

Article title	Population growth of <i>Rhopalosiphum padi</i> under different thermal regimes: an agent-based model approach
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Abstract	<ol style="list-style-type: none"> 1. <i>Rhopalosiphum padi</i> (Linnaeus, 1758) is abundant and has a broad geographic distribution. It is one of the most important cereal pests. In Brazil, the economic losses associated with this aphid result mainly from the transmission of the barley yellow dwarf viruses. 2. Decision-making for the adoption of management measures must consider the initial population size, the potential for population increase, and the time when this population will reach levels at which the resulting damage is equal to the costs of control measures. Consequently, the establishment of management programmes and decision support systems should be based on models that estimate the potential population growth of this pest species. 3. Temperature is one of the main factors that determine the growth rate of insect populations. Generally, controlled experiments are designed to examine the relationship of temperature at fixed intervals in relation to the development phases of insects. In nature, thermal regimes are not constant, and population growth is the result of a series of combined events. 4. In this work, the effects of different thermal regimes on the population growth of <i>R. padi</i> were compared. 5. An agent-based model was used to estimate population growth, and the parameters defined in controlled regimes were compared with fluctuating temperatures under natural conditions. 6. The temperature-driven model presented here can serve as a tool to predict population growth and decision-making for aphid management. 7. The model structure and the proposed experimental design allow the addition of modules and layers of factors that can progressively affect the populations of aphids to gradually improve the model.
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