



Appendix D

Other non-target arthropods

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INTRODUCTION

Non-target arthropods play a vital role in the ecosystem, and therefore pesticide products that are used as prescribed should not cause unacceptable effects on populations of non-target arthropods both in- and off-field. Many species of non-target arthropods are natural enemies of pests. Their presence and healthy activity keeps primary and secondary pests in check. The objective of the assessment is therefore to ensure that any risk to non-target arthropod populations, both within and off the cropping field, are highlighted and to assess the nature of the risk so that adequate risk reduction measures can be taken.

TOXICITY VALUES

Tier 1 testing

The Tier 1 laboratory test is a dose-response test assessing lethal effects of the active substance on the test species. This tier has a screening character and is required for all representative formulations where exposure of non-target arthropods can occur. At this tier, detailed information is not considered, eg about sublethal effects or about the effects of specific formulations. A representative formulation should be used for this test instead of the active substance as relevant experimental exposure of non-target arthropods to the pure active substance is impractical. Testing guidelines indicated in Candolfi et al. (2000) should be used for dose-response tests. The study should include different application rates of the test compound and should allow calculation of a dose-response regression curve. The report should include regression analysis and calculation of the required LR50 to be expressed in g ac/ha (Table D1). In certain conditions, eg when the toxicity is very low compared with maximum field rates or in other cases where experimental assessment of a reliable LR50 value is not reasonably possible, a limit test at the maximum seasonal rate may be sufficient.

Standard species are *Aphidius rhopalosiphi* (a parasitoid wasp) and *Typhlodromus pyri* (a predatory phytoseiid mite). These standard indicator species have been shown to be relatively sensitive and representative of non-target arthropods in a comparative study of arthropods of nine families exposed to 95 plant protection products (Candolfi et al. 1999) and are therefore suitable as indicator species for this group of terrestrial non-target arthropods.

Tier 2 testing

Higher-tier tests may comprise extended laboratory tests (eg on natural substrates), semi-field bioassays and field experiments. They are not necessarily executed in this order but depending on the question that needs to be answered one may choose, for instance, to skip extended laboratory tests and move directly to semi-field or field experiments.

If one or both indicator species are affected in Tier 1 testing, the affected species should be tested further in higher-tier studies. Moreover, additional species should be included in higher-tier tests. The choice of additional species, including criteria for the choice and testing methodology, is discussed in Candolfi et al. (2001). IGRs should be tested in these higher tiers on susceptible, immature life stages.

Tier 3 testing

In field trials, effects on populations rather than on individuals should be the testing endpoint. The effect on the population of a species including time to recolonization/recovery should be analysed by comparison with control plots. There is no fixed threshold (trigger) value for acceptability of effects, because the consequence/impact of treatments and potential for recovery can be markedly different for different organisms and circumstances. Factors such as mobility of a species, reproduction time and developmental stage at risk can influence the severity of product effects on a population.

RISK ASSESSMENT

Other beneficial (predatory and parasitic) arthropods could be directly exposed to the active constituent within the crop during treatment or as a result of spray drift. Risks to beneficial arthropods are assessed using a tiered approach, which is in line with EPPO (2003) guidance.

Tier 1 assessment

A screening level risk assessment utilises Tier 1 toxicity data and assumes the non-target arthropods are exposed to fresh-dried residues within the treatment area immediately after application (Table D2).

Tier 2 assessment

If it is necessary to refine the assessment, a Tier 2 assessment is conducted which considers higher-tier tests conducted under progressively more natural, realistic conditions.

Tier 3 assessment

The Tier 3 assessment considers the results of field trials. Relevance to the Australian situation must be considered. Acceptability has to be assessed on a case-by-case basis for each arthropod taxon or group under investigation. Expert judgement is required to interpret field study results. In some cases, in particular with insecticides, a certain level of adverse impact on in-field arthropods is likely and almost unavoidable. The final criterion for acceptable risk in-field is that non-target arthropods affected by pesticide products should be able to recover to levels of corresponding control fields within, at most, one year after treatment(s).

RISK ASSESSMENT TABLES

Table D 1: Regulatory acceptable rates for other non-target arthropods

Taxonomic group	Indicator species	Endpoint	Assessment factor*	RAR
Tier 1 toxicity testing				
Predatory arthropods	<i>Typhlodromus pyri</i>	LR50 XX g ac/ha	0.5	XX g ac/ha
Parasitic arthropods	<i>Aphidius rhopalosiphi</i>	LR50 XX g ac/ha	0.5	XX g ac/ha
Tier 2 toxicity testing				
Predatory arthropods	<i>Typhlodromus pyri</i>	LR50 or ER50 XX g ac/ha	1	XX g ac/ha
	<i>Coccinella septempunctata</i>	LR50 or ER50 XX g ac/ha	1	XX g ac/ha
Parasitic arthropods	<i>Aphidius rhopalosiphi</i>	LR50 or ER50 XX g ac/ha	1	XX g ac/ha
	<i>Aleochara bilineata</i>	LR50 or ER50 XX g ac/ha	1	XX g ac/ha

RAR = regulatory acceptable rate = endpoint/assessment factor

*Tier 1 assessment factor for predatory and parasitic arthropods as per trigger value specified in EPPO (2003) at the Tier 1 level of assessment for the indicator species. Other species and higher tiers (extended laboratory, semi-field and field studies) have an assessment factor of 1.

Table D 2: Assessment of risks to other non-target arthropods

Taxonomic group	Indicator species	Application rate (g ac/ha)	RAR (g ac/ha)	RQ
Tier 1 assessment				
Predatory arthropods	<i>Typhlodromus pyri</i>			
Parasitic arthropods	<i>Aphidius rhopalosiphi</i>			
Tier 2 assessment				
Predatory arthropods	<i>Typhlodromus pyri</i>			
	<i>Coccinella septempunctata</i>			
Parasitic arthropods	<i>Aphidius rhopalosiphi</i>			
	<i>Aleochara bilineata</i>			

Cumulative application rate is based on maximum single application rate, number of applications, and default foliar DT50 10 days

RAR = regulatory acceptable rate (from Table D1)

RQ = application rate / RAR, where acceptable RQ ≤ 1.0

RISK MITIGATION

Risk management should be done separately for in-field and off-field situations. 'In-field' is the land intended for agricultural production activities (including horticulture and forestry). The field includes a cropped area and field margins. A cropped area is that part of the field intended to grow the crop. It extends half a row distance beyond the centre of the last crop row. A field margin is the outer part of the field, between the cropped area and the off-field area. The field margin includes the parts of land used for agricultural purposes such as roads and fences, wind breaks, and vegetation planted for reduction of drift (catch crop) and run-off. 'Off-field' is all area surrounding the field. The off-field area includes natural and semi-natural habitats, in particular hedgerows and woodland. The edge of the field is the boundary line between the field margin and the off-field area.

In-field risks

If acceptable risk cannot be determined within the treatment area and compatibility with IPM is desired, then restraints on the application rate, application frequency or intervals, or timing of application (early and late crop stages, presence of concerned populations of non-target arthropods) can be considered. Otherwise, the product is not considered to be compatible with IPM.

Off-field risks

Currently the APVMA does not required mandatory no-spray zones for the protection of non-target arthropods, and therefore does not conduct a spray drift assessment. In the interim, advisory text is required to minimise spray drift to non-crop areas when in-field risks are identified.

REFERENCES

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