

English version

Announcement about the competition for the position of a doctoral student in a research project *

* this announcement is not an offer within the meaning of the Polish law

Institute: Institute of Nature Conservation, Polish Academy of Sciences

PhD scholarship: 5000PLN – total amount (approx. 4000 netto) first 3 years, for the 4th year - scholarship payable by the Institute, amount according to Act 2.0 as amended - currently about PLN 3400 net + allowance from your own grant

High bonus for publications (details in the IOP bonus regulations)

Scientific visits:

Australia (1 month)

China (1 month)

International conferences

1 International Congress for Conservation Biology in Oceania or North America

1 European Congress for Conservation Biology in Europe

Title: Risk of biological invasions combined with land sharing and sparing strategies, affects native organisms providing ecosystem services

Project in collaboration with

prof. Hugh Possingham from University of Queensland, Brisbane, Australia

<https://scholar.google.com.au/citations?user=ISYOB3cAAAAJ&hl=en>

prof. Johannes Knops from Xi'an Jiaotong Liverpool University in Suzhou, Jiangsu, China.

<https://scholar.google.com/citations?user=wQzqO0MAAAAJ&hl=en>

Name of potential supervisor(s) dr hab. Piotr Skórka, prof. IOP PAN

(pskorka@iop.krakow.pl), head of the project, helping supervisor and contact person: dr

Magdalena Lenda (magdalena.lenda@gmail.com, lenda@iop.krakow.pl)

You will learn with us

- advanced analyzes in R.
- advanced analyzes in GIS
- the basics of Marxan (on a course in Australia) and MaxEnt (on a course in Europe or Australia)
- more advanced analyzes in these programs as you like
- collecting data for scientific papers from available databases and the Internet
- research planning
- write high-quality typescripts for scientific journals
- write research grants for the National Science Center
- you will train your soft skills (cooperation in a large research team, building lasting cooperation with scientists from abroad, methods of self-presentation, methods of short, effective communication of information in speech and writing)

Money issues

- research (materials, costs of field staff, some species identification, business trips) and a 3-year scholarship financed by the National Science Center grant (Head of the grant – dr. Magdalena Lenda)

- for the fourth year, the scholarship will be financed by the Institute of Nature Conservation
- monthly internship with prof. Possingham in Australia, funded by a grant from the National Science Center
- monthly internship with prof. Knops in China, funded by a grant from the National Science Center
- 2 international conferences are financed by a grant from the National Science Center
- high bonuses for publications from the ministerial list (eg 12,000 PLN total amount for being the first or correspondence author in a journal for 140 points, more details of the bonus in the current regulations of bonuses for publications in the Institute), financed by the Institute of Nature Conservation, more information in the Institute's regulations
- you can apply for small (usually around PLN 1,000-10,000 per year) internal funds of the Institute of Nature Conservation - subsidies for young researchers for research minigrants, conferences, and workshops in the country and abroad; subsidies for mini-internships in Poland and abroad. More information in the Institute's regulations
- you can apply for Preludium from National Science Centre, and in it for an addition to the scholarship for the fourth year and funds for your own research

Working conditions

- you will be part of a dynamic international team of scientists that has been cooperating for a long time and has already published about 10 high-grade scientific papers (publications, among others, in Ecology Letters, Conservation Biology).
- we value good communication, collaboration, stress-free problem solving, supporting environment and individual talents.
- flexible working hours adapted to the work mode and effectiveness of team members
- we value our own ideas, including the interdisciplinary, even weird ones!

Recruitment

1. An open competition which will include rating of:

- CV - please attach a contact (e-mail address) to 3 people with whom you worked (e.g. the supervisor and members of his team or people from any previous work (bachelor's, master's, ornithological camps, nature valuation)
- cover letter
- your masters supervisor's opinion
- interview with the head of the project (Magdalena Lenda)
- an interview with the supervisor- Piotr Skórka, and one person from outside the team
- your questions to us

2. interviews with members of the recruitment committee for the Doctoral School
details here:

<https://www.botany.pl/index.php/pl/teaching-pl/doctoral-school-pl/admissions-pl>

Required documents

- diploma
- confirmation of the knowledge of English at least at B2 level
- driving license (for inspection, please do not send scans)
- CV
- letter of motivation
- your masters supervisor's opinion

- signed General Data Protection Regulation (available form sekretariat@iop.krakow.pl)
please send documents to the grant manager at the following address:
magdalena.lenda1@gmail.com and to sekretariat@iop.krakow.pl

Documents for the Doctoral School

details here:

<https://www.botany.pl/index.php/pl/teaching-pl/doctoral-school-pl/admissions-pl>

Deadlines

submission of documents to the grant manager:

until August 19

interviews: August 19 - August 30

Submitting documents at the Doctoral School

<https://www.botany.pl/index.php/pl/teaching-pl/doctoral-school-pl/admissions-pl>

Interview with the committee at the Doctoral School

<https://www.botany.pl/index.php/pl/teaching-pl/doctoral-school-pl/admissions-pl>

Background information

An increasing demand for food production is one of the main concerns in and nature conservation and agronomy. There are modern theoretical strategies in spatial conservation landscape planning, attempting to solve the problem of feeding 9 billion people by 2050 and preserving biodiversity. One of them is the land sharing or land sparing framework proposed by researchers from Cambridge University in the Science magazine in 2005. Two concepts from classic landscape ecology were proposed to resolve this problem: 1) land sparing and 2) land sharing (Green et al. 2005). Land sparing involves intensifying agriculture in cropland and protecting intact, natural, or restored areas (so-called spared land). Land sharing involves improving the quality of the agricultural landscape by increasing crop mosaic area that is extensively managed; thus, it may be suitable for many wild species. Should we use land sparing which assumes intensification of agriculture on one hand and protection of intact remnant areas or release areas from agriculture and leave it for the natural succession? Or should we improve the quality of the agricultural landscape for biodiversity by increasing the share of more extensively managed crops in the mosaic (land sharing)? The land sharing/sparing dilemma has been mostly studied in intact, pristine, and tropical forests. Recent studies in such forests suggest that land sparing is a better strategy for sustaining species diversity and for agricultural production (Phalan et al. 2011; Kamp et al. 2015). However, in the Anthropocene, few pristine intact areas are remaining on Earth to be spared. Therefore, in many regions where human-wildlife relationships have been established in cultural landscapes with long agricultural traditions, new areas for nature conservation could be created from abandoned post-agricultural land. There are some ideas, such as the newly proposed “rewilding” strategy in Europe to set new areas for nature conservation by agricultural land abandonment or using previously abandoned post-agricultural land (Navarro 2012; Sylven 2015; Pereino et al. 2019). The European Union (EU) has also advised abandoning at least 5% of farmland for conservation purposes (“Greening policy”). Not all such ideas propose buffer zones to control the colonisation of invasive species, especially since sometimes areas for nature conservation may be too small to create buffer zones. In my project, we adapt the land sharing/sparing concepts to a fully managed landscape, which could be previously abandoned or is abandoned for nature conservation, as proposed in the “rewilding” and “greening” strategies. Thus, in this proposal, I define land sparing as the intensification of agriculture in cropland and abandonment of fields for nature conservation,

and land sharing as increasing the crop mosaic area that is extensively managed. This definition is well established in the literature (Kamp et al 2015). Many studies have shown that abandoned agricultural land or land set-aside is highly threatened by the invasion of alien plant species that often create monocultures (Lenda et al. 2021). Such species disturb the natural succession (Gusev 2015) and decrease biodiversity (Moroń et al. 2009; Skórka et al. 2013). This is important because biodiversity in agricultural ecosystems has practical functions in ecosystem services, such as pollination, pest control, and nutrient cycling. Invasive alien plant species colonise abandoned farmland globally (Cramer et al. 2008) but the risk of plant invasions has never been addressed in the land sharing/land sparing conceptual framework. I predict that land sharing may be a profitable policy for sustaining biodiversity when the risk of invasion is high. This could be because land management practices may prevent biodiversity by damaging populations of invasive alien species. The land sparing policy may be a threat to biodiversity if invasion risk is high, because spared land, which in this project refers to abandoned post-agricultural land, may be colonized by alien species. They may remain uncontrolled in early invasion stages; thus, alien invasive species may benefit from the land sparing strategy. Therefore, the aim of this project is to verify which strategy—land sparing or land sharing—is better for biodiversity, conservation of nature, and yield production in regions under varying risk of invasion of alien species.

The main questions to be addressed in the project

The aim of this project is to verify which strategy—land sparing or land sharing—is better for biodiversity conservation and yield production in regions under varying risk of invasion of alien plant species.

Main hypothesis: If the invasion risk is high, land sharing is a better strategy for protecting biodiversity and ecosystem services than land sparing, allowing effective control of invasive species via fieldwork. (data will be collected in field)

2. Is land sparing the best strategy only in regions where agriculture encroaches into pristine and intact areas, and land sharing - better in areas already highly altered by agriculture such as cultural landscapes?

To answer that question, you will perform one systematic review.

Information on the methods/description of work

- your PhD thesis will consist of 4 chapters.
 - data collection in field on birds, collecting insects and spiders. Study site: Poland, agricultural landscape. You should be able to identify at least birds of Central Europe
 - building GIS database
 - GIS analyses
 - data collection from published scientific articles for systematic review and metaanalyses, articles are in English, Scopus and Google Scholar will be used to search for relevant publications
 - data analyses – ideally in R, but at the beginning can be any other software.
- You will have all essential facilities to learn R
- writing manuscripts in English being future PHD chapters – we will teach you high quality scientific writing
 - you will be trained in planning and writing of research grants and during the 3rd year you will apply for your own research grant

The phd student will lead 4 topics by himself, in cooperation with all project team members, which would be basis for his/her phd thesis.

The phd student will build professional contacts with project partners from abroad and members of their lab

- you will also talk and write to the public about her/his PHD thesis

Special requirements from the student

- general knowledge in biology and ecology
- field and/or laboratory skills
- excellent English (at least B2 level, proven by the university or certificate)
- experience in statistical analyses
- experience in data collection about birds – identification of Central European species in field
- experience in GIS spatial analyses
- driving license

Place/name of potential collaborator

dr Magdalena Lenda, <https://scholar.google.com/citations?user=-q0e3QAAAAJ&hl=pl>

prof. Johannes Knops <https://scholar.google.com/citations?user=wQzqO0MAAAAJ&hl=en>

prof. Hugh Possingham

<https://scholar.google.com.au/citations?user=ISYOB3cAAAAJ&hl=en>

References

Kamp J, Urazaliev R, Balmford A *et al.* 2015. Agricultural development and the conservation of avian biodiversity on the Eurasian steppes: a comparison of land-sparing and land-sharing approaches. *J Appl Ecol* **52**: 1578-1587. <https://doi.org/10.1111/1365-2664.12527>

Lenda M, Skórka P, Knops JMH, *et al.* 2012. Plant establishment and invasions: an increase in a seed disperser combined with land abandonment causes an invasion of the non-native walnut in Europe. *Proc Biol Sci* **279**: 1491-1497. <https://doi.org/10.1098/rspb.2011.2153>

Lenda M, Skórka P, Kuszewska K, *et al.* 2021. Misinformation, internet honey trading and beekeepers drive a plant invasion. *Ecol Lett* **24**: 165-169. <https://doi.org/10.1111/ele.13645>

Pe'er G, Dicks LV, Visconti P, *et al.* 2014. Agriculture policy EU, agricultural reform fails on biodiversity. *Science* **344**: 1090-1092. <https://doi.org/10.1126/science.1253425>

Perino A, Pereira HM, Navarro LM, *et al.* 2019. Rewilding complex ecosystems. *Science* **364**: eaav5570.

Phalan B, Onial M, Balmford A, *et al.* 2011. Reconciling food production and biodiversity conservation: Land sharing and land sparing compared. *Science* **333**: 1289-129