



## Interaction of leeches with Mugger Crocodile in Vadodara, India.

Leeches (Phylum Annelida: Class Hirudinida) are some of the most well-known ectoparasites, notable for their blood-sucking behaviour (hematophagous). Leech species are widely distributed across all continents and habitats, whether land, seas or freshwaters, except regions of terrestrial Antarctica.



Leeches attached to the left eye of a juvenile Mugger Crocodile *Crocodylus palustris* from a small puddle in Madapur village, Padara, Vadodara District, Gujarat, India. © Rocky Arya.

They are commonly found in freshwater, estuarine, marine-aquatic, and moist terrestrial ecosystems (Phillips et al. 2020).

These hematophagous organisms extract blood from their hosts, whether terrestrial or aquatic animals -including reptiles, by simply latching onto their bodies



Leeches after removal from the eyelids of the Mugger *Crocodylus palustris*. © Rocky Arya



**A large hirudidae leech attached to the posterior tail's scute of an adult Mugger Crocodile *Crocodylus palustris* from Kalali, Vadodara, Gujarat, India. © Rakesh Vadhvana**

(ectoparasitic). Many crocodylian species face leech infestations; however, the observations have not been well documented, and most reports refer primarily to leeches (Tellez 2013).

There are only a few reports that address leech parasitism in crocodylians. Tellez (2013) is well-reviewed and has compiled several publications on the host-parasite interaction of world crocodiles.

Vyas (2017) enlists leech infestations in thirteen species of crocodiles belonging to three families,

including Marsh or Mugger Crocodile *Crocodylus palustris*. This note adds further observations on the interaction between muggers and leeches.

On 20 August 2021, a juvenile (total body length [tbl] 88.5cm) Mugger was rescued from a small puddle (22.188 N; 73.121 E) at Madapur Village, Padra, Vadodara District, Gujarat. The animal was found in a small puddle, surrounded by scrubland and agricultural fields. The animal was active and healthy, except for some unusual growth on its left eye. Upon careful examination of the eye growth, it was found that tiny leeches were latched on both the eyelids. We removed all the leeches one by one with the help of forceps; a total of nine leeches were removed from both eyelids. The lower eyelid had been infested with



**The flocks of Black-headed Ibis *Threskiornis melanocephalus* foraging along with adult Muggers *Crocodylus palustris* basking at banks of Vishwamitri River, Vadodara, Gujarat, India. © Rakesh Vadhvana.**

five leeches, and the upper was infested by four. All the leeches were different in size, about 3–18 mm long.

The leeches were collected and preserved for further species identification. This is the third of its kind occurrence from this area, whereby a leech-infested mugger was encountered.

Similar leech infestation has been previously recorded in Muggers of river Vishwamitri, Vadodara City (Vyas 2017). In addition, another unpublished observation mentions leech infestations on the posterior tail scutes region in an adult Mugger (tbl 270cm) from Kalali, Vadodara. Thus, the present observation marks the third incidence of leech infestation in the Mugger Crocodiles from this locality, i.e. noted from the river system of Vishwamitri.

The Mugger population of river Vishwamitri sets a unique example among the entire distribution range of the species (Vyas 2018). It is an immensely polluted river surrounded by contaminated habitats full of urban sewage (Vyas et al. 2020).

Such organic contamination provides favourable conditions to not only Muggers but other aquatic reptiles also, enabling them to survive and flourish, right in the middle of the growing metropolis city of Vadodara (Vyas 2018). Thus, these urban ecosystems become breeding grounds for pathogens and leeches. As per Luiselli et al. (2004), organic pollution of streams also sustains leeches; these cause anaemias, favour bacterial and

fungal infections, and the transmission of reptilian haemoparasites.

A study of the Nile Crocodile *Crocodylus niloticus* population from Okavango Delta, South Africa, found high leech infestations in eleven crocodiles (Leslie et al. 2011). Leeches were found on both the dorsal and ventral sides of crocodile bodies, including the tail, neck, belly, armpits, between the webbing of back legs, and other inconspicuous sites. However, there was no obvious pattern of leech distribution on the crocodiles (Leslie et al. 2011).

All these ectoparasites indicate potential vectors for blood parasites. However, little is known about the possible pathogenicity of various species, although leeches could play an active role in transmitting crocodile-specific viral/bacterial infections and as vectors of blood protozoans (Fermino et al. 2015). Primarily, *Placobdella spp* species of leeches has been widely reported to cause infestations in various crocodilian species (Frank 1981).

Furthermore, Glassman et al. (1979) studies show a higher eosinophilic count noted in leech-infected alligators than uninfected gators. According to Diefenbach (1975), to some extent, leech infestation also affects thermal preferences and thermoregulation of crocodiles. Diefenbach (1975) further suggested that mouth gaping could possibly have the function of drying and killing ectoparasites. Therefore, the present occurrence of leech infestation, reported



as ectoparasitism in Mugger Crocodiles is further subject to veterinary research. Clinical findings can indicate the exact effects of leech infestation on a Mugger's health. Moreover, this suggests the need to deploy proper investigation and post-mortem procedures emphasising these possibilities, along with detailed histopathology profiles, especially when muggers face sudden mysterious deaths.

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