

Make a BeeCision – Is Insecticidal Activity of a PPP a Criterion to Trigger Laboratory Studies with Non-*Apis* Bees?

Sonja Haaf, Fabian Schroeder, Sabine Hecht-Rost, Johannes Lückmann and Oliver Körner
RIFCON GmbH, Goldbeckstraße 13, 69493 Hirschberg, Germany (E-Mail: sonja.haaf@rifcon.de)

Introduction

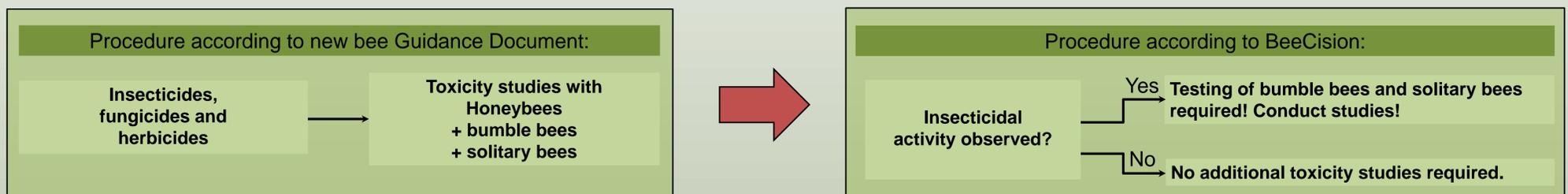
In 2013, under the new EU Regulation 1107/2009, the European Food Safety Agency (EFSA) published a new Guidance Document on risk assessment for pollinators (EFSA, 2013). In addition to assessments on honeybees, risk assessments on bumble bees and solitary bees are required. Because validated test guidelines for non-*Apis* bees will not be available in the near future, in the absence of other data, risk assessments for these species are based on honeybee toxicity endpoints. However, non-*Apis* risk assessments based on honeybee data sets are very conservative. Plant protection products (PPPs) therefore frequently fail the initial screening step and higher tier testing is automatically triggered. To bridge the time until suitable testing guidelines are available, RIFCON suggests the use of the BeeCision tool to assess the risk posed by non-insecticidal PPPs to non-*Apis* bees.



Material & Methods

Risk assessment screening steps for 20 herbicides were conducted on honeybees, bumble bees and solitary bees. According to the new EFSA Guidance Document (EFSA, 2013) each of the herbicides is currently approved for use in Europe. The non-*Apis* risk assessments were based on acute honeybee toxicity endpoints obtained from data sets available to the public (e.g. EFSA Conclusions). In addition, standard Tier I risk assessments on the non-target arthropods (NTA) *Aphidius rhopalosiph* and *Typhlodromus pyri* were conducted (according to Candolfi *et al.*, 2001), to identify potential insecticidal activity of the 20 herbicides.

A decision tool (BeeCision) was developed in order to more realistically assess the risk posed by non-insecticidal PPPs to bumble bees and solitary bees. BeeCision reinstates the 'insecticidal activity' approach originally suggested in the draft EFSA Guidance Document and triggers further tests on non-*Apis* species only when potential insecticidal activity is clearly demonstrated by honeybee and NTA risk assessment.



Results

Table 1: Results of non-target arthropods and pollinator risk assessment for 20 herbicides according to the new bee Guidance Document

Active substance	Formulation	NTA (Tier I)	Screening honeybee				Insecticidal activity triggers further pollinator studies?	Screening bumble bee ^A				Screening solitary bee ^A				
			Active substance		Formulation			Active substance		Formulation		Active substance		Formulation		
			contact	oral	contact	oral		contact	oral	contact	oral	contact	oral	contact	oral	
Acetic Acid	CEL 350 20 H (TEM 123)	x	x	x	x	x	Yes	x	x	x	x	x	x	x	x	x
2,4-D	2,4-D DMA 600 SL	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Thiencarbazone-methyl	SC 450	✓	✓	✓	✓	✓	No	✓	✓	✓	✓	✓	✓	✓	✓	x
Aminopyralid	GF-839	✓	✓	✓	✓	x	Yes	✓	x	✓	x	✓	✓	✓	✓	x
Trinexapac-ethyl	Moddus 250 EC	x	✓	✓	✓	✓	Yes	x	x	x	x	x	x	x	x	x
Quizalofop-P-ethyl	Targa Super	x	✓	✓	✓	x	Yes	x	x	x	x	x	x	x	x	x
Imazaquin	Meteor	✓	✓	✓	✓	✓	No	✓	x	✓	x	✓	✓	✓	✓	x
S-abciscic acid	ProTone SL	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Terbuthylazine	Terbuthylazine 500 g/L SC	✓	✓	x	✓	✓	Yes	x	x	x	x	x	x	x	x	x
Quinmerac	Butisan Top	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Flurochloridone	Racer	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Pinoxaden	A-12303C (+ A-12127R)	x	✓	✓	✓	✓	Yes	✓	x	✓	x	✓	✓	✓	✓	x
Metazachlor	FUEGO	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Metamitron	Goltix SC 700	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Fluroxypyr	Starane 200 EC	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Diflufenican	Herold SC 600	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Dicamba	Banvel 480 SL	x	✓	✓	✓	✓	Yes	x	x	x	x	x	x	x	x	x
Clopyralid	Lontrel 100	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Chloridazon	Pyramin WG	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x
Chlormequat	CCC 750 g/L	✓	✓	✓	✓	✓	No	x	x	x	x	x	x	x	x	x

✓ Risk acceptable x Risk not acceptable NTA = Non-target arthropods ^A Risk assessment based on honeybee toxicity endpoints including a safety factor of 10 (details are provided in EFSA (2013))

Calculations based on honeybee toxicity endpoints revealed that all 20 herbicides failed the initial screening step for bumble bees and solitary bees. Moreover, refinement with actual residue and sugar content data will probably not lead to an improved outcome of the assessment. However, based on the BeeCision tool it is only necessary to conduct additional bumble bee and solitary bee studies in 7 out of 20 cases (see Table 1). Risk assessments conducted on non-target arthropods suggest that many of the herbicides have little or no insecticidal activity. In particular, risk assessments for 13 of the herbicides suggest that these compounds pose no risk to either the standard arthropod species or honeybees. This indicates an acceptable risk to all insects including pollinators exposed to these 13 compounds.

Conclusion

As long as the new Guidance Document on risk assessment for pollinators is not legislated (see European Commission, 2014) or no full data set is available, non-target arthropods could be used as indicators of insecticidal activity. The BeeCision approach thus provides a useful strategy to conduct a more relevant risk assessment for honeybees and other pollinators.

Literature

- Candolfi *et al.* (2001) 'Guidance Document on regulatory testing procedures for plant protection products with non-target arthropods' From the workshop, European Standard Characteristics of Non-target Arthropod Regulatory Testing (ESCORT 2) 21-23 March 2000.
EFSA (2013) EFSA Guidance Document on the risk assessment of plant protection products on bees (*Apis mellifera*, *Bombus* spp. and solitary bees). EFSA Journal 2013;11(7):3295,
European Commission (2014) Implementation plan for the EFSA Guidance Document on the Risk Assessment of Plant Protection Products on Bees (*Apis mellifera*, *Bombus* spp. and solitary bees) SANCO 10606/2014, 16 May 2014