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[MS 9: Mathematical Modelling, Analysis and Simulations in Biology]

**Mathematical Modelling of mating-disrupting and trapping controls.  
Theoretical results and Simulations.**

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**Abstract:** The control of insect pest populations in environmentally friendly manner is a major challenge. Several techniques are available, like mating-disruption, pheromone trapping, sterile insect technique, or biological control methods using parasitoids or natural enemies, etc. In any case, a long term study is necessary to anticipate problems and difficulties related to the method and prevent any ecological disaster. The success of these control methods relies not only on a good knowledge of the pest's biology and ecology, but also on the population size and space-time distribution. In order to identify the most appropriate (combination of) control technique(s), to optimize a control strategy in time and space or to understand failures in experiments, mathematical modelling can be a very helpful tool for researchers.

In this talk, we focus on mating-disruption and trapping. First, we present a temporal model related to this control. A qualitative study allows us to highlight two thresholds related to the success or failure of the mating-disruption method. We also show that adding efficient tapping can considerably improve the control. Finally, we extend our model to a spatio-temporal model and provide simulations to illustrate our discussions.