Mathematicians simulate evolution of species

Wageningen scientists have used a mathematical approach to simulate the evolution in numbers of species. This shows that diversity in species makes ecosystems more robust. In future, the simulation model may be able to predict changes in ecosystems.

Species come and go constantly in nature. With the help of her supervisors, Master's student Elena Bellavere developed a mathematical model to simulate such evolution. If the simulation starts with a single species, all kinds of new species soon appear. That shows what biologists have long suspected: ecosystems benefit from having a variety of species. 'If a single species continues to dominate, it exhausts its natural resources,' explains Joshua Dijksman, associate professor of Physical Chemistry & Soft Matter.
The model looks at the amount of food, light, oxygen, CO_2 and space in a habitat and calculates which species will survive and which will become extinct. The simulation also constantly adds new species. This is what happens in nature too: species migrate from elsewhere or evolve due to random changes in the DNA.

Rules of evolution

By programming laws and calculating the consequences, a new layer of evolution rules is created automatically. They seem to be in line with actual trends in evolution.
But the simulation is not entirely accurate. 'Species don't eat one another in our model,' explains Christian Hamster, a mathematician in Biometris, WUR's applied mathematics department. It is a simplified version of the real world that can be used to simulate simple ecosystems. An example is our gut flora, a closed environment with only micro-organisms. Dijksman expects that in future, the model will be able to do things like show how antibiotics affect the composition of the micro-organisms in our intestines. NVHWH