

# HYPERBOLE AND HYSTERIA ON THE PATH TO ENLIGHTENMENT - A REVIEW OF CURRENT TEGENARIA PROJECTS OF RELEVANCE TO CANADIAN ARACHNOLOGISTS

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**Note: Rick Vetter (UC Riverside) is primary lead for much of the “*Tegenaria* effort” in North America. His work has resulted in a recent manuscript submission to *Journal of Medical Entomology* (see Vetter *et al.* in References) and some information presented below comes from that presently unpublished manuscript.**

Three non-native species of *Tegenaria* funnel-web weaving spiders are known to be established in North America, especially the Pacific Northwest (here taken to include British Columbia as well as the states of Washington, Oregon, Idaho, and Montana). *Tegenaria domestica* (Clerck) is a cosmopolitan synanthrope widespread in North America. *Tegenaria duellica* Simon (colloquially called the “giant house spider”) is common from the Georgia Lowlands of southwestern BC south through the Puget Trough and Willamette Valley regions. The probably unjustifiably dreaded “hobo spider,” *T. agrestis* (Walckenaer) has a coastal distribution similar to that of *T. duellica* but also has successfully invaded most of the rest of the Pacific Northwest.

Because of the facts that

- *T. agrestis* MAY be medically important,
  - *T. duellica* is often a very BIG spider,
  - both species are common in and around homes and disturbed habitats in areas of the Pacific Northwest, and
  - both have become successful and highly visible invasive species,
- a good deal of *Tegenaria* mythology, hyperbole, and hysteria has arisen in the region. In an effort to rectify this situation, various research projects are currently examining aspects of the biology of the North American populations of *T. duellica* and *T. agrestis*. Following is a summary of recent work on these two species.

## BACKGROUND

**Taxonomic note.** Confusion exists concerning the correct name for North American specimens of *T. duellica*. Some publications refer to these as *T. gigantea* Chamberlin & Ivie (e.g. Crawford & Vest 1989, Leech and Steiner 1992, Buckle and Randell 1995), others as *T. saeva* Blackwall (e.g. Roth 1968). However, the former is a junior synonym of *T. duellica* (Brignoli 1978, Platnick 1993 & 2002). *Tegenaria saeva* and *T. duellica* are very similar morphologically and easily confused. Both are reported to occur in western North America. All North American specimens of *duellica/saeva* morphology examined critically by myself agree with the published descriptions of *T. duellica*. It is my working opinion that *T. saeva* does not occur in western North America.

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Both *T. agrestis* and *T. duellica* likely were introduced into the Puget Trough / Georgia Lowlands area in the first quarter of the 20<sup>th</sup> Century or earlier. The former was first recorded in North America in the Seattle area in the 1930's (Exline 1936). The latter showed up somewhat earlier on southern Vancouver Island. Both expanded their Pacific Northwest ranges considerably through the last century, apparently with *T. duellica* more common in coastal locations and *T. agrestis* dominating the interior. Anecdotal evidence suggests that, where the two species are sympatric, *T. duellica* "out-competes" *T. agrestis* although the nature of their relationship is unclear.

As with most dictynoid/amaurobioid spiders, these species mature, mate, and lay eggs in late summer and early fall. Males are rarely found at other times of the year but females and a range of sizes of immature specimens can be found year round, at least on the south coast of BC. This suggests that both species take at least two years to reach maturity.

North American specimens of *T. agrestis* popularly are considered to be medically important; *T. duellica* is believed to be harmless. During the last half of the 20<sup>th</sup> Century, medical professionals began to blame cases of presumed "necrotic arachnidism" in North America on the brown recluse spider, *Loxosceles reclusa* Gertsch & Mulaik. This happened first in the United States (Atkins *et al.* 1957) where *L. reclusa* is native and later in Canada (Baldwin *et al.* 1988) where no population of *L. reclusa* is known to exist and no specimen has ever been collected. In spite of this, some medical and media professionals (and even some biologists) cling to the belief that *L. reclusa* is common in Canada and in parts of the United States where this spider is not known to occur (e.g. see Rose *et al.* 2001, Roche *et al.* 2001). However, in the Pacific Northwest, blame for "necrotic arachnidism" has gradually been shifted to *T. agrestis* (Vest 1987a, 1989, Akre & Myrhe 1991) although the evidence for its guilt is questionable at best.

*Tegenaria* spiders are difficult to identify without experience. Many of the +120 described species (including all three introduced species in North America) are generally similar looking, medium-sized brownish spiders. Species diagnostic characteristics are not discernable without magnification. In addition, a variety of other common North American spiders (e.g. other agelenids, various lycosids and amaurobiids, and even thomisids, salticids, and araneoids) are often misidentified as *Tegenaria*, especially *T. agrestis*. In the Pacific Northwest, both *T. duellica* and *T. domestica* are commonly misidentified as *T. agrestis*.

Although there is a general trend from larger to smaller size and from contrasting to dull patterning from *T. duellica* through *T. agrestis* to *T. domestica*, individuals of all three species show considerable variability of coloration, patterning and especially size. Identification of *Tegenaria* species is reliably accomplished only through microscopic examination of genitalic characters.

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## UPCOMING MEETINGS

June 25-29, 2002: The 26th annual meeting of the American Arachnological Society at the University of California, Riverside hosted by Rick Vetter. Registration deadline is May 15, 2002. Visit [http://www.americanarachnology.org/AAS\\_2002/AAS\\_meetings.html](http://www.americanarachnology.org/AAS_2002/AAS_meetings.html) for more information.

July 22-26, 2002: 20th European Colloquium of Arachnology in Szombathely, Hungary. Registration and abstract submission deadlines is May 24. Visit <http://www.julia-nki.hu/arachnol.html> for more information.

October 6-9, 2002: Joint meeting of the Entomological Society of Canada and the Entomological Society of Manitoba in Winnipeg, Manitoba. Visit the Entomological Society of Canada homepage for updates: <http://esc-sec.org/>

## CURRENT RESEARCH

### **On the medical importance of *Tegenaria agrestis***

Vest (1987b) first suggested a link between necrotic arachnidism and *T. agrestis*. Based on his work, hobo spider necrotic arachnidism has joined loxoscelism as a popular default medical diagnosis for dermonecrotic lesions (see Vetter 2000, 2001). However, recent work (Binford 2001) has called Vest's conclusions into question. Noting that *T. agrestis* is considered harmless within its native range, Binford summarized four possible reasons for the apparent medical importance of this spider in North America: our populations may

- have evolved new venom components
- be behaviourally more likely to encounter humans
- have some unique microbial necrotizing factor associated with their venom or mouthparts, or
- have been falsely accused.

The first paper published by her addressing these possibilities (Binford 2001) demonstrated that

- there is no significant difference between the venoms of European and North American specimens of *T. agrestis*,
- venom or mouthpart associated microbes are unlikely to be causing necrosis associated with spider bites, and
- there is no solid evidence that *T. agrestis* is likely to bite or that its bite can cause necrotic lesions (i.e. it seems likely that *T. agrestis* is innocent).

Binford is continuing her research.

### **On the distribution and abundance of *T. duellica* and *T. agrestis***

The North American distribution and abundance of *T. agrestis* and *T. duellica* are not well known. Roth's (1968) range maps are outdated and most recent publications list only broad state or regional occurrences (e.g. Baird & Akre 1993) and of *T. agrestis* only. To address this issue Rick Vetter lead a study encompassing BC, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming to map the ranges and determine the relative abundance of both spiders in North America. Nearly 2,000 specimens of *Tegenaria* were examined during the field seasons of 1999-2001. A manuscript describing this work (see Vetter *et al.* in References) has been submitted for peer review and a version of the results (Bennett 2001) has been presented at entomology meetings in 2001 and 2002 in BC. Following is a summary of the Vetter *et al.* results. NOTE: Data collection was *ad hoc* in nature and the results cannot be interpreted as a completely accurate reflection of the true distribution and abundance of hobo and giant house spiders in North America. Vetter *et al.* did the best they could with volunteer participants and limited funds.

***Tegenaria duellica.*** *Tegenaria duellica* is mostly restricted to the Georgia Lowlands / Puget Trough area west of the Coastal (BC) and Cascade (US) mountain ranges from south coastal BC to mid-coastal Oregon. Isolated outlier populations are found in towns across southern BC and in Edmonton (Leech & Steiner 1992) and Lethbridge AB (Dan Johnson and Robb Bennett *pers. obs.*) and in Saskatoon SK (Buckle & Randell 1995). Although at least on the BC south coast *T. duellica* may be very common around beaches and other open, natural areas, populations in the BC interior are apparently always isolated and synanthropic. For example, *T. duellica* is common in the Okanagan Valley towns of Penticton and Kelowna BC but has never been found in extensive pitfall trapping and other collecting in natural habitats in that general area (*pers. obs.*, Blades & Maier 1996, Geoff Scudder *pers. comm.*).

***Tegenaria agrestis.*** In the Pacific Northwest, *Tegenaria agrestis* is much more widespread than *T. duellica*. It is found from southern BC east to central Montana and western Wyoming and south to southern Oregon and northern Utah. Two very isolated synanthropic populations are now known from northern Colorado. A couple of singleton specimens were recovered in Nevada. None were found in California. Recently, a single female was collected in Edmonton AB (Robin Leech *pers. comm.*).

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**Relative abundance.** Fully  $\frac{3}{4}$  of all specimens of *Teegenaria* collected by Vetter *et al.* were *T. agrestis*. The majority of these came from east of the Cascades and Coastal mountain ranges where *T. duellica* is rare (southern BC) or apparently absent (US). Where the two species co-occur in major urban areas west of the Cascades/Coastal ranges, *T. duellica* is usually more abundant. For instance, *T. duellica* comprised 57, 77, 70, and 71% of specimens captured in Victoria BC, Bellingham and Tacoma WA, and Salem OR respectively ( $N \geq 35$  at each locality). In Pacific Northwest coastal areas, *T. agrestis* tends to be rare but locally common. This supports the notion that *T. duellica* may edge out *T. agrestis* where they are sympatric. Or perhaps they get along just fine and *T. duellica* is simply more fecund.

### Life history and species interactions

In North America, populations of *T. duellica* and *T. agrestis* are primarily synanthropic. However, in the Georgia Lowlands of south coastal BC, populations of *T. duellica* are commonly encountered in reasonably “natural” settings. Open marine beaches and shorefronts often support large numbers of this species as may openings in the dry Douglas-fir forests and Garry oak meadows of the area. At such sites, *T. duellica* typically occurs underneath or on the underside of objects. At beaches, driftwood above the high tide line is a normal habitat; in the woods, rocks and loose bark on logs often harbour specimens.

Recently I discovered strong populations of both *T. duellica* and *T. agrestis* co-occurring near Victoria BC at Island View Beach, an extensive shallow sandy beach backed by low dunes and abandoned marshy farm fields. The dunes are heavily impacted and stabilized by invasive plants (especially grasses, broom (*Cytisus scoparius*), and woody Rosaceae), ditching, diking, and human recreational activities. However, some areas of old open sandy dunes persist in the backshore. Old driftwood in these areas supports large numbers of *T. agrestis* (Fig. 1A), *T. duellica* (Fig. 1B), and other interesting (native) spiders including the lycosid *Alopecosa kochii* (Keyserling) and the western black widow *Latrodectus hesperus* Chamberlin & Ivie. Often a single piece of driftwood will support an apparently interconnected network of webs of widows and both species of *Teegenaria*. I have even collected an apparently happy and healthy male *T. agrestis* from within the web of a large female *T. duellica*.

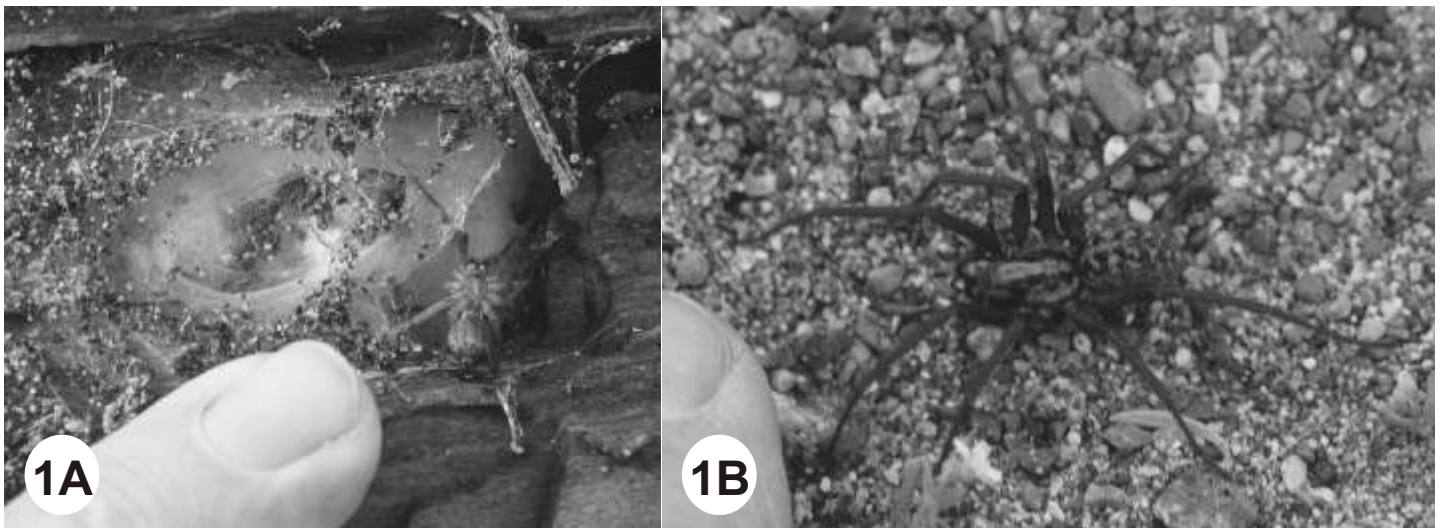


Fig. 1A. The “dreaded” hobo spider in its lair on the underside of rotting driftwood. At Island View Beach, adult female *T. agrestis* are smaller than sympatric *T. duellica* females, yellowish-brown, lack sternal spots, and have dark markings only on coxae IV.  
1B. Female *T. duellica* recovering at the beach after being rudely awakened from a mid-winter nap and ripped from its web. At Island View Beach, adult female *T. duellica* are larger than sympatric *T. agrestis* females, greyish with strongly contrasting abdominal patterning, have 3 pairs of distinctive pale sternal spots, and paired dark markings ventrally on all coxae.

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To take advantage of this site and the possibly unique araneologically interesting things happening in it, I am hoping to produce a long-term study of the life histories and ecological interactions of its *Tegenaria* inhabitants. This may provide insight into why these spiders are such successful invaders, how they interact with each other, and how they affect the native spider fauna. Organized work started this past winter (2002) and is summarized below.

Under permit with the major property controller (Capital Regional District Parks), Richard Ring (University of Victoria) and I supervised student Jesse Senecal on a one term "Directed Studies" examination of the life histories of *T. duellica* and *T. agrestis* at Island View Beach. During 4 days in late February and early March, she collected egg cases and observed and measured carapace widths of over 100 juvenile and adult female specimens of *T. duellica* and *T. agrestis*. Of interest are the following results:

- numbers of adult females were similar for both species (*T. duellica* - 6, *T. agrestis* - 9, species determined by genitalic characters) but there were 7 times as many juveniles of *T. duellica* as *T. agrestis*.
- there was no overlap in size of adults *T. duellica* females ranged from 4.25-5.0 mm, *T. agrestis* from 3.0-3.5 mm.
- there was no overlap in patterning and colouration of adults. All female *T. duellica* were greyish with strongly contrasting dorsal abdominal markings and distinct light sternal spots and paired dark marks ventrally on all coxae (Fig. 5A). All female *T. agrestis* were yellowish brown with dark relatively unmarked abdomens, no sternal spots, and ventral coxal markings only on coxae IV (Fig. 5B).

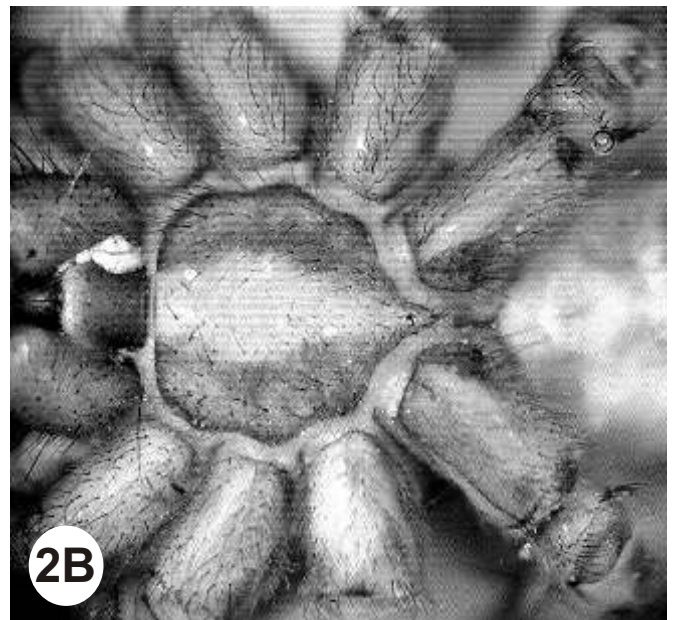
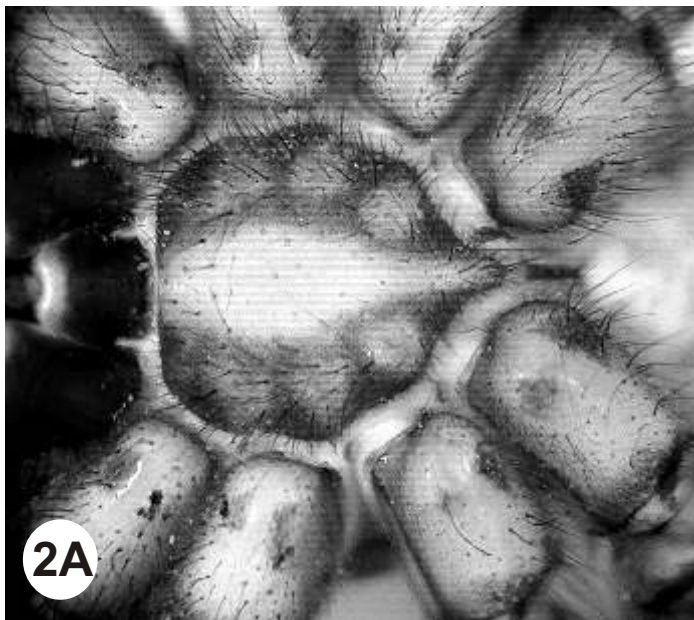


Fig. 2A. At Island View Beach, adult female (and most juvenile) *T. duellica* have three pairs of well-defined pale spots in the longitudinal sternal marks and paired dark marks ventrally on all coxae. At other localities these markings may be highly variable and often are like those of *T. agrestis*.

2B. At Island View Beach, adult female (and most juvenile) *T. agrestis* have longitudinally marked but unspotted sternum and a dark mark on the "upper inner thigh" region of coxae IV. Although at other localities these markings may be highly variable and unreliable for species identification, adult *T. agrestis* never have distinctive paired pale sternal spots.

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- Most juvenile *T. agrestis* and *T. duellica* appear to have the same sternal and coxal markings as adults. All but 6 of 96 juveniles could easily be assigned to one group of the other.
- lab-reared juveniles just emerging from egg-cases lack the distinguishing somatic characters.
- “wild” juvenile *T. duellica* ranged in size from 0.75 to 3.25 mm, *T. agrestis* from 1.25 to 2.5 mm. Neither showed clear distinctions between size classes.

From these results the following conclusions may be drawn:

- although size and somatic characters are variable and may overlap across the North American ranges of these two species, at Island View Beach apparently all females and most juveniles can be eye-balled to species by a combination of size and colouration (adults) and abdominal, sternal, and coxal patterning (both adults and juveniles).
- wide size range and indistinct size classes of juveniles could be due to differential growth rates of individuals between or within egg cases and/or an extended period of egg case production by females and of hatching of eggs.
- lack of very small *T. agrestis* juveniles suggests that *T. agrestis* eggs laid in the fall had not yet begun to hatch.
- it appears both species may take at least two years to reach maturity at this site but, because of the overlap of size classes, we could not determine how many juvenile instars are present during the late winter period.
- at this snap-shot point, it seems that both species are doing well together (although perhaps one or the other are recent beach-goers and we have stepped into the scene at an early stage of their “interaction”).

Looking towards the future, Senecal currently is rearing *T. duellica* hatchlings. She hopes to get a better handle on growth rates of siblings and non-siblings, number of instars to maturity, other life history data, and confirmation of diagnostic characters for identification of juveniles. She would also like to study the longer-term ecological relationships between the two species and between them and native spiders at Island View Beach. This has great potential for graduate work and she will be in the market this fall.

#### Finally, taxonomic studies

Although at individual sites it may be possible with experience to eye-ball identify species of *Tegenaria*, the only consistently accurate way to identify them continues to be microscopic examination of male and female genitalic characters. Roth's revision (1968) is dated, long out of print, and hard to come by but Rick Vetter (*pers. comm.*) is close to completing a guide to synanthropic *Tegenaria* geared towards pest control specialists and other non-arachnologists. This will feature high-resolution digital images of genitalic and other characters and likely will be available in both print and electronic formats. In addition, I am working towards publication of a more “traditional” review of the taxonomy of *T. domestica*, *T. agrestis*, and *T. duellica*. I have some images done but much work remains and, if my record with publishing cybaeid taxonomy is anything to go by, it may be some time before this review will see printers ink. Oh well.

#### IN CONCLUSION

Probably because *T. duellica* is big, *T. agrestis* has gained a nasty reputation, and both are common around homes in the Pacific Northwest, much public and considerable professional mythology and misinformation has arisen around these two species. Current research on a number of fronts should help to rectify this problem. However it is becoming apparent that *T. agrestis* probably is not the bad actor it is supposed to be. The real reasons to be interested in these spiders are that they are

- quite nifty in their own right,
- highly successful alien invasive species,
- easy to find and work with, and
- as such, truly wonderful tools to aid in understanding the biology of invasive species and what governs the distribution and abundance of animals.

Coming soon to a trash heap, woodpile, old garage, or vacant lot near you. Just add money and study.

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