Calymmaria emertoni (Simon) (Arachnida, Araneida, Agelenidae), a cave twilight spider: troglophile status, range extension, and natural history

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Species of the Nearctic spider genus *Calymmaria* (Agelenidae[1], funnel weavers) are often troglophilic. Seven of 31 currently described species are recorded from caves[2]. All records of *Calymmaria farallon* Heiss & Draney are from caves[2], and *C. persica* (Hentz) (= *cavicola* Banks) is a well-known troglophile of Eastern USA that in Indiana[3] and Ohio[2] is likewise known only from caves. But no published records document cave occurrence for *C. emertoni* (Simon).

In a 1983 cave fauna inventory in the Cave Basalt, Mount St. Helens, Washington[5], I found *C. emertoni* (a 7 mm long brown spider with thin legs) in 14 of 23 caves surveyed, and in 18 of 42 cave entrances searched for spiders. Webs were nearly always on the ceiling or under wall ledges; a few were in wall irregularities, and one was under a rock on the cave floor. Most were in the first 3 m of their respective caves, but a few specimens and webs were up to 20 m inside. The species was second only to *Pimoa altioculata* (Keyserling) (Araneida: Pimoidae) as the dominant cave twilight spider in that area. It likely plays a significant role as a predator of trogloxene flies and other shallow twilight fauna. The species is far from cave-limited in Washington, but is never as easy to find in surface situations as in caves. Both adults and juveniles were common throughout both spring and fall sampling seasons, so the life cycle may be non-seasonal or two-year.

The previously undescribed web of *C. emertoni* is typical of those described[2,7] for other *Calymmaria*, and similar to *C. persica* webs I saw in Kentucky and Tennessee caves. A silken cup or inverted cone 7.5-13 cm in diameter hangs from the cave ceiling. The spider hangs inverted from a smaller platform closer to the ceiling, ready to descend into the main web below in response to prey vibrations. Water drip from rainwater seepage is sometimes heavy in entrance areas of these caves. My partner Clyde Senger and I observed such drip water accumulating in the cups of many *Calymmaria* webs; whether this water aids or impedes spider survival is unknown.

In addition to the basaltic caves at Mount St. Helens, I found *C. emertoni* in 5 small caves of diverse types in northwestern Washington: 3 talus caves (2

sandstone, 1 phyllite), 1 landlocked former sea cave, and 1 limestone solution cave (Fig. 1). Most of these spiders were in situations like those described above, but one was in the dark zone. A female taken in March had an irregular egg sac, 5 mm in diameter, with some prey remains (Diptera: Nematocera) incorporated.

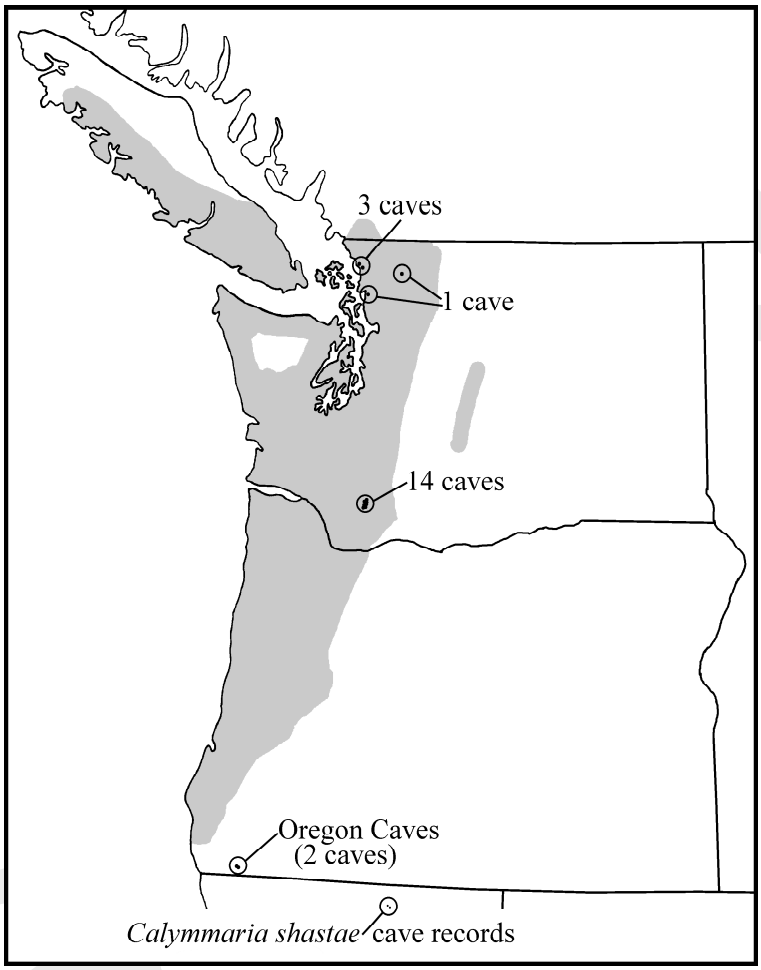

Figure 1. Pacific Northwest showing known distribution[1,2,4] of *Calymmaria emertoni* (Simon) (shaded) and cave record locations for that species and *C. shastae* Chamberlin & Ivie.

The distribution of *C. emertoni* includes most of Vancouver Island, leading cave area of British Columbia (Fig. 1). Although spiders (list unpublished) were included in a recent cave invertebrate survey[6] there, surprisingly no *C. emertoni* were taken (P. Shaw, pers. comm.).

Based on data from the Burke Museum spider collection, *C. emertoni* is chiefly a low elevation spider, but specimens exist from elevations up to 1380 m. There are no records from the higher, central parts of the Cascade or Olympic ranges, but two unpublished records from the east slope of the Cascades (Fig. 1, separate shaded area) in Washington constitute a range extension. My southernmost cave records, in Oregon Caves National Monument, are also a

range extension (Fig. 1) and may be near the actual southern limit of the spider's range. In September 1992, I found the species in two entrances of Oregon Cave and in the much smaller Mushroom Cave, in typical situations. One female *Calymmaria* in Mushroom Cave was preying on a large trogloxenic harvestman, *Nelima paessleri* (Roewer).

Not far south of Oregon Cave, in Lava Beds National Monument, I found the *C. emertoni* niche (cave twilight ceilings) occupied by *Calymmaria shastae* Chamberlin & Ivie in 1989 (Fig. 1); the species was found there again in 2005[7]. The troglophile habit is not universal in *Calymmaria*; *C. nana* (Simon), which has a very similar range[2] to *C. emertoni* and is significantly more common in collections, has never been found in a cave.

All specimens supporting previously unpublished records in this paper are in the spider and cave fauna collections of the Burke Museum, University of Washington.

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