PhD Thesis Acceptance Report
Research Discipline Council of Biological Sciences
Jagiellonian University in Kraków

Candidate's name and surname: Elisa Plazio

PhD Thesis Title: Intersexual differences in butterfly dispersal and their consequences for metapopulation functioning

Thesis Supervisor: Prof. Dr. hab. Piotr Nowicki

Assistant Supervisor / Second Supervisor/ Co-supervisor (if applicable): None

Reviewer: Prof. Dr. Thomas Fartmann

THESIS EVALUATION

1. **Scientific merit of the thesis**

a. Originality of the research *(25-200 words):*

So far, the intersexual differences in butterfly dispersal and their consequences for metapopulation persistence are poorly understood. All three study species, *Lycaena helle*, *Maculinea* (*Phengaris*) *nausithous*, *Maculinea* (*Phengaris*) *teleius*, are of high conservation concern and, hence, are protected by the EU Habitats Directive. Elisa Plazio identified in her PhD thesis strong differences in dispersal patterns between males and females of the three butterfly species. The main implications of her thesis are the (i) development of more realistic metapopulation models and (ii) the conduction of more effective conservation measures for all three declining species through considering her findings. Moreover, in future, intersexual differences in dispersal should generally be considered in metapopulation models and species action plans for butterflies of conservation concern.

b. Scientific merit of the chapters / articles *(25-200 words):*

The general introduction (chapter 1) gives a thorough overview on the published knowledge on butterfly dispersal and metapopulation ecology, identifies gaps of knowledge and states the main goal of the dissertation. Each of the three following chapters (chapter 2–4) contains an extensive mark-release-recapture study. Field data were analysed using well-established models in dispersal ecology: the multi-state recapture model and the virtual migration model. All three studies have already been published in high-ranked international journals (*Journal of Evolutionary Biology*, *Scientific Reports*, *Movement Ecology*; impact factor 2020: 2.4–4.4). Elisa Plazio had a contribution of 50–80% to each of the papers. The first study (chapter 2) showed that emigration rates of *M. teleius* males were substantially higher than those of females. Additionally, emigration rates changed in the course of the flight period. The second study (chapter 3) revealed that in the bivoltine species *L. helle* emigration did not only differ between males and females but also between the two generations. In the last study (chapter 4), Elisa Plazio identified that topography had differential effects on the dispersal of males and females of *M. nausithous* and *M. teleius*. The general discussion (chapter 5) is a concise conclusion of the dissertation, including implications for conservation.

2. **Substantial merit of the thesis** *(25-200 words):*

The research topic of the thesis is well-introduced in the general introduction (chapter 1) and the introductions of the three articles (chapter 2–4). For each of the three papers clear hypotheses are formulated. Each of the studies is based on extensive field work on a daily basis. Elisa Plazio clearly showed that she is able to question and evaluate the scientific relevance of the results of her studies.

She is highly capable of doing independent scientific work and is familiar with relevant sampling techniques and state-of-the-art statistics (e.g. multi-state recapture model, virtual migration model). In all chapters she distinguishes between own, new contributions and already known findings. The conclusions are sound.

3. **Layout and register** *(25-200 words):*

The dissertation is generally well written, clearly structured and nicely illustrated. The graphical abstract for each chapter is a nice add-on.

4. **Critical notes**

For nature conservationists, more precise recommendations on how the network of habitat patches and the landscape composition should look like for the long-term survival of the three studied species would have been helpful.

5. **Final grade** (justification *25-200 words):*

Overall, the thesis of Elisa Plazio is an important scientific contribution to metapopulation ecology and the conservation of insect diversity in modern-day landscapes. It strongly improves the scientific knowledge on the key drivers of persistence of butterfly metapopulations in fragmented landscapes.

I, hereby, declare that the reviewed PhD thesis by **Elisa Plazio** meets the criteria pursuant to art. 13.1 of Act of 14 March 2003 on Academic Degrees and Academic Title and Title in the Arts (O.J. no 65 item 595 as amended) and request that the Research Discipline Council of Biological Sciences of the Jagiellonian University in Kraków accepts **Elisa Plazio** for further stages of doctoral proceedings.

YES

I, hereby, request that the thesis is accepted with distinctions. Justification *(25-200 words)*

Reason: The number of articles is this thesis fulfils my expectations of a PhD in Biology. However, the quality of the three articles is clearly higher than average.

YES

30/07/2021
date

Reviewer's signature

INFORMATION FOR THE REVIEWER:

1. Information on requirements concerning PhD thesis structure:
http://www.wb.uj.edu.pl/en_GB/stopnie-tytuly/doktoraty
2. A digital copy should be sent to:
nauki.biologiczne@uj.edu.pl

A duly signed original should be sent to:
Rada Dyscypliny Nauki biologiczne
Dziekanat Wydziału Biologii
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