

Comparing seasonality of bats' feeding behavior to seasonality of Nipah Virus transmission to humans in Bangladesh

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Background: Nipah outbreaks occur during the winter in Bangladesh and have been linked with the consumption of either fresh or fermented date palm sap presumed to be contaminated with bat (*Pteropus giganteus*) urine or saliva. A few communities collect date palm sap throughout the year to ferment and consume. This study's objective was to characterize *Pteropus* bats' sap feeding behavior round the year to identify potential for sap contamination with bat excreta.

Methods: We used infrared cameras to observe bats' feeding behavior for 28 tree-nights per month for 22 months from March 2013 to December 2014. We placed the cameras at 4 sap producing date palm trees focused at the sap producing surface and collection pot from 5:00 PM to 6:00 AM for seven consecutive nights. We extracted the number and duration of bat visits and duration of contact with date palm sap from the images. We described the frequency of bat visits during four seasons: winter (December-February), spring (March-May), monsoon (June-September), and post-monsoon (October-November).

Results: We recorded a total of 26,870 bat visits (5% *Pteropus*, 90% non-*Pteropus* and 5% unidentified) from 616 observation tree-nights. Median duration of each visit was higher for *Pteropus* bats than non-*Pteropus* bats (8 versus 0.03 minutes, $P < 0.001$). Median duration of contact with date palm sap was higher for *Pteropus* bats (0.67 versus 0.03 minutes, $P < 0.001$) for each visit. The average number of *Pteropus* bat visits per night was the highest during spring (17) followed by winter (14), post monsoon (6) and monsoon (3).

Conclusions: Even when date palm sap is harvested year-round, *Pteropus* bats visit the date palm trees more frequently during the spring and winter, perhaps due to lack of other available food. Feeding behavior could be one reason why the risk of Nipah infection to people has been concentrated in the winter season, even when fermented sap is consumed year-round. Sap harvesters should regularly use skirts to prevent bats from contaminating the date palm sap to prevent Nipah virus and other bat associated zoonoses.

Biography

Ausraful Islam is a veterinarian by training. He has completed his DVM and MS from Bangladesh Agricultural University and MPH from American International University-Bangladesh. He joined icddr,b during 2009. He is involved in different research projects focused on various emerging diseases like Nipah and avian influenza. He has several years of working experience with wild animals. He is leading a project funded by DARPA (Defence Advanced Research Projects Agency) to look for the Nipah virus among bats of Bangladesh. He has published his work in different national and international journals.