

Institute: Institute of Systematics and Evolution of Animals, Polish Academy of Sciences

Title: Do linear structures affect dispersal of pollinators in an agricultural landscape?

Name of potential supervisor: Dr. hab. Dawid Moroń (ORCID 0000-0003-3692-7855)

Formal conditions: Recruitment is combined with recruitment to the Doctoral School of Natural and Agricultural Sciences. Candidates must meet the requirements provided for in the Admission Rules for the Doctoral School of Natural and Agricultural Sciences.

Financial conditions: Scholarship of PLN 4100 gross (approx. PLN 3600 net) per month for a period of 4 years financed by the National Science Centre under the project entitled "Do linear structures affect dispersal and ecosystem services of pollinators in an agricultural landscape?". The scholarship paid under NCN project will be the scholarship paid under the Doctoral School of Natural and Agricultural Sciences.

Background information:

Farmland intensification is major driver of global decrease of insect populations. Farmland in developed countries is characterized by intensive management with natural or semi-natural habitat patches separated from each other by a matrix of agricultural fields. Metapopulation theory predicts and empirical studies confirm that both habitat loss and fragmentation contribute to local population extinctions. Thus, to develop the landscape management strategy which preserves biodiversity as well as sustains food production for the ever-growing human population, there is a need to understand key ecological processes shaping species distribution and ecosystem services in farmland.

Contrary to fragmented remnants of semi-natural patches the linear character of LS makes them one of few relatively continuous habitats in a farmland. Thus, the increase of species dispersal and availability of their ecosystem services along spatially connected LS may be expected. The above-mentioned expectation is strengthened by findings that some of LS may be a suitable habitat for many organisms and the habitats of high quality are often used by organisms to disperse. However, LS may also be dispersal barriers, especially when an organism attempts to cross the structure and is prone to e.g., collisions with vehicles. Thus, linear structures may be both dispersal corridors and barriers and it is highly interesting how animals distribute and behave in these habitats.

To enable understanding of LS impact on the spatial processes affecting living organisms in Anthropocene, the experimental study will be performed in three, representing the different intensity of human use, types of LS: railway embankments, levees and verges of highways. Native pollinator community (bees, butterflies, flies), with special attention paid to the red mason bee *Osmia bicornis*, and pollination as an ecosystem service will be studied.

The main question to be addressed in the project:

1. Do pollinators move along linear structures on the landscape scale?
2. Is the movement of pollinating insects along linear structures affected by the landscape?
3. Does the presence of linear structures in the landscape affect the fitness parameters of pollinators?

Information on the methods/description of work:

1. Field work will be an important part of the project. It will include selection of sites, surveying pollinator insect and plant biodiversity, observation of pollinator behaviour as well as collecting environmental and GIS data.

2. Laboratory works will require sorting of entomological samples for subsequent species identification and marking of bees.
3. Analysis of the collected data will require statistical analysis (R software) and GIS (QGIS software).

Additional information (e.g., special requirements from the student):

1. A strong background in ecology and biological conservation.
2. Significant experience in field work.
3. Identification of invertebrates and plants (basic).
4. Experience in statistics and GIS.
5. Driving license (cat. B) will be appreciated.
6. Involvement in field work in difficult conditions and non-standard working hours.
7. No health contraindications to work with bees.
8. Scientific achievements such as publications or attendance in conferences are considered advantageous.

Recruitment documents:

1. [Rules for Admissions to the Doctorat School of Natural and Agricultural Sciences.](#)
2. [Regulations on Awarding NCN Scholarships in Research Projects Funded by the National Science Centre.](#)
3. [Personal questionnaire.](#)

Documents should be sent electronically to dr hab. Dawid Moroń (moron@isez.pan.krakow.pl) by February 10, 2021. The interview with the candidates will take place on February 16, 2021 at the Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences (Sławkowska 17, 31-016 Krakow).

References:

1. Moroń, D., Skórka, P., Lenda, M., Celary, W. & Tryjanowski, P. Railway lines affect spatial turnover of pollinator communities in an agricultural landscape. **Divers. Distrib.** **23**, 1090–1097 (2017).
2. Baguette, M., Blanchet, S., Legrand, D., Stevens, V. M. & Turlure, C. Individual dispersal, landscape connectivity and ecological networks. *Biol. Rev.* **88**, 310–326 (2013).