

Host invasion and its control by parasitoids

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We study the spatial propagation of a lepidopteran *Cameraria ohridella* (Lep. Gracillariidae), an invasive insect species which attacks chestnut trees. The leaves of this tree become yellow and fall already early summer. This Lepidoptera was observed in Macedonia in 1985, and we have recorded it in France for the first time in 1998. It has already invaded more than half of France.

Chestnut tree is one of the major ornamental trees and we have no efficient methods to eradicate this leafminer at this point in time. This leafminer is attacked by a whole range of parasitoids, but it seems that they are not able to control the invader. We want to find why parasitoids are not efficiency to control leafminer, and what are the solutions.

We have made a two dimensional -space & time- numerical model developed in Matlab. Space is divided in patches with length's side equal to 100 km. Time steps correspond to 1 generation and there are three generations per year. Leafminers disperse at each generation and can cover a distance of several hundred km. To take into account the distribution of chestnut trees and the spatial geography, we have included some spatial heterogeneity related to human densities. We study the propagation in France but we will extend this model to Europe. We used different growth functions: Malthus, logistic and with Allee effect. Results are discussed in function of different parameters, in particular parasitism rate and the relative dispersion rates.

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