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Scientific Note

Injury Caused by an Ovipositor of Dragonfly (Insecta: Odonata: Anisoptera): First Report in Humans

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Abstract. This is the first documented case of human injury caused by a dragonfly species (Odonata: Anisoptera: Aeshnidae). Females of this group possess a well-developed endophytic ovipositor, specialized for inserting eggs into plant tissues. To date, there are no reports in the scientific literature on the use of ovipositors as defensive structures. This case highlights the importance of the safe and informed handling of these organisms, especially considering their increasing use in research and educational settings.

Keywords: *Anax amazili*, insect, insect ovipositor, urban ecology, odonates, odonate ovipositor, human injuries.

Arthropods can inflict mechanical injuries on humans through bites and stings, resulting in localized pain, swelling, allergic reactions, localized redness, and papular urticaria on the skin, and facilitating secondary infections by pathogens (Diekema & Reuter 2001; Steen et al. 2004; Cardoso & Haddad Junior 2005; Haddad Junior et al. 2012; Herness et al. 2022). In insects, many species can cause skin disorders, including erucism from caterpillars, painful bites from ants and aquatic insects, and anaphylactic shock from bee and wasp venom (Cardoso & Haddad Junior 2005; Haddad Junior et al. 2012). Mosquitoes, lice, fleas, and bedbugs can inject salivary secretions and venom, while bees, wasps, and ants use specialized stingers (Sarwar 2015), which can cause ocular trauma, including corneal decompensation and cataracts (Arcieri et al. 2002). Among aquatic insects, Odonata (dragonflies and damselflies) are not considered medically important. To our knowledge, there are no records in the scientific literature on medical injuries caused by odonates in humans, likely because of the non-aggressive nature of odonates and/or the low frequency of interactions between these insects and humans. However, odonates can potentially cause injuries with their mandibles and/or ovipositors, especially if handled improperly (Heckman 2006). This risk is especially pronounced among anisopteran species (dragonflies), which tend to be larger and more powerful than zygopterans (damselflies) (Garrison et al. 2006), making injuries more probable when these insects are handled carelessly.

The ovipositor of dragonflies is an anatomical structure located at the posterior end of the female abdomen (segments VIII and IX), and is used for oviposition (Fig. 1A; C) (Corbet 1999; Garrison et al. 2006). In many odonate species (Zygoptera and Aeshnidae), the ovipositor has evolved to facilitate oviposition into substrates such as plants, and rotten logs (Suhling 2015). The ovipositor is composed of rigid chitinous parts that help pierce or scratch the substrate where the eggs are placed (Fig. 1C) (Klass 2008), and may vary in size and shape depending on the species, reflecting adaptations to the preferred type of oviposition site (Matushkina & Gorb 1997; Matushkina 2007; Matushkina 2008; Rebora et al. 2013). In Zygoptera, Anisozygoptera and Aeshnidae species, the ovipositor is composed of foliar appendages of the abdominal segments (valves – lamina valvarum: valvulae – V1 = lower; valvulae – V2 = upper; valvulae – V3 = sheath + stylet), with the first two pairs used for cutting and anchoring the ovipositor to the plant surface, preventing the abdomen from slipping over the vegetal substrate during the oviposition stage (Fig. 1C) (Matushkina & Gorb 1997; Bechly 2001; Matushkina & Gorb 2002; Matushkina 2007; Matushkina 2008; Rebora et al. 2013).

The Aeshnidae species (Anisoptera) possess a piercing-type ovipositor (endophytic) (Matushkina & Gorb 1997; Corbet 1999; Bechly et al. 2001; Matushkina 2007; Matushkina 2008; Rebora et al. 2013). This oviposition strategy represents a plesiomorphic characteristic, that is, a trait shared with ancestral groups (Bechly 2001).

To date, there have been no reports in the literature describing any type of injury to humans caused by odonates, especially through the use of ovipositors as a defensive mechanism. Here, we report the first case of this condition.

Case report: This report details an incident involving injury caused by the anisopteran species *Anax amazili* (Burmeister, 1839) (Odonata: Aeshnidae) (Fig. 1A). The incident occurred on April 4, 2025, during twilight collection of odonates at the Federal University of Sergipe, São Cristóvão, Sergipe, Brazil (10°55'21"S – 37°06'07"W). During this event, a master's student, male, 30 years old, 1.73 m tall, weighing 80 kg, who lacked experience with this group of insects, after improperly removing a female *A. amazili* from the entomological net, inadvertently handled the animal incorrectly (Fig. 1B). Contrary to the instructions provided, the student grasped the odonate using the thorax between his fingers, with the insect's anterior facing him (Fig. 1B). In this position, the female could curve her abdomen and insert the ovipositor into the index finger, resulting in a minor injury (local pain) (Fig. 1D). We believe that this movement was merely an attempt to free itself from the captor's hand, since the mouthparts are used for both predation and defense. Approximately 24 hours later, the patient experienced only slight local pain, but there was no swelling or redness of the skin. The lesion healed without treatment within three days.

This case study emphasized the critical need for careful and informed handling techniques to prevent such injuries in the future. Considering the increasing application of odonates in environmental education and outreach programs (Clausnitzer et al. 2017), we strongly recommend adopting proper handling protocols to minimize the risk of accidental harm, particularly in settings involving children. Awareness and education regarding the potential risks associated with female ovipositors are essential for promoting safe interactions with these insects while preserving their ecological and educational value. It is important to emphasize that in this case, the injury did not cause any allergic reactions, inflammation, or secondary complications.

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Figure 1. Female of *Anax amazili* (Burmeister, 1839) (Odonata: Aeshnidae). (A) Proper handling of odonates after capture; (B) improper handling of odonates; (C) terminal abdominal segments of a female, highlighting the ovipositor; and (D) injury inflicted by the ovipositor. Photo credits: A – C: A.B.S.F.; and D: J.C.S.

Nevertheless, we strongly recommend adopting safe handling practices when dealing with specimens in this group.

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Authors' Contributions

JCS: Conceptualization, investigation, methodology, writing – original draft, writing – review & editing; ABSF: Conceptualization, investigation, methodology, writing – original draft, writing – review & editing; HV: Conceptualization, investigation, methodology, writing – original draft, writing – review & editing; MMSS: data curation, investigation, writing – review & editing.

Conflict of Interest Statement

The authors declare that they have no conflict of interests.

Ethical Approval

One of the co-authors of the paper, Jean Carlos Santos, holds a valid collection license (SISBIO #28398-11) for the collection of insect, ensuring that all sampling conducted in the study complies with current environmental regulations.

Data Availability

The original data presented in this study are included in the article. Further inquiries can be directed to the corresponding author.

Generative AI Statement

The authors used Paperpal software to assist in reviewing the translation of the manuscript. After using this tool, the authors thoroughly revised the content as needed and assumed full responsibility for the content of the publication.

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