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ABSTRACTS

8_105. ON THE USEFULNESS OF MATHEMATICAL MODELLING FOR FRUIT FLY CONTROL

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Mathematics has become established as biology's new microscope. The aim of this contribution is to demonstrate the usefulness of mathematical modelling in dealing with two important aspects related to fruit fly control: (i) estimation of population parameters and (ii) design of successful control strategies. On the first aspect, we constructed a trapping model that allows for joint identification of several population parameters. Using this model we designed a feasible protocol using Mark-Release-Recapture experiments for reliable estimation of fruit fly population parameters, including density. An added benefit from this approach is the possibility to optimise the placement of traps in the field, duration of experiments, frequency of service, etc.. On the second aspect we conducted a threshold analysis for a model of mating disruption with trapping. The highly nonlinear relationship between the control effort and its impact on the population makes determining the optimal level of control a challenging problem that is resolved here by a combination of mathematical analysis and numerical computing. The developed models are generic insect models by nature and can be adapted to different fruit fly species.

Keywords: population parameter estimation, control optimisation, threshold analysis