SHORT COMMUNICATION

A Case Study of *Megaselia scalaris* (Diptera: Phoridae) Causing Ocular Myiasis in a Western Hognose Snake

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ABSTRACT Late instar larvae of the scuttle fly, *Megaselia scalaris* Loew, were found near the right eye of a live captive-reared western hognose snake, *Heterodon nasicus* Baird and Girard. Dissection and removal of the snake's dorsal cranial bones revealed tissue degradation of the infected eye, the optic nerve, and the brain case; we suggest that these factors contributed to the death of this snake. This case study further demonstrates the opportunistic behavior of *M. scalaris*.

KEY WORDS ocular myiasis, reptile myiasis, scuttle fly, hognose snake, reptile parasite

The scuttle fly, *Megaselia scalaris* Loew (Diptera: Phoridae), is known to breed in a wide range of decaying organic matter, and is often observed near dirty floor drains and mausoleums (Disney 2008). Widely considered a pest of annoyance, *M. scalaris* is also associated with facultative myiasis, an invasion of vertebrate tissue by larvae (Day et al. 2004, Hall and Gerhardt 2009). Although there are reported cases of reptile myiasis, there are only a few reports of myiasis in snakes, particularly corn snake, *Elaphe guttata* L., eggs (Da Silva et al. 1999, Jacobson 2007). The objective of this case study was to report ocular myiasis caused by *M. scalaris* on a western hognose snake, *Heterodon nasicus* Baird and Girard (Squamata: Colubridae).

Materials and Methods

A snake-breeding facility in Alachua County, Florida, contacted the senior author regarding a captive-reared female *H. nasicus* with larvae on its right eye. The facility staff noted that the snake previously had an open wound on its head, most likely caused by a bite from its mate, and maggots were observed a couple of days later. The snake was observed over a period of 99 d.

Initially, exposed larvae were removed from the snake's head, and the snake was placed into a plastic Rubbermaid (Atlanta, GA) Snaptopper container (58 × 43 × 26 cm) fitted with a screened lid. The habitat contained pine bedding and a water container. The snake was force-fed one pinkie rat purchased from a local reptile store every 2 wk. Larvae developed in the snake habitat to adults, and were then identified. The hognose snake was kept in this habitat and monitored until death, and was then stored in a −20°C freezer for 2 wk before dissection.

The snake's head was dissected to determine the extent of tissue damage caused by the larvae using standard dissecting tools. The dorsal cranial bones were removed by cutting across the frontal bones near the prefrontal region of the undamaged left eye toward the damaged right eye. Two additional posterior cuts were made, each along the distal sides of the parietal bone. A final cut was made across the posterior end of the parietal that connected the two distal cuts; the dorsal cranial bones were removed. Digital images were taken of the infested region and brain case with an Auto-montage (Auto-Montage Pro software version 5.02, Syncroscopy, Frederick, MD) and a Leica MZ12.5 stereomicroscope (Bannockburn, IL) with a JVC KY-F70B digital camera (Wayne, NJ). Images from Digimorph (University of Texas at Austin 2007) and Pough et al. (1998) were used for anatomical identification.

Results

Initial observation of the snake occurred on 30 July 2009. The first examination revealed no obvious puncture wounds on the head or in the mouth; however, there was discoloration and swelling on the right side of the snake's head. Five days later, the right eye protruded from the head, and a large number of late instar *M. scalaris* larvae were observed in the snake's right eye socket. Twenty-two days later, the snake's head had crusted over with unsloughed skin. When the excess skin was removed, ≈250 late instar larvae

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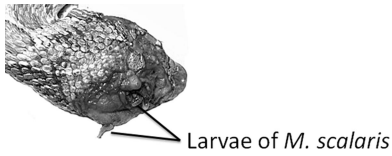

Fig. 1. Photograph of the western hognose snake's head after removal of old scales. The missing right eye was most likely consumed by the larvae of *M. scalaris*, which were occupying the right eye socket, as shown here. The left eye was intact and functional.

were exposed. Removal of the old skin revealed an empty right eye socket (Fig. 1), but the left eye appeared functional. The snake laid a clutch of three eggs 2 d later.

Thirty-four days after the snake was first observed, 33 adult dipterans were collected from the snake habitat and identified as *M. scalaris*, and four more were collected a few days later. Pupal exuviae were observed in the bedding of the snake habitat. Both eye sockets were continuously being covered by unsloughed skin, and the snake was no longer flicking its tongue and had become less active, and died 65 d later.

The dissection revealed extensive tissue damage on the right side of the head, including extensive degradation of the optic nerve (Fig. 2). There was little or no damage on the left side of the snake's head. Damage on the right side extended from the initial wound site near the eye to the basioccipital bone.

Discussion

It is likely that the death of this snake was associated with the degradation of tissue of the eye and the brain, and the surrounding muscle tissue, caused by the *M. scalaris* infestation. Tissue damage was observed from the initial bite region (near the right eye) to the brain (damage on right side of basioccipital bone), and the right eye was apparently completely consumed by *M. scalaris* larvae. If brain damage was severe, it could have led to other physiological complications, resulting in the shutdown of necessary life processes.

Given the area of infection on the snake, the vomeronasal organ (i.e., Jacobson's organ) may have been affected by the myiasis. Although the mouth was inspected and revealed no damage to the tongue or the vomeronasal duct, the extensive damage inside the snake's head may have severed the vomeronasal nerve or impacted its ability to function properly because of swelling, which could explain why the snake was no longer flicking its tongue. In addition, if brain damage occurred, it may have impacted the ability to interpret information sent from the vomeronasal organ, such as location of food and water.

To our knowledge, this is the first reported case of ocular myiasis on a snake. *M. scalaris* is commonly associated with myiasis in other vertebrates, including reports of human infestations (Komori et al. 1978, Da Silva et al. 1999, Chigusa et al. 2006). This case study contributes to our understanding of the spectrum of *M. scalaris* larval habitats and the robust opportunistic behavior of this species.

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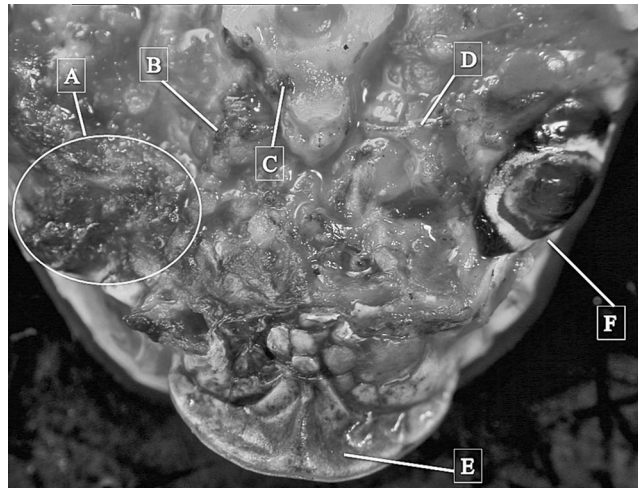

Fig. 2. A dorsal view of the western hognose snake's head after dissection. Damage at initial area of infection (A) resulted in complete degradation of the eye and surrounding tissues, including the optic nerve (B) and basioccipital bone (C). Removal of scale layers over left eye revealed an anatomically normal, perhaps functional eye, as the optic nerve (D) was undamaged, nor did damage spread to the nose (E) or left eye (F).

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