Appendix F

Non-target terrestrial plants

APRIL 2019
INTRODUCTION

Non-target plants are defined as non-crop plants outside the treatment area. Non-target plants are primary producers supporting organisms at higher trophic levels. These supporting services include primary production, habitat provision and food for other trophic levels. Since it is known that phytotoxic effects may occur for products other than herbicides, some level of testing of all active constituents is necessary, unless it can be shown that exposure will not occur.

The general protection goal is to protect biodiversity and ecosystems. The protection goal for higher terrestrial plants aims to protect both plant species abundance (e.g., numbers and/or cover of individuals for single species) and plant diversity in an agricultural area (EFSA 2014). It is assumed that the biodiversity is maintained when the plant populations will not be affected by the use of pesticide product.
TOXICITY FIGURES

Tier 1 testing

Single-dose phytotoxicity screening data for terrestrial non-target plants at or above the maximum application rate on a wide range of species (eg, at least six but preferably more), is recommended as a first tier to determine whether the active constituent has phytotoxic properties. These data could be supplemented by further information on efficacy, selectivity, phytotoxicity, etc. included in the biological dossier or obtained from the different field assays such as efficacy trials, residue studies, environmental fate and ecotoxicological studies, etc. The initial step is usually skipped for herbicides and plant growth regulators as these inevitably will end up in the second tier.

Tier 2 testing

If > 50 per cent effect is observed in Tier 1 testing for one or more species, dose-response relationships for at least six species representing families for which significant herbicidal action has been found are recommended to quantify the level of effect using both soil and foliar exposure scenarios under Tier 2. The second tier considers laboratory assays on a selection of plant species. It is recommended to conduct dose-response tests on six to 10 plant species representing as many taxonomic groups as possible. In order to generate data that are useful for probabilistic approaches there should not be a focus exclusively on species assumed to be the most sensitive. If, from the screening data, a specific mode of action is evident, or strong differences in the species sensitivities are identified, this evidence should be used in the selection of the appropriate test species. This may be especially true if non-herbicides reach Tier-2 testing. ER25, ER50 and, if possible, HR5 values (on the ER50 data) should be generated.

For foliar applications, the bioassays should be conducted by spraying the product on the plants, to reproduce as far as possible the realistic exposure conditions and, in particular, spray drift. Soil application should be chosen if that is more appropriate with regard to the mode of action. The test substance should be the lead formulation (or another formulation) because formulations contain, besides the active substance, all those components and co-adjuvants required for maximising biological activity. For systemic products applied on the ground/soil, the tests should reproduce this application pattern.

Tier 3 testing

The third tier requires semi-field or field assays, to study the effects observed on non-target plants during realistic applications. Such studies are time-consuming and expensive; before undertaking them it should be checked whether there are options for the refinement of exposure and/or effects. Furthermore, as for all other non-target organisms, field or semi-field studies are not required if the risk based on the Tier 2 assessment could be managed by risk mitigation measures (ie mandatory no-spray zones).

Field or semi-field studies with non-target plants are not standardised. Therefore applicants might wish to discuss the protocol with the APVMA under a Pre-Application Assistance (PAA) application. Generally, effects on plant abundance and biomass production at different distances from the crop or at exposure levels representing different distances from the crop should be analysed. These studies are compatible with most semi-field and field studies.
RISK ASSESSMENT

Non-target terrestrial plants adjacent to the treatment area could be directly exposed to spray drift during treatment. Risks to non-target terrestrial plants are assessed using a tiered approach, which is in line with current EPHC (2009) guidance. Although non-target plants are defined as non-crop plants located outside the treatment area, screening level risk assessment assumes the worst-case scenario of a direct exposure to the treatment in order to identify those substances and associated uses that do not pose a risk to non-target terrestrial plants (Tables F1 and F2). Both pre-emergent and post-emergent exposure scenarios are considered.

Only the maximum single application rate is considered for post-emergent exposure; however, for pre-emergent exposure, accumulated residues in soil are considered in the case of multiple applications.

If the RQ exceeds 1.0 for either exposure scenario, a spray drift assessment is conducted to establish mandatory no-spray zones. Please refer to our website for details on APVMA standard scenarios for spray drift.
## RISK ASSESSMENT TABLES

### Table F 1: Regulatory acceptable rates for non-target terrestrial plants

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Test</th>
<th>Endpoint</th>
<th>Assessment factor*</th>
<th>RAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-emergent</td>
<td>Seedling emergence</td>
<td>ER50 XX g ac/ha</td>
<td>10</td>
<td>XX g ac/ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ER25 XX g ac/ha</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HR5 XX g ac/ha</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Post-emergent</td>
<td>Vegetative vigour</td>
<td>ER50 XX g ac/ha</td>
<td>10</td>
<td>XX g ac/ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ER25 XX g ac/ha</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HR5 XX g ac/ha</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Assessment factor as per EPHC (2009)
RAR = regulatory acceptable rate = endpoint/assessment factor

### Table F 2: Screening level risk assessment for risks to non-target terrestrial plants

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Test</th>
<th>Application rate (g ac/ha)</th>
<th>RAR (g ac/ha)</th>
<th>RQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-emergent</td>
<td>Seedling emergence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-emergent</td>
<td>Vegetative vigour</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For pre-emergence exposure, cumulative application rate is based on maximum single application rate, number of applications, interval between applications and soil DT50
RAR = regulatory acceptable rate (from Table F1)
RQ = risk quotient = rate / RAR, where acceptable RQ <1
REFERENCES

