Tytuł projektu

Cechy funkcjonalne gatunków jako cecha zespołów roślinnych europejskich solnisk śródlądowych

Project title

Plant functional traits drive plant associations in European inland salt marshes.

Dyscyplina /Area of science

Nauki biologiczne

PROJECT DESCRIPTION

Project goals

- To use the multivatiate classification methods for existing phytosociological data from inland saltmarshes to build vegetation classification system in the european scale
- To find functional traits characteristics for vegetation units
- To find functional traits that discriminate between plant associations
- To link functional traits of plant associations with the environmental gradients
- To test if arrangement of the vegetation reflects its functional traits

Outline

Functional traits determine plant species vital rates and fitness (Viole et al. 2007; Adler et al. 2014). Species under contrasting environmental conditions exhibit very different functional trait attributes due to diverging selective pressures (Viole et al. 2007; Wright et al. 2005). Gradients of environmental stress and disturbance are important drivers for traits variability in plants (Milla et al. 2008), for example along salinity gradient (Ulrich et al. 2018). Saline soils, which are associated with the special type of vegetation – halophytes, are relatively widespread throughout the world. They cover ca. 10% of the land (O'Leary and Glenn 1994). Saline terrestrial habitats include coastal salt meadows, mangrove forests and inland areas under the influence of saline waters that accompany the salt deposits, as well as areas exposed to water deficit in dry climate (Reimold and Qeen 1974, Poljakoff-Mayber and Gale1975). Inland salt marshes are typical and integral parts of arid and semiarid regions, whereas in humid regions they occur in limited areas, mostly on fossil salt deposits and around salty springs (Waisel 1972). Indeed, inland saline areas in temperate climate of Central Europe are associated with salt rock deposits uplifted to the surface and associated salt springs and salty ground water (Wilkoń-Michalska 1963, Brandes 1999). Vegetation of inland saline areas has been already described but rather in regional scale (eg. Piernik 2005). In recently published Vegetation of Europe there is still a gap in vegetation system regarding inland salt marsh vegetation

of temperate climate (Piernik 2012, Mucina et al. 2016). There is also little knowledge about traits variability in plant associations in relation to the environmental factors (Urlich et al. 2018). Therefore, in this project we are seeking in identification of general pattern in inland salt marsh associations in the European scale and disentangling their functional traits rules.

Work plan

Within this PhD project proposal we plan to perform two major research tasks:

1. Task 1. Within this task we consider vegetation units in the classical context following Braun-Blanquet concept (Braun-Blanquet 1964) of plant community assembly, defined mostly by characteristic species and species with high fidelity. In the first step we will create the data base of phytosociological relevés based on published data form inland European salt-marshes (Hennekens et al. 2001). The second step will be classification of vegetation, according to currently applied multivariate methods, that reflect classical vegetation assembly concept (Chytry et al. 2002; Tichy et al. 2006) (First/second year of the study)
2. Task 2. This will be the second step, directed into the plant associations functioning. Species traits for such general purpose can be inferred from common plant trait data bases that contain averaged values (eg. The LEDA Traitbase, Kleier et al. 2008). Then we will relate set of traits values of each patch to the derived previously association. In this way we will search for functional traits defining plant associations. Within this task we assume that arrangement of the vegetation reflects its functional traits. (Second/third year of the study)
3. Research summary – set of papers related to Task1 and Task2. (Third/fourth year of the project).
4. **Literature**

A. Piernik, Nicolaus Copernicus Press (2012)
A. Piernik, Phytocoenologia 35 (2005), 19-37.
L. Mucina et. al., Applied Vegetation Science19 (Suppl. 1) (2016), 3–264
W. Ulrich et al., Journal of Ecology 106 (2018), 865–876.
M. Chytry et al., Applied Vegetation Science 19 (2016), 173-180.

Required initial knowledge and skills of the PhD candidate

- ➔ Analytical thinking
- ➔ Eager to learn
- ➔ Understanding of statistical tools in geobotany
- ➔ Knowledge about inland salt marsh habitats, their typical plant species and vegetation
- ➔ Bacis knowledge about plant functional traits
- ➔ Eager to work hard

Zgłaszający projekt/ Author of the project

dr hab. Agnieszka Piernik stopień/tytuł, imię, nazwisko	piernik@umk.pl e-mail
	Wydział Biologii i Ochrony Środowiska UMK jednostka organizacyjna
Proponowani promotorzy i mentorzy/prospective supervisors	
1) promotor główny/ main supervisior	
dr hab. Agnieszka Piernik	e-mail : piernik@ umk.pl
	Instytut Fizyki UMK jednostka organizacyjna
2) promotor pomocniczy / co-supervisor	
dr Dariusz Kamiński	