Modelling seed abscission strategies of wind dispersed plants.

Abstract

It has been suggested that wind dispersed plants and other passive dispersers influence their dispersal direction and distance by dispersing during certain meteorological conditions. For example wind and thermal convection could transport passive dispersers great distances and seed release during strong thermal convection could result in a very long distance distribution. However, what would be the optimal strategy? As far as possible, or finding the nearest unoccupied site? To what degree is this dependent on the type of species or the landscape and what are the implications for biodiversity in a more fragmented landscape? Many of these questions are still unanswered. Plants could develop a certain strategy by non-random abscission. The goal of this research is to define possible strategies for passive dispersers. We use modelling techniques to determine optimal moments and dispersal strategies in relation to weather types at temporal scales from seconds to hours.

Type of project:

MSc research project (stage)

Duration of the project: (6 - 9 months)
Starting time: (any time)
Contact: h.j.treep@uu.nl

Relevant literature:


Regional scale modeling of species distributions and dispersal.

Abstract

Changes in the landscape at varying scales – from local disturbances to global climate change - cause extinction, adaptation and migration of species. During the global warming in the last century, dispersal of plant species is mostly directed poleward or to higher elevations in order to follow their climate envelopes. Future climate projections suggest a further heating, and a question that rises is: can plant species keep track with their climate envelopes? Paleorecords have indicated that some wind dispersed species have migrated northwards at rapid rates after the last glacial period. However, our current landscape is typically characterized by habitat loss and fragmentation, which could greatly reduce the probability of successful dispersal events and hence migration.

The research could focus on a comparison of different modeling techniques to simulate species migration or using one of the models to quantify the potential effect of fragmentation on migration rates. The research could also focus on gathering and analyzing existing data from databases or remote sensing methods.

Type of project:

Bsc research project / MSc research project / MSc thesis / MSc Free electives

Duration of the project: (3 - 9 months)
Starting time: (any time)
Contact: h.j.treep@uu.nl

Relevant literature:


Seed transport by wind in heterogeneous landscapes.

Abstract

Habitat loss and fragmentation could greatly reduce migration capacity of plants by reducing the total area of suitable habitat and the connectivity of the landscape. On the other hand it could also increase turbulence and create opportunities for long distance dispersal as heterogeneous environments can induce more turbulence in windy conditions. Large Eddy Simulation models are used to study the transport of seeds in heterogeneous landscapes. These simulation of seed trajectories are, however, never evaluated with data other than the resulting patterns of seed deposition. In this study we will try to find new methods to quantify seed transport by wind.

Type of project:

MSc research project / MSc thesis

Duration of the project: (6 - 9 months)
Starting time: (januari-march 2015)
Contact: h.j.treep@uu.nl

Relevant literature:


Measuring seed abscission strategies of wind dispersed plants.

Abstract

It has been suggested that wind dispersed plants and other passive dispersers influence their dispersal direction and distance by dispersing during certain weather conditions. For example wind and thermal convection could transport passive dispersers great distances and seed release during strong thermal convection could result in a very long distance distribution. However is far always optimal, or is finding the nearest unoccupied site sometimes a better strategy? To what degree is this dependent on the type of species or the landscape and what are the implications for biodiversity in a more fragmented landscape? Many of these questions are still unanswered. The goal of this research is to quantify seed abscission strategies of varying plant species in an experimental setup or in the field. Experimental research could focus on relating the moments of seed release to meteorological variables at varying timescales or measuring distance distributions in varying weather conditions.

Type of project:

MSc reseach project / MSc thesis

Duration of the project: (6 - 9 months)
Starting time: (januari-march 2015)
Contact: h.j.treep@uu.nl

Relevant literature :

