252

EFFECTS OF ENVIRONMENTAL VARIABLES AND PREDATORY ON SWARMING AND MATING BEHAVIOUR OF NATURAL POPULATIONS OF *ANOPHELES GAMBIAE* S.S. IN BURKINA FASO

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The progress in genomic have increased the prospects of using genetically modified mosquitoes or sterilised males in malaria vector control. This strategy requires a proper understanding of potential interactions with naturally occurring populations. *Anopheles gambiae*, the main malaria vector in Africa, mates in swarms. Factors that may be involved in the swarming and mating system are poorly documented. We characterized swarming behaviour and determined whether predatory presence affect mating behaviour of *An. gambiae*. Swarms of *An. gambiae* s.s. were followed up from July 2006 to December 2008 in Vallée du Kou and Soumousso situated in southwestern Burkina Faso. Environmental parameters such as light intensity, temperature, and relative humidity were recorded at the time of swarm formation. We determined the number of mating and predation intrusion. A copulating were noted when a pair of mosquitoes was seen leaving a swarm. A predation event was noted when a predator swooped into a swarm, slowed down and dipped into the mass of mosquitoes, and flew out. We investigated the predatory intrusion following the dynamic of mating. The first indicator of swarming occurrence in the rice area was the apparition of dragonflies. Before swarming occurred, one or two dragonflies started flying insistently around the swarming place at the same height. After five minutes the first male pointed up flying in zigzag movement. It was rejoined by other males. Males swarmed 0.6-4 m above field markers constituted by stored wood, wells, heaps of refuse and open areas. The environmental parameters at swarm starting and ending showed substantial spatio-temporal variation. We observed that mating was not exponential but varied following the intrusion of dragonflies. This study showed that the environmental parameters we measured were not correlated with the swarm formation, and that Predatory intrusion perturbed mating and swarming behaviour.

253

SEASONAL ABUNDANCE AND NATURAL INFECTION OF THE SAND FLY *LUTZOMYIA LONGIFLOCOSA* IN A DOMESTIC FOCUS OF AMERICAN CUTANEOUS LEISHMANIASIS IN CHAPARRAL, TOLIMA, COLOMBIA

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The sand fly *Lutzomyia longiflocosa,* is considered the principal vector of cutaneous leishmaniasis (CL) in the Sub Andean region of Colombia. In 2004, this was the most abundant species found in the municipality of Chaparral during the largest CL outbreak ever recorded in the country. The main aim of this work was to identify temporal abundance patterns of *L. longiflocosa* during high and low precipitation periods, and natural infection by *Leishmania* in different environments in the rural township of Agua Bonita in Chaparral. This township registered high cumulative incidence during the CL outbreak. CDC light traps were set up monthly in 3 houses for 3 consecutive nights for 11 months beginning in June 2007. The three houses were selected on the basis of previous observation of high indoors sand fly abundance. Five traps were set per house: one indoors, 2 peridomestically (10 m away from house) and 2 in neighboring woodland. Sand fly abundance data was linked to local climatic data from IDEAM (National agency). Natural infection was determined in pools (10<n>20) using PCR-Southern-Blot with kDNA as a target. The months with lower precipitation, August and February, presented the highest sandfly capture (28.6% and 31.8% of 9,420 collected respectively). *L. longiflocosa* was the most abundant species collected every month in all environments and captures were higher in woodland environments (44.14% per trap per night) and peridomestic (44.08%) than indoors (11.8%). Southern-Blot revealed amplification in 10pools out of 33 indoor environments (n=451, 2.2%), followed by peridomestic (14p/138; n=2.498, 0.6%) and woodlands (3p/134, n= 2.490, 0.1%). Verification of the PCR product by DNA sequencing is ongoing. The presence of *L. longiflocosa* and the high prevalence of infection observed indoors and in the peridomestic environment suggest that the transmission is associated with the house. These findings explain the high proportion of women and children infected during outbreaks and suggest the presence of a reservoir associated with the peridomestic environment.

254

URBAN STREAM POLLUTION INCREASES MOSQUITO FITNESS AND DISEASE VECTOR POTENTIAL

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Anthropogenic disturbance of natural cycles in organic elements (Nitrogen and Phosphorus) is one of the major causes of the disruption of species interactions across ecosystems. In urban landscapes the crowding of humans and their waste products in freshwater systems is likely to exacerbate distressing patterns of intra and inter-specific interactions, especially those relevant for disease emergence. Here, we present the results of field observations and two semi-natural experiments addressing the effects of ecosystem level changes on the density dependent fitness of the most common tropical and subtropical urban mosquito, Culex quinquefasciatus Say (Diptera: Culicidae). The semi-natural experiments were designed to quantify both the oviposition preference for water influenced by sewage overflows, and the relative importance of density, weather variability and water quality on larval mortality, sex ratio and size at adult emergence. These phenotypic traits are important in determining vectorial capacity for the transmission of several pathogens.The field observations showed this mosquito species to be present in streams where N and P levels were significantly higher than in streams where it was absent, the difference mediated by the effects of combined sewage overflows. The oviposition experiment showed water from these systems to be more attractive for oviposition by this mosquito species than water uninfluenced by the sewage overflows. The density-dependence experiment revealed that mortality hazards were independent of larval density, decreased in sewage overflow water and increased with raising minimum temperatures. Under all rearing conditions adult mosquito size decreased with density. Mosquitoes from sewage overflow water emerged faster, were bigger and had an increased ratio of females to males. All these traits could determine the density dependent regulation of mosquito populations and the ability to transmit pathogens through size mediated fecundity and mating induced feeding behavior. Finally, our results show the importance of urban stream quality as a factor for the urban emergence of arboviral diseases, calling for the implementation of environmentally sound strategies for water management, given the potential to diminish the risk of some vector-borne diseases and other health hazards, while conserving biodiversity in cities.