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Grande salle + visio.

STOCHASTIC AND DETERMINISTIC MODELING OF MOSQUITO POPULATION DYNAMICS WITH STERILE INSECT TECHNIQUE INTERVENTIONS

par

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- 📌 Mosquitoes of the genus *Aedes* are major disease vectors, and their control is increasingly challenged by adaptation to new environments. Among alternative strategies, the Sterile Insect Technique (SIT) and Incompatible Insect Technique (IIT) rely on the release of sterilized or incompatible males to reduce the expected number of viable offspring per female, while targeting a single species with limited environmental side effects. However, the efficiency of SIT depends on population dynamics and environmental variability.
 - 📌 Using field data on *Aedes polynesiensis* collected on Tetiaroa Atoll (French Polynesia), we develop a stochastic population model with partially observed stages. The different life stages are represented as compartments, and life events (birth, death, transitions between stages) are modeled using Poisson point processes. The model incorporates environmental dependence, density-dependent reproduction and the influence of repeated releases of sterile males.
 - 📌 We link the stochastic compartmental model to deterministic and diffusion models in the large population limits, and derive a reduced model restricted to the observed adult compartments. This framework provides a basis for parameter estimation and optimization for future SIT deployment.
- 📌 Exposé en français