Report on the outcomes of a Short-Term Scientific Mission[[1]](#footnote-1)

Action number: CA18221

Grantee name: Blagovesta Dimitrova

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| **Details of the STSM**  Title: Review of information useful to develop biologically-based models to assess combined effects of pesticides and pathogens on amphibians and with an introduction to *in vivo* experimental methods  Start and end date: 01/06/2022 to 16/07/2022 |
| **Description of the work carried out during the STSM**  Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section. |
| In the established timeframe of this STSM, I was part of the Ecotoxicology research lab of the University of Castilla-La Mancha, in Ciudad Real, Spain. The main objectives were: 1) to compile a knowledgebase that will allow for the building of biologically-based models to estimate apical toxic effects from responses measured at the sub-organismal level, and 2) to investigate the toxicity of different active ingredients and formulations on amphibian terrestrial stages.  For my first objective during this STSM, I had the task to gather data that falls under specific criteria, in order to obtain a good amount of high quality data that can be used in a statistical model analysis. The model at hand was TKTD, which concerns itself with toxicokinetics and toxicodynamics. It simulates the processes that lead to toxicity at the level of organisms over time. This model allows for the quantification of toxicity and provides a conceptual framework to better understand the causes for variability in different species’ sensitivity to the same compound, as well as causes for different toxicity of different compounds to the same species. TKTD models can address both the large number of species that have the potential to be affected, and the large number of chemicals we need to take into consideration. Learning in detail what type of data is required for this model and how it works was very beneficial for me, because this type of statistical analysis allows us to reduce the number of animals we use for experiments and offers a less invasive method of reaching scientifically valid and important conclusions. In total, I reviewed data from 4099 papers, and had a database of 23632 data points, out of which 1892 data points were classified by me as suitable to be included in the model. Approximately 8% of the entire 23632-point dataset was viable for the model. Partial or complete data results from 123 out of the 4099 reviewed papers was selected for the model, making up 3% of the investigated papers. Overall, my investigation showed that only a small percentage of the available data can be used and incorporated into the TKTD model, but it is nonetheless not impossible and there are studies and papers available, which can be considered high quality sources for such an analysis.  The second objective of this STSM involved an experiment on frogs of the species *Pelophylax perezi*. Unfortunately, due to what we believe were unforeseeable weather conditions, the frogs had not mated yet by the time I arrived in Spain, and the experiment had not begun yet. However, I participated in the fieldwork, where we collected clutches of eggs and tadpoles, and I learned how to then take care of them in laboratory conditions. This was very useful for me, as it allowed me to see what types of materials and methods are applied when taking care of tadpoles, which is information that I will apply in the following years of my PhD, when I myself perform a very similar experiment. |
| **Description of the STSM main achievements and planned follow-up activities**  Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section.  While working in the Ecotoxicology lab I took part in the AMPHIDEB project, as per the first and main objective of this STSM. In doing so, I was able to familiarize myself with its structure, objectives and research strategies of the project. This provided me with an invitation to further participate in the project, whenever an opportunity arises, throughout the next two years of my PhD and, possibly, even after that. This could lead to a collaboration between me and the UCLM team, that has the potential to produce research papers, as well as conference participations and presentations. Thanks to this STSM, I Obtained a new and deeper level of understanding of TKTD models and the data requirements for this type of analysis. I was able to improve my skills in handling large datasets and extracting the necessary information required for the construction of the TKTD model. This task also helped me improve my organisation and communication skills, and was a solid stepping stone for my development into the field of ecotoxicology. The following objectives were addressed with this task: RCO 2, whose aim is to continuously update and analyse the available information potentially useful to fill the gaps relative to the characterisation of pesticide exposure and effects on amphibians and reptiles; the objectives of WG3, in particular O.3: Identify chances of minimising the use of *in vivo* amphibian and reptile models to build the pesticide ERA scheme through replacement methods (Task 3.4); Capacity Building Objective 1 (CBO 1) – this STSM allowed for the exchange of information between groups and institutions, creating networks that will help me become a capable scientist that can predict and address challenges regarding the impact of pesticide use on amphibians.  During the work on the secondary objective of this STSM, I was able to obtain valuable information about the necessary equipment, the experimental design, and the methodology of keeping tadpoles at various stages in the lab, including the contents of the water necessary for their growth and development, the food intake and the methods for cleaning and maintaining the water tanks. This information was very useful for me, as in the following years of my PhD, I plan on creating a similar experiment, and knowing how to take care of the animals, so as to minimize the losses, is essential. The following objective was addressed: CBO 2 – I took part in the experimental setup, which provided me with the necessary information and experience to be able to conduct future research initiatives focused on environmental risk assessment of pesticides for amphibians.  The main benefit for me, after completing this STSM in UCLM, was the establishment of a connection between me and my hosts, that will be maintained through common scientific interests, which may lead to collaborations on new projects and the publication of research papers. I am grateful for this opportunity and I have learned a lot during my stay in Spain. |

1. This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant. [↑](#footnote-ref-1)