**THE ECOLOGICAL STRUCTURE OF MOSQUITO POPULATION DYNAMICS: INSIGHTS FROM INDIA, CONSEQUENCES FOR MALARIA CONTROL**

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Understanding the temporal dynamics (including the start, duration and end) of malaria transmission at a given location represents a vital input to optimising control strategies aimed at reducing malaria transmission. This requires an intimate understanding of the mosquito populations that shape and define the temporal profile of malaria risk. Despite this, many outstanding questions remain surrounding the drivers of these dynamics, particularly their dependence on the underlying ecological structure of a setting. Here we collate a novel data set of temporally disaggregated mosquito catch data from across the Indian subcontinent in order to better understand these dynamics and the factors shaping them. Statistical analysis and characterisation of these time series reveal marked diversity in temporal dynamics including extensive hetrogeneity in the dynamics of the same species across different settings. We show that this variation is underpinned by a complex interplay between mosquito species and abiotic ecology, but that this diversity can be clustered into a small number of unique temporal modalities. Analyses of these distinct clusters using a multinomial logistic regression-based framework shows that the observed heterogeneity intimately depends on the particular ecology of a setting, which in turn interacts with intrinsic species-related factors to shape and define the temporal dynamics (including timing and extent of seasonality). The results of these analyses are then integrated with spatial predictions of species presence/absence in order to generate predictive maps of mosquito population seasonality across India, to inform the planning and timing of control efforts.