

Further developments in the risk assessment of pesticides to non-target terrestrial plants

M. Arena¹, D. Auteri¹, A. Ippolito¹, R. Luttik, R. Sharp¹, F. Streissl¹, Cs. Szentes¹

Pesticides Unit, European Food Safety Authority (EFSA), Parma, Italy

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Introduction

In view of the publication and entry into force of the new Regulation (EC) 1107/2009 and the revised data requirements for chemical PPPs (EC Regulation 283/2013 and 284/2013), as well as new scientific findings, the Panel on Plant Protection Products and their Residues (PPR) was asked to revise the Guidance Document on Terrestrial Ecotoxicology [1]. It was decided to split the task and to address individually the risk assessment for separate organism groups, i.e. in-soil organisms, non-target arthropods, amphibians and reptiles, and for non-target terrestrial plants (NTTPs).

The Opinion on the state of the science for the risk assessment for NTTPs was issued in 2014 [2].

The overall protection goal for higher terrestrial plants is to maintain biodiversity of plant species in the agricultural area, including both the above- and below ground (seed bank) diversity, and is linked to ecosystem services.



Methodological approach of the EFSA PPR Opinion

Specific Protection Goals were defined:

- for off-field NTTPs as key drivers for nutrient cycling, water regulation, food web support aesthetic values and genetic resources (biodiversity) (see Table 1);
- for in-field NTTPs as key drivers for food web support (primary production, provision of habitat and food, etc.) (see Table 2) and aesthetic values and genetic resources;
- for endangered species.

Table 1. Off-field NTTPs as key drivers for nutrient cycling, water regulation, food web support, aesthetic values and genetic resources (biodiversity)

Ecological entity	individual-population-functional group
Attribute	behavior-survival/growth/reproduction-abundance/biomass-process -biodiversity
Magnitude	Negligible effect-small effect-medium effect-large effect
Temporal scale	Days-weeks-months-season->year (Not applicable)
Spatial scale	Edge of field
Degree of certainty	High

Table 2. In-field NTTPs as key drivers for food web support (e.g. primary production, provision of habitat and food)

Ecological entity	individual-population-functional group
Attribute	behavior-survival/growth-biomass-process -biodiversity
Magnitude	Negligible effect-small effect-medium effect-large effect
Temporal scale	Days-weeks-months-season->year (Not applicable)
Spatial scale	Field/landscape*
Degree of certainty	High

*medium effects (field), negligible effects (landscape)

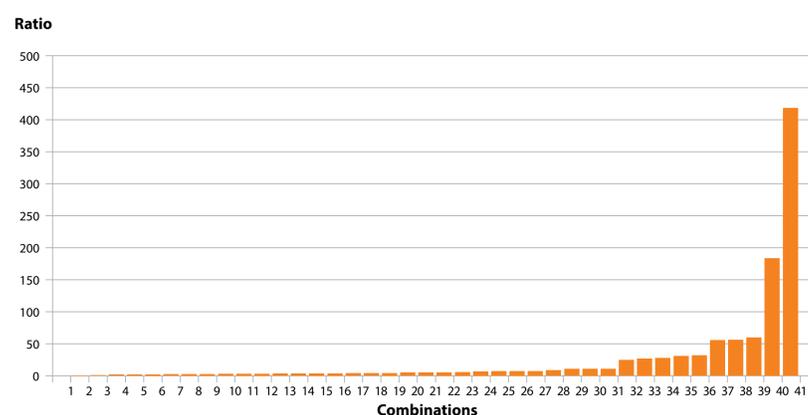
In current test guidelines, plants are tested only at the seedling/juvenile stage. However, effects can be observed on either the vegetative or the reproductive parts.

A number of test endpoints which can be derived directly from standard tests with several species are proposed for the risk assessment of NTTPs:

- Reproductive endpoint:** based on the 5th percentile of distribution of effect rate ($ER_{repro10}$) values;
- Biomass endpoint:** one based on ER_{veg50} values, one based on ER_{veg10} values. Both the 5th percentiles of their respective distributions;
- Visual endpoint** (e.g. chlorosis or bleaching): based on a 5th percentile of the distribution of $ER_{visual50}$ values;

If reproductive data are not available, to derive the $(ER)_{repro10}$, the 5th percentile of the ER_{veg10} (when available) or the ER_{veg50} should be used in combination with a suitable extrapolation factor (EF). The EFs used to extrapolate from vegetative to reproductive endpoints and calculated with a 95 % confidence are 3 (ER_{veg10}) and 35 (ER_{veg50}), respectively.

Figure 1. Ratio between vegetative endpoint (ER_{50}) and reproductive endpoint (ER_{10})



References and Acknowledgments

[1] European Commission. 2002. Guidance Document on Terrestrial Ecotoxicology Under Council Directive 91/414/EEC. SANCO/10329/2002 rev.2 final, 17 October 2002 22:11-33.

[2] EFSA PPR Panel (EFSA Panel on Plant Protection Products and their Residues). 2014. Scientific Opinion on the science behind addressing the state of the science on risk assessment of plant protection products for non-target terrestrial plants. EFSA J 12(7):3800.

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For more information, please contact: Pesticides unit

Email: maria.arena@efsa.europa.eu
http://www.efsa.europa.eu