

Abstract Submitted
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Mosquitoes drink with a burst in reserve: explaining pumping behavior with a fluid mechanics model¹ SOUVICK CHATTERJEE, JAKE SOCHA, MARK STREMLER, Virginia Tech — Mosquitoes drink using a pair of in-line pumps in the head that draw liquid food through the proboscis. Experimental observations with synchrotron x-ray imaging indicate two modes of drinking: a predominantly occurring continuous mode, in which the cibarial and pharyngeal pumps expand cyclically at a constant phase difference, and an occasional, isolated burst mode, in which the pharyngeal pump expansion is 10 to 30 times larger than in the continuous mode. We have used a reduced order model of the fluid mechanics to hypothesize an explanation of this variation in drinking behavior. Our model results show that the continuous mode is more energetically efficient, whereas the burst mode creates a large pressure drop across the proboscis, which could potentially be used to clear blockages. Comparisons with pump knock-out configurations demonstrate different functional roles of the pumps in mosquito feeding.

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