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ENTOSIM, AN INSECTS’ LIFE CYCLE SIMULATOR ENCLOSING MULTIPLE MODELS IN A DOCKER CONTAINER

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Abstract

EntoSim is a software aimed to collect different physiologically based models describing the life cycle of ectotherms and, more specifically, of insect pests. It is developed in an open-source framework including the ROOT’s software libraries in a C/C++ programming language, with the purpose of an easy diffusion and compatibility. EntoSim could be used in model development and validation and in decision making frameworks, to support farmers and technicians to formulate low-impact control strategies. The growing availability, in literature, of physiologically based models and their utilisation in plant protection, led to explore the latest computer technologies that could be applied in entomology. This led to a significant revision of the EntoSim philosophy and structure. This work, therefore, aims to describe this conceptual and operational change, and its implications on EntoSim in order to: i) increase the number of options available to the users, ii) simplify the software development and iii) increase software dissemination and adoption. These three points led to the addition of two more population density models within EntoSim, and to the creation of the first Docker image available in a public repository for entomological purposes, to make its deployment faster. In this regard, the code structure was reorganised in modules corresponding to each EntoSim function; the graphical part was developed and implemented using Python language so that results are visualized directly in a web browser page. All the EntoSim dependencies were included into a Docker image, using Linux CentOS as base operating system.

Key words: decision support systems, descriptive models, growth models, integrated pest management, population modelling, ROOT

Received: January, 2021; Revised final: April, 2021; Accepted: October, 2021

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