



The utility of honey bee larval toxicity bioassays for the safety evaluation of a pesticide

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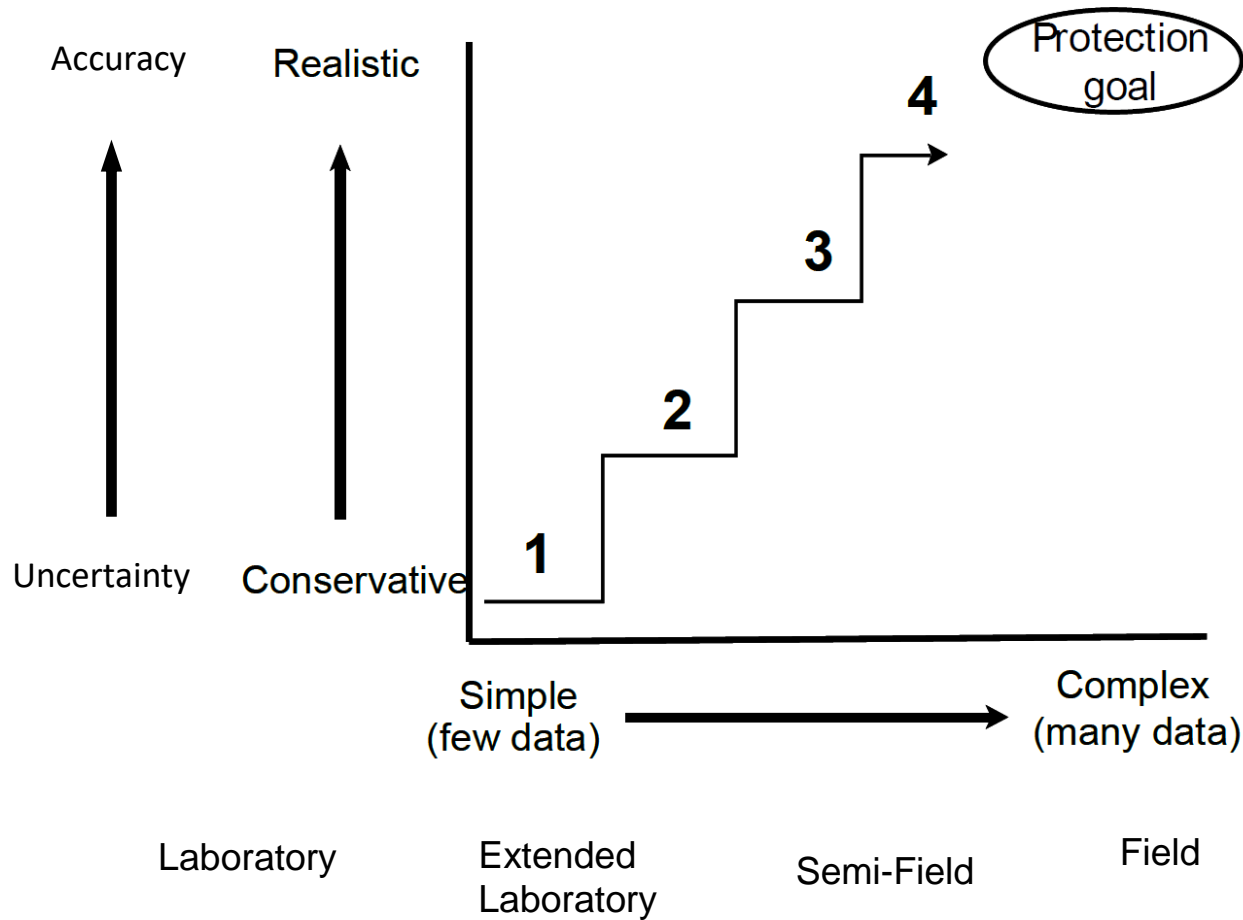
Scientific Research Improving Risk Assessment for Pollinators



PRTF member companies



Pollinator Risk Assessment scheme by US_EPA



Pollinator Risk Assessment scheme by US_EPA

Study type	Tier	Guidelines
HB adult acute contact (LD50)	Tier 1	OECD 214
HB adult acute oral	Tier 1	OECD 213
HB adult chronic	Tier 1	OECD 245
HB larval acute	Tier 1	OECD 237
HB larval chronic	Tier 1	OECD 239
HB toxicity to residues on foliage	Tier 2	850.3030
Residues in pollen and nectar	Tier 2	Non-guideline
Semi-field testing for pollinators (tunnel or colony feeding studies)	Tier 2	Non-guideline; OECD 75, EPPO 170
Field testing for pollinators	Tier 3	850.3040



Pollinator Risk Assessment scheme by US_EPA

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Larval Study Design

OECD
237

1A)

Single
Exposure

Diet	A	-	B	C + test solution	C	C	E
Volume of diet/larva (µl)	20	-	20	30	40	50	

D-3 D-2 D-1 D0 D1 D2 D3 D4 D5 D6 D7

OECD
239

1B)

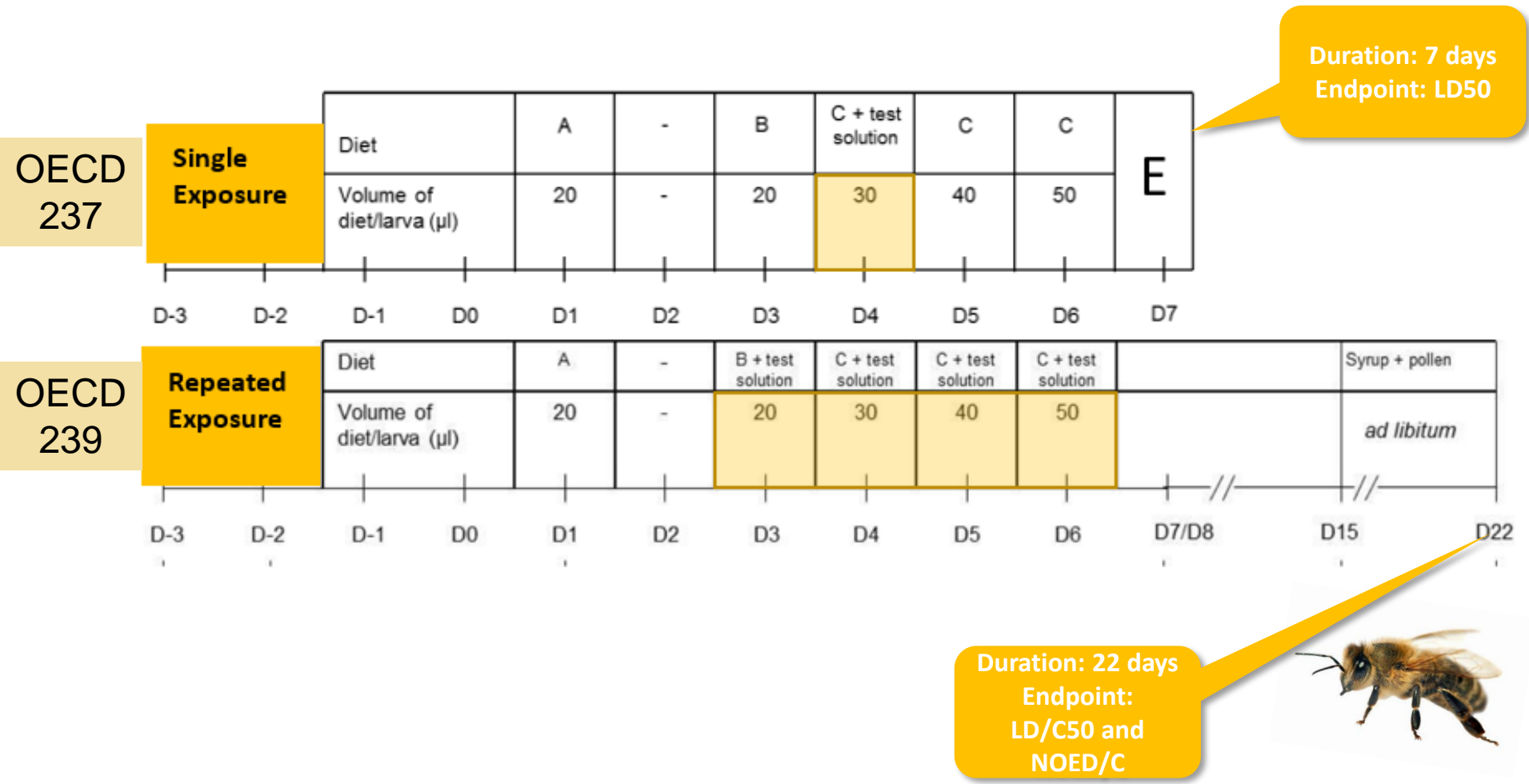
Repeated
Exposure

Diet	A	-	B + test solution	C + test solution	C + test solution	C + test solution		Syrup + pollen
Volume of diet/larva (µl)	20	-	20	30	40	50		<i>ad libitum</i>

D-3 D-2 D-1 D0 D1 D2 D3 D4 D5 D6 D7/D8 D15 D22



Larval Study Design



Larval Study Design

Question 1: Are D7/D8 LD50/LC50 values different in these two tests?

OECD 237	Single Exposure	Diet	A	-	B	C + test solution	C	C	E						
		Volume of diet/larva (µl)	20	-	20	30	40	50							
			D-3	D-2	D-1	D0	D1	D2	D3	D4	D5	D6	D7		
OECD 239	Repeated Exposure	Diet	A	-	B + test solution	C + test solution	C + test solution	C + test solution		Syrup + pollen					
		Volume of diet/larva (µl)	20	-	20	30	40	50		<i>ad libitum</i>					
			D-3	D-2	D-1	D0	D1	D2	D3	D4	D5	D6	D7/D8	D15	D22



Larval Study Design

Question 1: Are D7/D8 LD50/LC50 values different in these two tests?

OECD	Exposure Type	Diet	D1	D2	D3	D4	D5	D6	D7	D7/D8	D15	D22
237	Single Exposure	A	-	B	C + test solution	C	C	E				
		Volume of diet/larva (µl)	20	-	20	30	40					
239	Repeated Exposure	A	-	B + test solution	C + test solution	C + test solution	C + test solution	Syrup + pollen <i>ad libitum</i>				
		Volume of diet/larva (µl)	20	-	20	30	40					

Question 2: Are weight after adults' emergence a sensitive indicator of a pesticide effect ?



Methodology

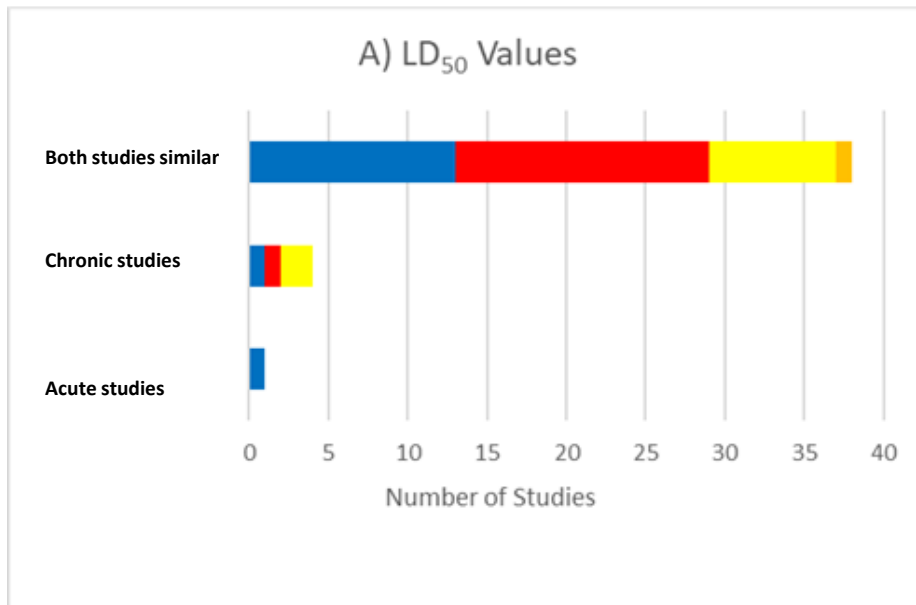
“Study data were acquired from pesticide companies (*i.e.*, registrants) that generated larval toxicity data as part of the data requirements necessary to inform a comprehensive environmental risk assessment.”

- 86 study reports – 43 different compounds



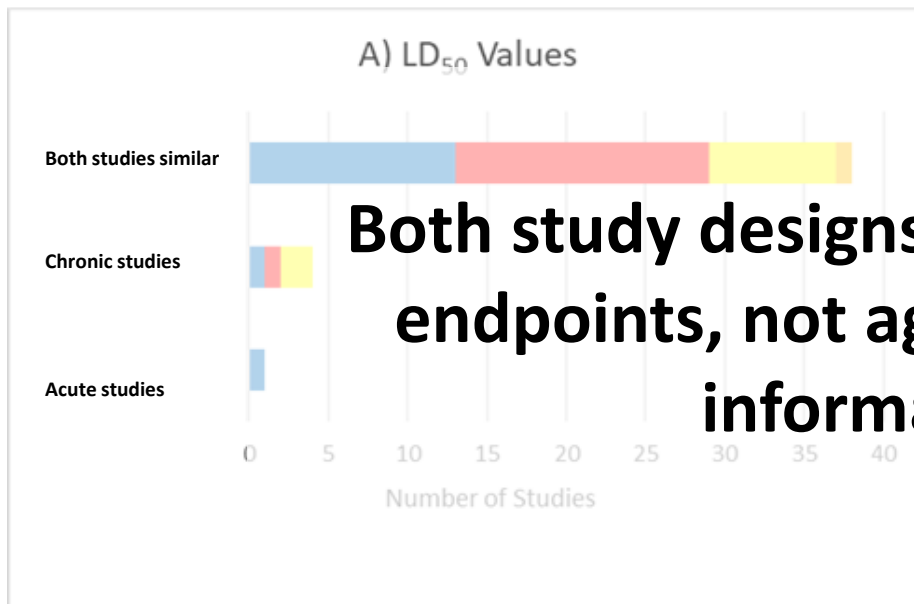
SMITHERS
VISICENT

Larval Study Design



■ Insecticides ■ Fungicides ■ Herbicides ■ Safener

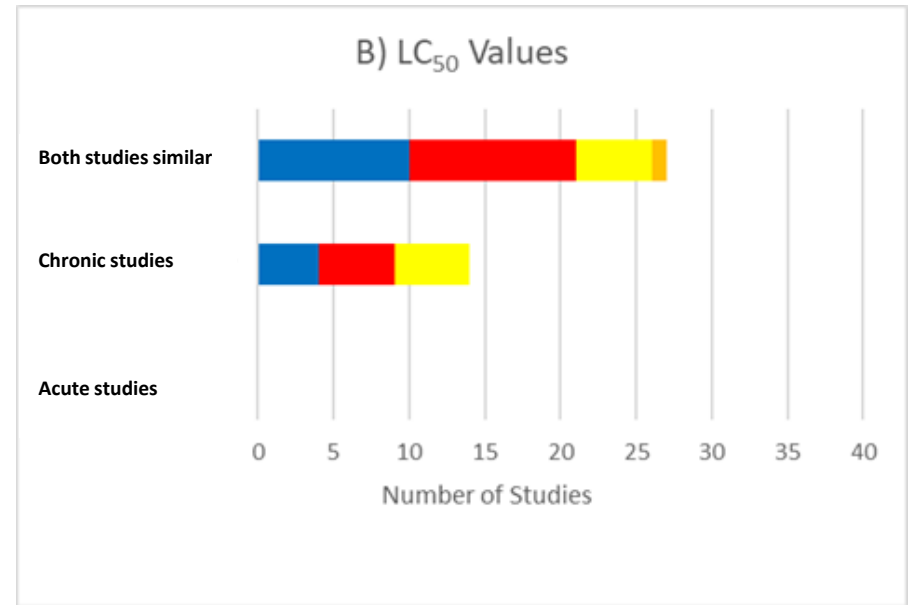
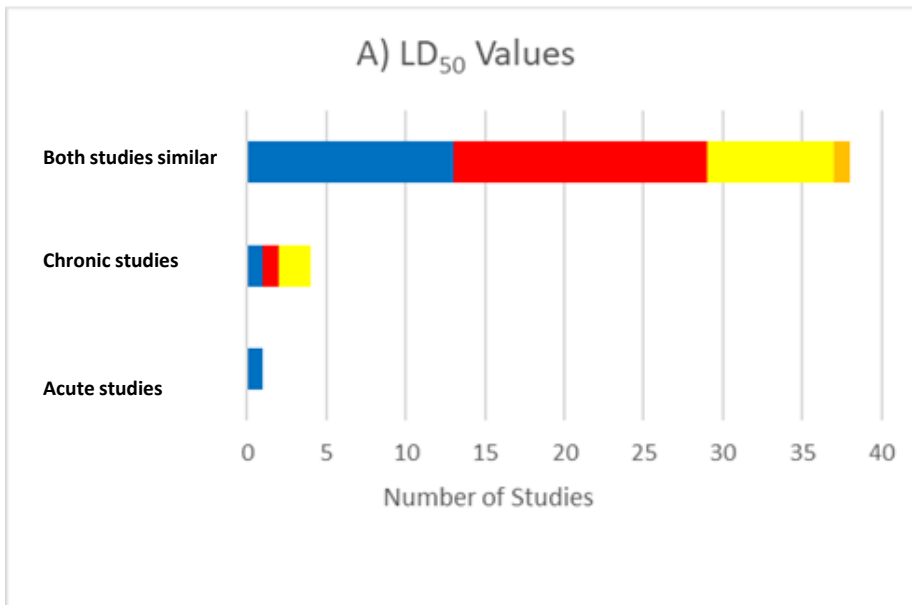
Larval Study Design



Both study designs result in similar endpoints, not aggregating new information

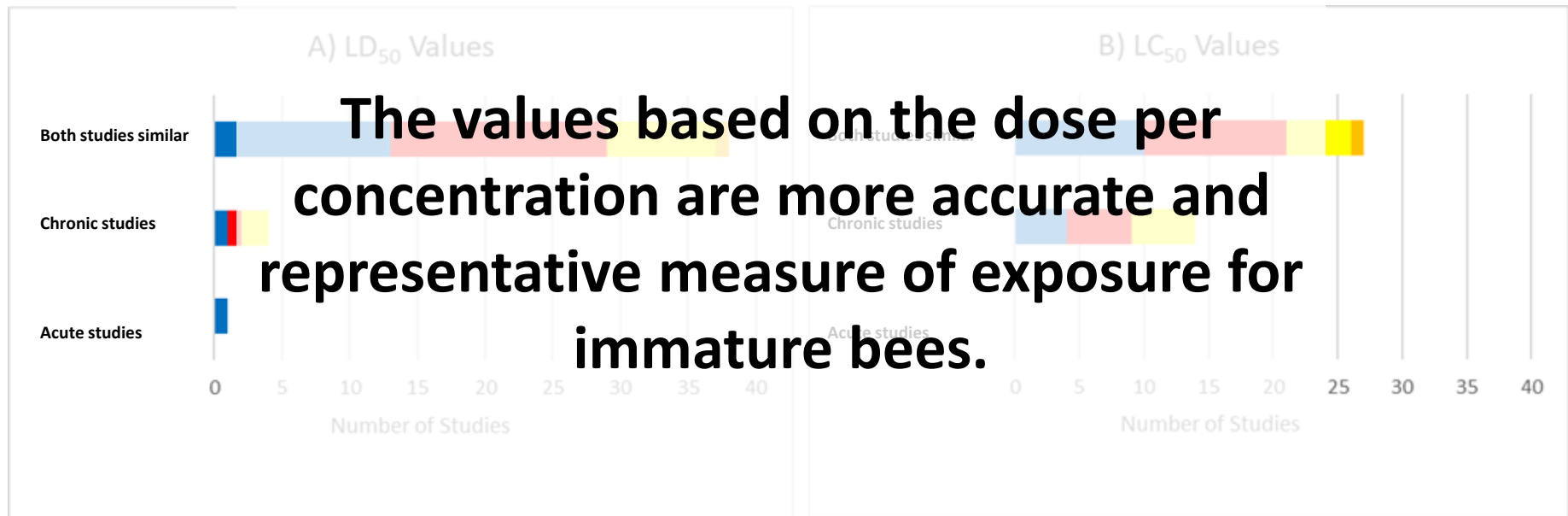
■ Insecticides ■ Fungicides ■ Herbicides ■ Safener

Larval Study Design



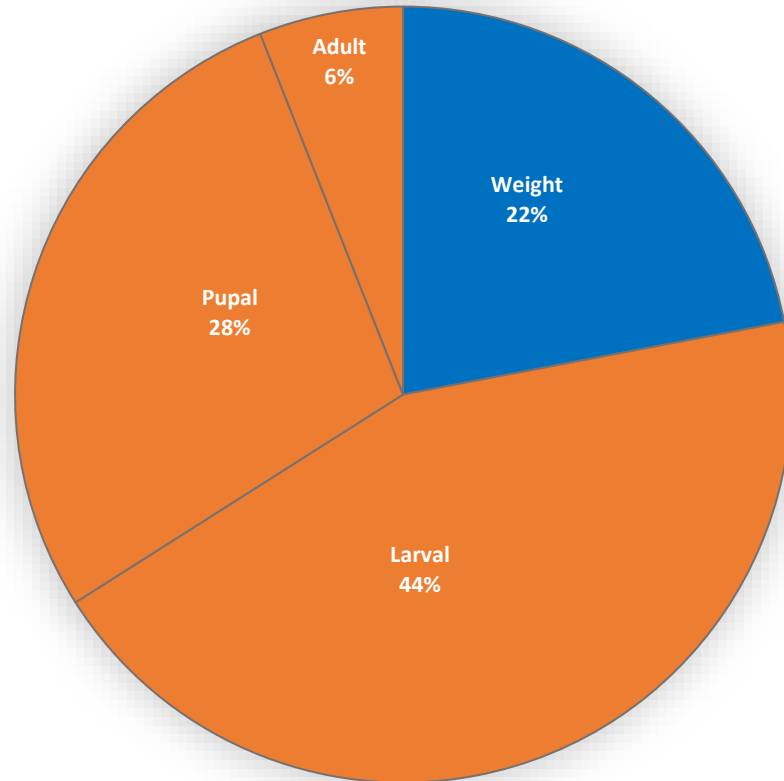
■ Insecticides ■ Fungicides ■ Herbicides ■ Safener

Larval Study Design



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Weight After Emergence

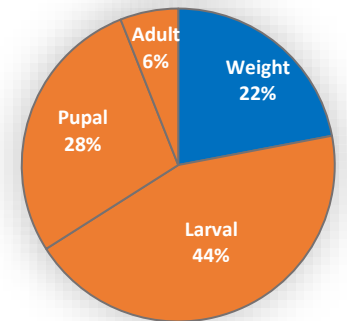
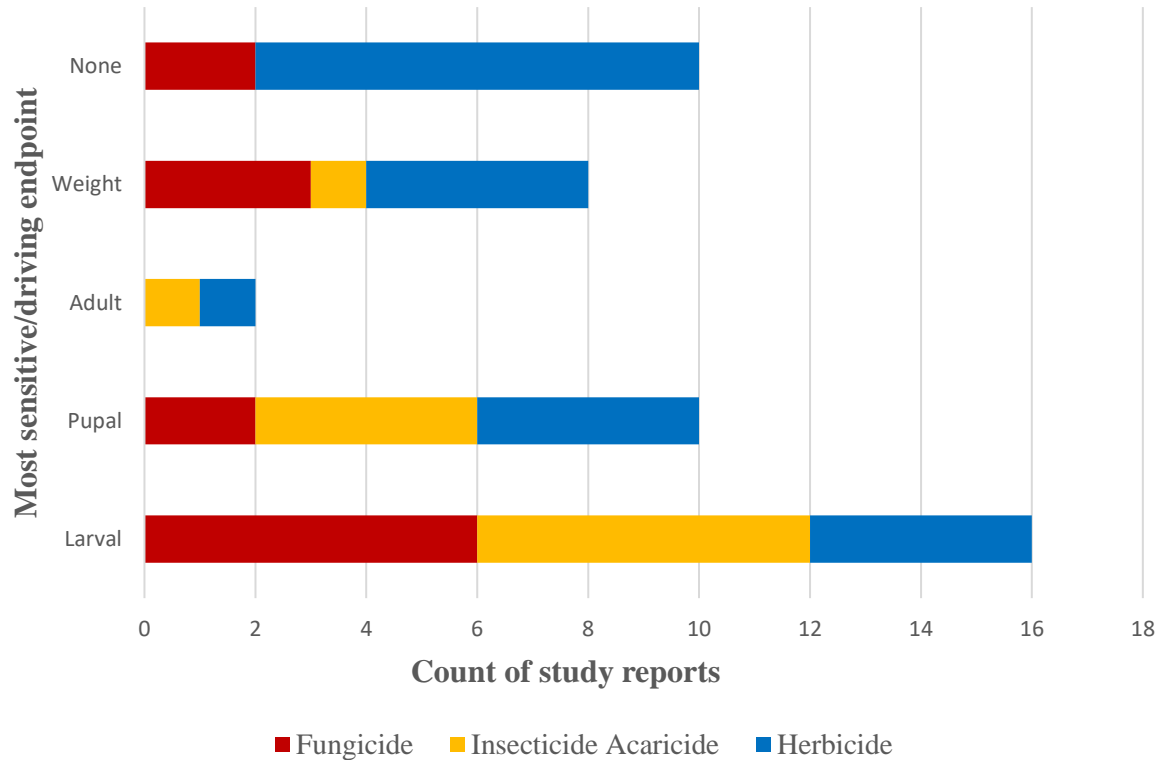


Weight After Emergence

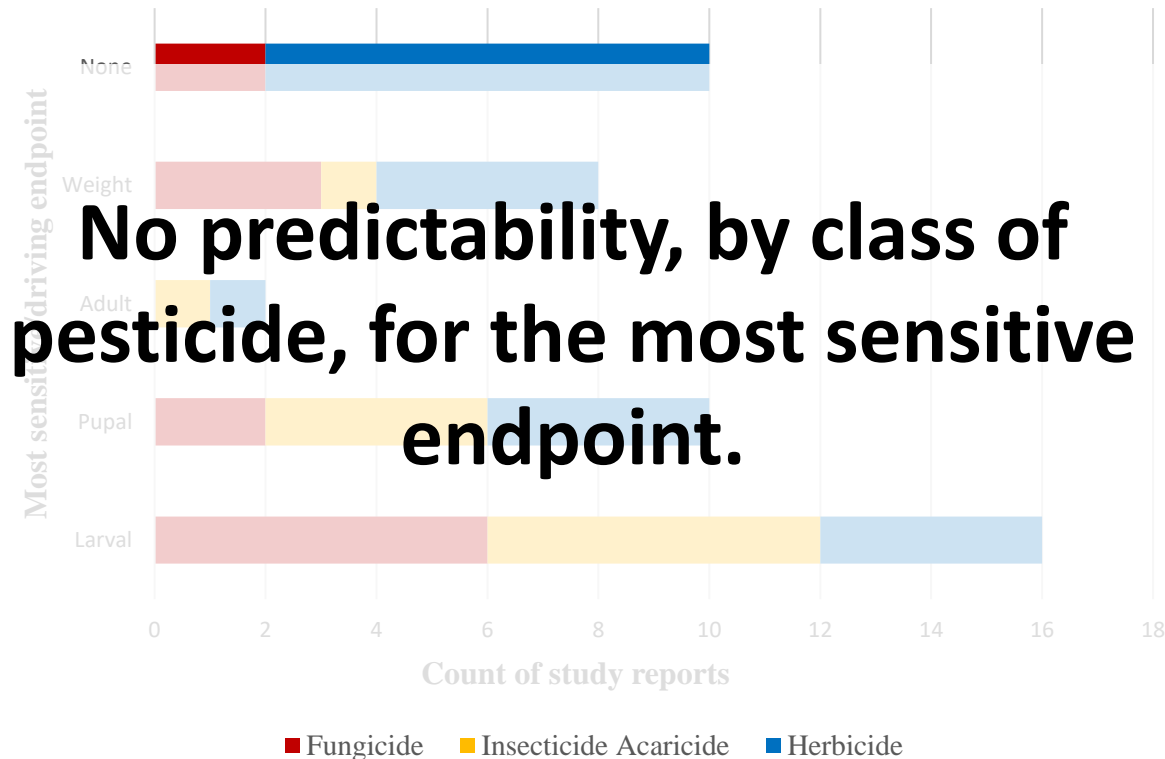
The hazard assessment was driven by the weight after emergence among 22% of the compounds.



Weight After Emergence



Weight After Emergence



Conclusion

- Reliability of chronic study design (OECD 239) as a robust study design;
- Weight after emergence stands out as a potential indicator for overall growth.

(relevance should be carefully considered due to the lack of standardized guidance).





**POLLINATOR
RESEARCH
TASK FORCE**

Thank you!

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