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OCCURRENCE OF INTRADERMAL MITE, HANNEMANIA SP. (ACARINA: TROMBICULIDAE), PARASITES IN TWO SPECIES OF AMPHIBIANS IN VIRGINIA-Chiggers, or trombiculid mites, are ectoparasites of a wide array of vertebrates, including amphibians and reptiles. Common ectoparasites apparently restricted to frogs and salamanders are species of the trombiculid mite genus Hannemania (Loomis, 1956). Host integument tissue is invaded by the larvae of this genus where they insert their mouthparts into the skin and form small red pustules that are visible to the naked eye. Reported amphibian hosts include species in the frog genera Bufo, Gastrophryne, Hyla, Pseudacris, Rana, and Scaphiopus and the salamander genera Ambystoma, Desmognathus, Eurycea, and Plethodon (Regester, 2001). Hannemania parasites have been reported from Rana catesbeiana, R. clamitans, R. palustris, and R. sphenocephala from North Carolina (Brandt, 1936; Murphy, 1965), Rankin (1937) reported chiggers on Ambystoma maculatum, A. opacum, Eurycea guttolineata, and Plethodon glutinosus from North Carolina. The only report of chiggers on amphibians from Virginia is by Loomis (1956), who reported Rana clamitans and R. palustris as hosts. This paper reports recent observations of Hannemania sp. parasitism on one salamander species and a frog from two locations in Virginia.

A juvenile (47 mm SVL) Rana palustris (pickerel frog) with chiggers was found in a spring box on 4 October 2003 at the Chancellorsville Battlefield, 12.6 km W Fredericksburg, in the Fredericksburg/ Spotsylvania National Military Park, Spotsylvania County, Virginia by Will Brown and Lenny Leta. Dissection of one red pustule revealed a larval chigger inside. In total, 13 chiggers occurred on the inside of the right thigh, eight in the inside of the left thigh, and four on the rear thigh near the cloaca. Two other juvenile R. palustris were captured, as well as a juvenile Rana clamitans and three Pseudotriton ruber larvae. None of these specimens had chiggers. Amphibian specimens were donated to the National Park Service (Shenandoah National Park. Herpetological Collection). Murphy (1965) reported a prevalence of 78% in a sample of 201 R. palustris from North Carolina. McAllister et al. (1995) reported chigger mites on pickerel frogs from Arkansas. Loomis (1956) had previously reported Hannemania dunni larvae in this frog from Virginia but did not note a specific locality. The occurrence of this parasite in Spotsylvania County forms the second report of chigger mites on Rana palustris from Virginia.

On 15 August 2002 and 10 September 2003, C. Todd Georgel found single individuals of Eurycea cirrigera (southern two-lined salamander) with red pustules identical to those observed in the Rana palustris likely containing Hannemania sp. in Fort Lee, Prince George County, Virginia. The former was a juvenile (29 mm SVL, 32 mm tail length) caught under a rock in a tributary leading to Bailey's Creek with at least nine red pustules. They were located as follows: one on the right neck, one on the right lateral side behind the right forelimb, one on the left upper arm, one just anterior to the right rear limb insertion, two above the right limb insertion, two on the right foot, and one on the distal third of the tail. On the latter date he caught a male salamander (37 mm SVL, 42 mm tail length) under a log in the Bailey's Creek watershed in mixed hardwood forest with a total of eight chigger mites. These occurred as follows: one on each forearm. one 1 mm anterior of the left forearm on the neck, one on the posterior surface of the right thigh, one inside the right thigh, two near the right knee, one on the left forefoot, and one on the base of the tail 3 mm posterior to the right rear leg. Both specimens were released. Hannemania parasitism has only been reported previously for *E. cirrigera* in Tennessee by Regester (2001). He found a prevalence of 48.7% infestation (1-24 per individual) in a sample of 158 salamanders. The Virginia observations expand the known geographic range of chigger mite parasitism in the Southern Twolined Salamander.

Rankin (1937) suggested that *Hannemania* parasitism in amphibians was limited to those species that used terrestrial habitats for long periods of time. Both *Eurycea cirrigera* and *Rana palustris* occur frequently in leaf litter and under surface objects well away from water (Conant & Collins, 1998; Petranka, 1998; pers. obs.). The low occurrence of chiggers in more aquatic frogs such as *Rana catesbeiana* and *R* clamitans suggests that they are usually not terrestrial long enough for larval mites to attach to a host, resulting in low prevalence (Murphy, 1965). It would be instructive to compare chigger mite prevalence in large samples of Virginia amphibians to test this hypothesis.

The specific identification of chigger mite parasites on amphibians is hindered by the fact that the infective life history stage is the larva (McAllister et al., 1995). Hyland (1956), Loomis (1956), and Murphy (1965), however, identified the chigger in amphibian specimens from North Carolina and Virginia as *Hannemania dunni*. Although it may be that the parasites on the two amphibians reported here represent a different species, it is also possible given the geographic proximity of the work in North Carolina and Loomis' identification in Virginia that the parasite is *H. dunni*. It remains clear, however, that more detailed studies of chigger mite parasitism in these vertebrates in Virginia need to be undertaken.

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