

**Review of USB RIFCH PhD Thesis**

Surname of the PhD student: <b>Ing. Miloš Buřič</b>	Name of supervisor: <b>doc. Ing. Pavel Kozák, Ph.D.</b>
Title of PhD thesis: Biology of spiny-cheek crayfish ( <i>Orconectes limosus</i> , Rafinesque, 1817) under conditions of the Czech Republic and the study of factors influencing its invasive spreading	

**REVIEWER:**

Surname: <b>Gherardi</b>	Institution: Department of Evolutionary Biology, University of Florence, Via Romana 17, 50125 Firenze (Italy)
Name: <b>Francesca</b>	
Titles: Senior Researcher	E-mail: <b>francesca.gherardi@unifi.it</b>
Please describe your professional relationship to the PhD student: Host of a 2-month scholarship (at the University of Florence, Italy)	Please describe your field of expertise: Eco-ethology of crustacean decapods, Invasion biology, Conservation biology, Biology of crayfish

**QUESTIONNAIRE*****Originality, scientific importance, prospects of the PhD thesis and benefits for basic or applied research***

Evaluate its competitiveness in the international context and compare its level with the current state of the art in the field:

The PhD thesis entitled “Biology of spiny-cheek crayfish (*Orconectes limosus*, Rafinesque, 1817) under conditions of the Czech Republic and the study of factors influencing its invasive spreading” analyzes several aspects of the biology of the invasive crayfish, the North American *O. limosus*. Although the study has been conducted in the Czech Republic, many of the drawn conclusions are of particular relevance for the other European countries invaded by the same species, Italy included. There is no doubt that, from a practical point of view, the results of this work will benefit our efforts to conserve biodiversity in European freshwater ecosystems. In fact, this species is typically considered to be a serious threat to other species, native crayfish included, and to alter the structure and functioning of freshwater communities and ecosystems. However, until now, there have been very few studies investigating *O. limosus*' biology and most of them have been carried out in very limited contexts and within narrow objectives. On the contrary, Ing. Buřič pursues to reach a large breadth of objectives: he analyzes *O. limosus*' reproductive success, growth patterns, morphotypes, migration, behavior, habitat preferences, and thermal tolerance. The majority of Ing. Buřič's findings is completely new for science and will certainly have a large relevance for the advancement of our knowledge about the properties that make a species invasive. The PhD thesis will ultimately contribute to the invasion biologists' effort to predict the invasive potential of the introduced species.

***Preparation of the PhD thesis, targets of the work and deliverables***

Evaluate the overall level of preparation of the PhD thesis and the originality of the selected approaches; evaluate publications and whether the targets set in the PhD thesis correspond with the declared purpose of the thesis:

The general aim of the thesis is to collect data about the biology and ecology of *O. limosus* in order to understand the reasons that make it a successful invader. As said above, this effort is particularly novel since most often the invasive potential of this crayfish species has been given for granted without dedicated scientific studies. Besides, our knowledge about its biology and ecology is fragmented across the literature.

The main purpose of the thesis has been achieved by analyzing several key aspects of *O. limosus*' biology, such as:

1) Reproductive biology

- 2) Growth and survival of young-of-the-year (YOY)
- 3) Activity patterns, migrations, habitat preferences, etc.
- 4) Morphological changes.

During his work, Ing. Buřič has used appropriate and relatively innovative approaches. In particular, the adoption of a comparative approach is crucial when the focus is understanding the properties that make a species a potential invader: the comparison between the study species and the native noble crayfish *A. astacus* has provided in fact important insights in this respect. To understand migration and other aspects of *O. limosus*' use of space, Ing. Buřič has adopted radio-telemetry, a technique widely used to quantify home range and movements in vertebrates but seldom in invertebrates. Indeed, radio-telemetry allows for a nearly continuous recording of an animal's movement without interfering with it through repeated captures, being thus the best method to trace animal movement and activity in the wild. Finally, the collected data have been analyzed using appropriate statistical techniques.

As far as the dissemination of his scientific results is concerned, Ing. Buřič is the co-author of 15 scientific publications (some under his first authorship) and of 5 abstracts for international conferences. Most of the papers report the results gained during his work for the PhD thesis, whereas others refer to other projects to which Ing. Buřič has taken part during these years, showing his wide interests in the field and his willingness and ability to collaborate with other researchers and with international teams as well.

---

### ***OVERALL COMMENTARY ON THE PhD THESIS***

The PhD thesis entitled "Biology of spiny-cheek crayfish (*Orconectes limosus*, Rafinesque, 1817) under conditions of the Czech Republic and the study of factors influencing its invasive spreading" analyzes several aspects of the biology of the invasive crayfish *O. limosus*. This aim has been fulfilled by (1) addressing crucial questions about the invasive potential of the study species, (2) adopting appropriate and new methodologies, such as radio-telemetry, (3) analyzing the data with correct statistical techniques, and (4) drawing conclusions, in part new for science. The results of this work are expected to be of high relevance for the international research in crayfish and in invasion biology in general, and certainly open new directions for the future scientific effort on this and other invasive crayfish species in Czech Republic and elsewhere in Europe. Some of the results of this work have been disseminated (or are in the process of being disseminated) across the scientific community through international journals. They will certainly aid the today's main objective of invasion biologists to unravel the properties that make a species invasive within the rationale of containing the spread of invasive species and preventing the introduction of new invaders. The relevance of the questions addressed, the ability to give answers to them, and the international dimension of the research, taken together, justify my final recommendation for the defense of Ing. Buřič's PhD thesis.

### ***FINAL RECOMMENDATION***

**X can be recommended for defense of PhD Thesis**

Firenze, May 26, 2009

Francesca Gherardi

