

Abstract

Amphibians are a class of terrestrial vertebrates currently facing population declines in many regions of the world. Multiple causes have been suggested to be responsible for this trend including habitat loss, invasive species, disease and pollution (Alford, 2010). Regarding contamination of amphibian habitats, especially pesticides may be of concern, because pesticides have specific modes of action and are applied in the environment intentionally on a large scale.

For the approval of plant protection products and their active substances in the European Union, the data requirements are laid down in Commission Regulations (EU) No 544/2011 and No 545/2011, which implement Regulation (EC) No 1107/2009. Amphibians are currently not specifically included in regulatory testing or in the ecotoxicological risk assessment. The risk of plant protection products to amphibians is assumed to be covered by data derived from standard testing with other vertebrate classes, i.e. birds, mammals and fish. These data requirements are currently under revision. According to the draft versions of the revised requirements (SANCO/11802/2010 and SANCO/11803/2010), amphibians are now mentioned in the ecotoxicological section, though no agreed testing strategy or risk assessment schemes are available. Relevant data, including data from open literature, should be considered in the overall risk assessment.

Therefore, for the current thesis a literature review was conducted to assess availability of toxicity data and to elaborate on key issues of ecotoxicology of pesticides and amphibians relevant from a regulatory perspective.

A review of sensitivity of different amphibian species and families was conducted exemplarily for active substances Malathion and Chlorpyrifos, because for these two insecticides most data could be obtained from open literature. Still, for both substances the available data set was not sufficient to identify clear differences in sensitivity of amphibian species or families.

Furthermore, the sensitivity of amphibians in comparison to other standard test organisms in aquatic ecotoxicology was assessed. The available toxicity data for Malathion and Chlorpyrifos for aquatic life stages of amphibians did not indicate higher sensitivity in comparison to fish. The standard aquatic invertebrate test organisms were clearly more

sensitive than aquatic life stages of amphibians, as expected for substances with insecticidal mode of action. Consequently, in this case, amphibians are covered by the available toxicity data for fish and aquatic invertebrates and the standard risk assessment would be protective for the aquatic life stages of amphibian species as well.

Finally, the use of data from open literature for regulatory purposes was critically evaluated. A detailed assessment of the available literature data on insecticides concerning reliability revealed that a high proportion of the publications cannot be regarded as reliable from a regulatory point of view.

Consequently, from the present review it becomes apparent that literature alone will not be sufficient for an appropriate assessment of risk for amphibians exposed to pesticides. Standard testing methods need to be developed and incorporated into regulatory ecotoxicology. The potential contribution of pesticides to global amphibian declines as suspected in open literature should not be ignored.