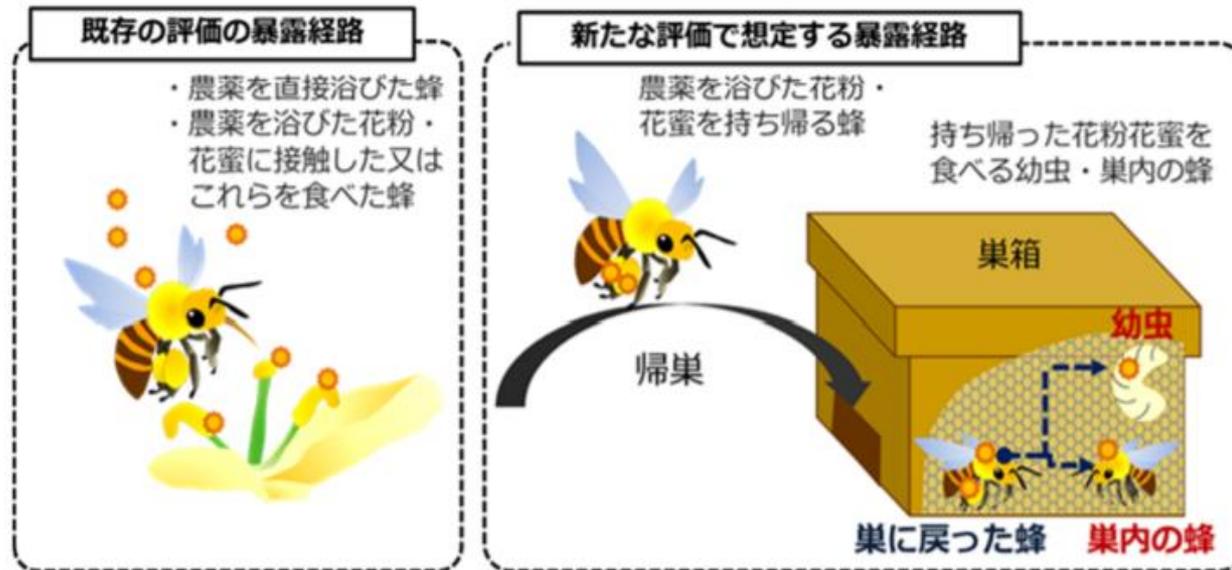


Risk assessment of pesticides to honeybee in Japan

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Honeybee and wild bee

- **Risks to honeybee and wild bees (Hymenoptera: Anthophila) in crop fields.**
- **Contact and oral toxicity of pesticides applied in crops field to be checked.**

Timing of application at crop flowering stage	Requirement of bee toxicity studies		
	Acute contact toxicity	Acute oral toxicity to adult bee	Acute oral toxicity to larval bee
Yes	Y	Y	Y
No	Y	N	N

High risk to acute oral toxicity

chronical toxicity studies

To refine risk assessment

Residue study in pollen and honey

Guidelines of studies

- OECD Test No. 214: Honeybees, Acute Contact Toxicity Test
 - OECD Test No. 213: Honeybees, Acute Oral Toxicity Test
 - OECD Test No. 237: HoneyBee (*Apis mellifera*) Larval Toxicity Test, Single Exposure OECD Environment, Health and Safety Publications Series on Testing and Assessment
 - OECD Test No. 245: HoneyBee (*Apis mellifera* L.), Chronic Oral Toxicity Test

 - No. 239: Guidance Document on HoneyBee (*Apis mellifera*) Larval Toxicity Test, Repeated Exposure
- <Higher tier study>
- OECD Environment, Health and Safety Publications Series on Testing and Assessment No. 75: Guidance Document on The HoneyBee (*Apis mellifera* L.) Brood Test Under Semi-Field Conditions, Oomen PA, De Reuijter A, Van Der Steen (1992). Method for honeybee brood feeding tests with insect growth-regulating insecticides., EPPO (1992). Side-Effects on Honeybees, OCSPP 850.3040: Field Testing for Pollinators

Risk assessment

Input of application condition

Crop condition

Flowering crop	Harvest before flowering	Protected cultivation	No visit by honerbee
Yes	No	No	No
Yes	No	No	No

Pesticide application condition

Crop	minimum fold dilution	maximum spray volume (L/ha)	Application method
vegetables	2000	3000	foliar
fruits	2000	7000	foliar

Application rate g a.i./ha	Concentration in spray soution %	Risk assessment		residue in pollen and honey(µg/g)
		contact	oral	
1.5	0.0005	Yes	Yes	147
4	0.0005	Yes	Yes	392

Procedure of risk assessment

1. Crop condition

1,1 Maximum spray volume should be chosen 7000L/ha for fruits, 3000L/ha for vegetables and 1500L/ha for wheat for risk assessment.

1.2 Possibility of contact exposure of adult bee and visiting crop flowers.

2. Pesticide application condition

2.1 Minimum fold dilution is used for foliar application pesticides.

2.2 AI g/ha is input for soil treatment pesticides.

Risk assessment

Toxicity

Adult			larval
acute contact toxicity (LD ₅₀) (µg a.i./bee)	acute oral toxicity (LD ₅₀) (µg a.i./bee)	repeated oral (LDD ₅₀) (µg a.i./bee/day)	acute oral (LD ₅₀) (µg a.i./bee)
0.10	1510		130

Calculation of exposure

Application rate g a.i./ha	Concentration in spray solution %	Risk assessment		residue in pollen and honey(µg/g)	exposure		
		contact	oral		Contact exposure to adult (µg/bee)	Oral exposure to adult (µg/bee)	Oral exposure to larvae (µg/bee)
1.5	0.0005	Yes	Yes	147	0.035	21.9912	18.1692
4	0.0005	Yes	Yes	392	0.035	58.6432	48.4512

Risk calculation (=exposure/toxicity)

Risk exposure/toxicity				Necessity of repeated oral toxicity
adult contact	adult oral	adult repeated oral	larval acute oral	
0.388889	0.014960	-	0.146526	No
0.388889	0.039893	-	0.390735	No
<0.4	<0.4		<0.4	
	<0.04			

Criteria for higher tier study
Criteria for chronic study

Procedure

3. Toxicological studies

3.1 Adult acute contact study is necessary and adult and larval acute oral toxicity studies are required if pesticides are used at crop flowering stage.

3.2 If acute oral for adult showed high toxicity(risk \geq 0.04), chronic toxicity study becomes required)

Result:

1. Adult acute dermal toxicity<0.4: no problem
2. Adult acute oral toxicity<0.4: no problem
3. Larval acute oral toxicity<0.4: no problem
4. Adult acute oral toxicity<0.04: no need of chronic acute oral