Master Thesis - Distribution and potential impacts of *Abutilon theophrasti*, an invasive alien species threatening the Swiss agroecosystems

Starting date:	upon agreement
Duration:	depending on the university's requirements, 6-12 months
Working Place:	A Ramél 18, 6593 Cadenazzo (TI), Switzerland
Language:	Italian / French / English
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Background

Abutilon theophrasti Medik. is an annual species of the Malvaceae family native to southern Asia. Formerly cultivated as a fiber plant, the Velvetleaf now behaves as a weed and invades sites subject to disturbance such as wasteland, forest margins, irrigation channels and roads. In the agricultural context, it has become a noxious weed in several crops, in particular maize and soya. Velvetleaf is an extremely competitive plant that can cause significant yield losses in heavily infested sites. It prevents crops from thriving by reducing light penetration and by withdrawing nutrients and water. It can also act as a reservoir for various problematic pathogens. This species is currently listed as an invasive weed in many countries around the world, including Switzerland.

Aim of the project

The objectives of the proposed work are to i) model the potential distribution of the species by capturing its climatic niche at a global scale and integrating finer characteristics of its ecological niche at a regional scale in order to obtain robust predictions for Switzerland; ii) carry out germination tests at different temperatures and humidity levels in a climatic cabinet; iii) integrate results to assess the potential impacts on natural and agro-ecosystems of Switzerland.

Experimental approach / Methods

This project involves i) modelling the distribution of the species (spatial data organization in a GIS and modelling in R using modern approaches), ii) assessing the germination capacity of the species (experiments in climatic cabinets), and iii) integrating the results in order to assess the potential impacts of this species of neophyte on natural and agro-ecosystems of Switzerland.

Workplace and supervision

This study is based at Agroscope, in the Neobiota Competence Centre of Cadenazzo (TI). Knowledge of the Italian language is an advantage for the student's social life but is not essential for the work (French / English are also working languages). The student will be supervised by Dr Ramona Maggini at Agroscope and by the professor at a Swiss University regarding the modelling and the assessment of potential impacts (which can also be developed at distance). The germination experiments on the other hand will be carried out on site at Agroscope Cadenazzo with the support of Mr Antoine Jousson. For the stay in Cadenazzo, a room can be made available to the student in a nearby facility.

Significance

This work is transdisciplinary and is situated at the interface between spatial ecology, invasive alien species and weed science. This project will improve classic modelling approaches and predictions of potential distribution by integrating germination success to better assess the magnitude of the impacts of this invasive species for the ecosystems in Switzerland.

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