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IMPACT OF IRRADIATION ON REPRODUCTIVE PERFORMANCE OF WILD AND LABORATORY *ANOPHELES ARABIENSIS* MOSQUITOES

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Sterile Insect Technique (SIT) aims at suppressing or decreasing insect pest population by introducing irradiated mass-reared insects into wild populations. However, both mass rearing and radiations can affect life history traits of some insects making them less competitive than their wild counterparts. In the malaria mosquito *Anopheles arabiensis*, many progress have been done to improve mating competitiveness of mass-reared irradiated males. However, to date, no study has been done to decipher entangled negative effects of laboratory rearing and irradiation on important reproductive traits. Such data could help to target more precisely research efforts to improve current techniques. Here, we used two sources of *An. arabiensis* from the same locality; one reared in laboratory for 5 generations and the other collected at late larval instar in the field. Pupae were irradiated and adult insemination rate, fecundity, oviposition behavior, fertility and male survivorship were assessed. Results revealed different impacts of both mosquito origin and irradiation onto reproductive processes. First, insemination rate was more intensively affected by irradiation in laboratory-reared mosquitoes than in wild ones. Second, oviposition behavior was different between the two mosquito origins with a quick “adaptation” of laboratory-reared mosquitoes to artificial conditions. Third, a greater proportion of eggs hatched in irradiated field than in laboratory-reared mosquitoes, but conversely, a larger proportion of larvae survived to the first instar in laboratory-reared than in field mosquitoes. Finally, while irradiation had no effect on longevity, field males survived better than those from laboratory. Effects of both mass-rearing and irradiation must be taken into account when investigations attempt to improve insect quality used in SIT.

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HIGH THROUGHPUT SCREENING OF THE MICROBIOTA ASSOCIATED WITH TWO MALARIA VECTORS OF COLOMBIA

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The number of deaths caused by malaria has decreased worldwide, however, the dramatic increase in insecticide-resistant *Anopheles* mosquitoes has accelerated the search for alternative strategies to diminish or eliminate malaria vector populations. Recent studies have shown that some bacteria of the mosquito microbiome have important negative effects on the parasite development within the mosquito midgut, as in the vector's survival. However, little is known about the microbiota of Latin American anopheline mosquitoes and its significance for parasite blocking. Therefore, the purpose of this study is to characterize the midgut microbiota composition of two main Latin American malaria vectors, *Anopheles darlingi* and *A. nuneztovari*, collected in two malaria-endemic regions of Colombia. We characterized the bacterial microbiome of 64 adult (A) mosquito midguts, 12 larvae (L) midguts and 7 breeding sites (BS). A total of 15,909,048 bacterial 16S rRNA reads were grouped

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into 274,990 swarms, from which we identified 14,440 unique OTUs. Preliminary results showed that the composition of the microbiota differs between regions and groups but not between species or feeding status. A deeper examination of the metadata is currently in progress and will reveal the microbiome composition at a more detailed taxonomical level, which is essential to discover novel potential candidates for vector biocontrol strategies.

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SPECIES COMPOSITION OF PHLEBOTOMINE SAND FLIES AND BIONOMICS OF *PHLEBOTOMUS ARGENTIPES* IN AN ENDEMIC FOCUS OF VISCERAL LEISHMANIASIS IN BIHAR STATE, INDIA

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Visceral leishmaniasis (VL) also known as Kala-azar in India is transmitted to man by *Phlebotomus argentipes*. In the Indian subcontinent, Bihar state is endemic to VL. A year-long study was initiated in twenty four villages, within two districts of Bihar, to examine the species composition of Phlebotomine sand flies. In each village twelve CDC light traps were installed in three locations which include houses, cattle dwellings, and vegetation. In each location, 4 traps were installed. Traps were activated every two weeks for 12 hours from 1800 to 0600 hours. Sand flies trapped were transferred to the lab in Patna, identified, and recorded as to sand fly species. Our trapping was initiated in February 2016 and continued to December 2016. Sand flies were identified morphologically and molecular techniques were used to confirm identification. Blood meals were identified from trapped blood fed sand flies. We trapped 126,394 *P. argentipes*, of which 76,554 were males and 49,840 were females. We also trapped 1,465 *P. papatasi* and 24,218 *Sergentomyia* species. Earlier studies suggested sand fly behavior is more exophilic now, contrary to previous reports. We also trapped a large proportion of sand flies outside of houses and cattle sheds in vegetation. This suggest a new sand fly management tool is required to control the vector in peri-domestic vegetation in order to achieve elimination of VL in India.

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DENGUE VECTOR CONTROL: BUILDING THE EVIDENCE BASE

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Dengue is endemic in many parts of the world with an estimated 390 million infections annually. Vector control remains the primary method of prevention and control. Despite substantial investment, the evidence guiding such interventions is limited in its quality and scope and is widely disbursed among academic journals and within national control programmes. Here we summarise our efforts to consolidate and evaluate the existing evidence base for dengue vector control. We have conducted a series of systematic literature reviews covering both single vector control interventions, including peridomestic space spraying (Esu 2010), Temephos (George 2015), *Bacillus thuringiensis israelensis* (Boyce 2013), copepods (Lazaro 2015) and larvivorous fish (Han 2015), pyriproxifen (Moaz 2017, submitted) and indoor residual spraying (Samuel 2017, submitted), as well as outbreak response (Pilger 2010) and service delivery (Horstick 2010). Our analysis shows that 1) vector control can be effective, but implementation and sustainability remain issues 2) single interventions are probably not effective, but even combinations of interventions have mixed results, 3) Interventions in response to outbreaks have limited effectiveness and, 4) the quality of service delivery, rather than the choice