 putative BRSB cases studied, 38 met the criteria for a probable BRSB and 7 met the criteria for a documented BRSB. From these data, we extracted the month of the reported envenomation, Figure 1 (brown recluse spider bites, dashed line).

The seasonality data collected by Vetter counted the number of brown recluse spider submissions by the general public over a five-year period after a listing on the Department of Entomology website at the University of California Riverside and the University of Georgia. By the end of the study, 382 recluse submissions were recorded. The month of brown recluse spider submission is shown in Figure 1 (spiders collected, solid line). For both brown recluse bites and brown recluse spiders collected, the date shown is the date the patient appeared in the clinic or the spider was received by Vetter. In both cases there was a delay, most often less than a week, between spider shipment and spider arrival, and a similar delay between spider bite and presentation in the clinic. No adjustment was made for these delays, as these were significantly less than one month.

Of the 45 BRSBs ranked probable or documented on the scale presented here, modified from the scale of Sams et al. (2001), 43 (95.6%) occurred during the months of April through October (Fig.1). Only 4.4% of BRSB occurred during the months of November through March. This graph also shows the close correlation between the number of BRSB and the number of brown recluse spiders collected and submitted for identification. Totals seen in Figure 1 support seasonality of brown recluse activity. Almost no recluse spider activity was seen from November through March. The graphs also imply spring and late summer peaks in activity, with a drop in early summer—a pattern that reflects the percentage of recluse females mating observed by Hite (1966). These additional lines of evidence—mating activity observed by Hite and numbers of probable or documented recluse bites, all serve to support Vetter's brown recluse seasonality observation. Physicians postulating the brown recluse spider as etiology for wounds observed in months other than the April–October spider bite season are urged to consider other causes.

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Figure 1.
Monthly Totals for Brown Recluse Spiders Collected and Brown Recluse Spider Bites

Table 1

Positive and Negative Examination Features for Evaluation of Possible Brown Recluse Envenomations

POSITIVE EXAM FEATURES	NEGATIVE EXAM FEATURES
<p>Lesion has small central blister without pus</p> <p>Pale area in center of the lesion</p> <p>Purpura /bruising</p> <p>Purpura spread in a direction consistent with gravity (gravitational spread)</p> <p>Outer part of lesion is red and either pale area in center or purpura is present</p> <p>Central pale area with some surrounding purpura; outer part of lesion is red (red, white, and blue sign)</p>	<p>Pus observed in lesion</p> <p>Center raised and red</p> <p>Drainage present before one week *</p> <p>Tender enlarged lymph node present †</p> <p>Ulcer present before one week</p> <p>Ulcer > 10 cm in diameter or more than 0.5 cm deep</p> <p>More than 2 separate lesions</p> <p>Lesion present more than 3 months</p>

* Ignore this negative feature for some body sites: periorbital region, hands, feet

† denopathy is observed in approximately 1% of brown recluse spider bite cases.