# Citrus Tristeza Virus desease modelling.

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It has been realized a Swarm based model to simulate the diffusion of Citrus Tristeza Virus (CTV). CTV is a semi-persistent virus which causes a serious pathology of the citruses. It is still not known any treatment , the only remedy is to extirpate the sick tree. The most serious epidemics have taken place in California, in Spain and in Turkey, with a great economic impact. In Italy there is a situation of extreme attention to this problem, because some focuses have been found in southern regions. The only vectors of the virus are Toxoptera Citricida aphids, more dangerous but not present in Italy, and Toxoptera Aurantii, Aphis Gossypii, Aphis Spiraecola aphids. The key to control the infection, and the aim of our model, is to understand and to try to foresee the special and temporal diffusion of these parasites, and the influence on theme of micro-climatic factors. The model has been realized in Objective C and is made up by four different types of agents: three species of aphids and the trees. It simulates parasites life in a citrus grove by monitoring the movements reproduction and death, and by monitoring also the health and the state of infection of the trees. The citrus grove has been implemented as an array containing tree-agents; every tree knows its neighbours on the bases of a coordinates greed, which enables the aphids to perform likely movements. The aphid-agents move themselves and live according to rules ad methods based on the real biologic life of aphid. Temperature and humidity change during the days, in agreement with seasonal means. Various scenarios have been considered: we have sprinkled with fungicide as few tree as possible and we have changed its special and temporal distribution, so find the best combination to stop the diffusion of the epidemics.  Model assessment will be done with fill data.