Background

In de Tweede Kamer is op 17 februari 2011 motie 19 aangenomen. Deze motie betreft de herbeoordeling van bestrijdingsmiddelen op basis van neonicotinoïden voor het onderdeel (subletale) effecten op bijen. Dit document is een concept beoordeling van het risico voor bijen van momenteel in Nederland toegelaten middelen op basis van thiamethoxam. Deze concept beoordeling is geen standpunt van het College. Om de zorgvuldigheid van het herbeoordelingtraject te borgen, krijgt de toelatinghouder de gelegenheid om te reageren op de concept beoordeling. Mogelijk leidt dit tot wijziging van de voorlopige conclusies. De door Ctgb gesignaleerde vragen zijn paars gemarkeerd en de discussiepunten geel.

Biociden op basis van thiamethoxam

toelatingnr	middelnaam	toelatinghouder	werkzame stoffen	toepassing	formulering	Toepassing(en)
13399	AGITA 10 WG	Novartis Consumer Health B.V.	thiamethoxam 10%	Professioneel	Water dispergeerbaar granulaat	Tegen vliegen. Korrels die je moet oplossen en dan op de muur etc smeert. In dierverblijfplaatsen.

Er zijn geen gewasbeschermingsmiddelen van Novartis Consumer Health BV toegelaten.

A. Plant protection products
None.

B. Biocides

Risk assessment is done in accordance with the RGB published in the Government Gazette (Staatscourant) 188 of 28 September 2007, including the update of 20 October 2009, which came into effect on 1 January 2010. The bee risk assessment is based on EPPO 2010, as this includes methodology to assess the risk from systemic substances.

B.1 Professional biocidal uses

toelatingnr	middelnaam	toelatinghouder	werkzame stoffen	formulering	Toepassing(en)
13399	AGITA 10 WG	Novartis Consumer Health B.V.	thiamethoxam 10%	Water dispergeerbaar granulaat	Tegen vliegen. Korrels om op te lossen en dan in dierverblijfplaatsen op oppervlakten als muren te smeren.

This assessment is based on the endpoints listed in de draft CAR of thiamethoxam (feb 2009). The risk to honeybees of Agita 10 WG was not assessed in previous Dutch risk assessments nor in the draft CAR. However, because thiamethoxam has systemic properties and is persistent in soil, honeybees may be exposed when manure from treated stables is spread over arable fields on which flowering crops are then grown. The initial concentrations in soil of thiamethoxam and metabolite clothianidin have been calculated in the Tables below. For clothianidin, it is assumed that about 1/3 of the a.s. is converted into clothianidin. As shown, the highest PECsoil is 23.1 µg thiamethoxam/kg and 11.1 µg clothianidin /kg (veal calve grassland scenario, shown in bold). However, it is difficult to correlate this soil level to an expected level in pollen and/or nectar of crops growing on that soil based on the available information. Therefore, the applicant is requested to address the risk to honeybees from the use of Agita 10 WG (since the a.s. is systemic and persistent, it may occur in flowering plants growing in fields on which manure from treated stables is spread).

Thiamethoxam: expected concentration in soil after the use of Agita 10 WG in stables

index	Category	Subcategory	Arable land PIEC soil# (mg a.i. /kg soil)	Grassland PIECsoil after 4th application* (mg a.i. /kg soil)
1	Cattle	Dairy cattle (housed during grazing season)	3.14E-03	5.42E-03
		Dairy cattle (outdoors during grazing season	7.42E-03	1.30E-02
2		Beef cattle (housed during grazing season)	1.98E-03	3.44E-03
		Beef cattle (outdoors during grazing season)	4.43E-03	7.67E-03
3		**Veal calves**	**1.33E-02**	**2.31E-02**
4	Pigs	Sows	7.54E-03	1.31E-02
5		Sows in groups	8.20E-03	1.43E-02
6		Fattening pigs	6.02E-03	1.04E-02

7	Poultry	Laying hens in battery without treatment (aeration)	4.45E-03	7.80E-03
8		Laying hens in battery with treatment (belt drying)	6.39E-03	1.11E-02
9		Laying hens in battery cages with forced drying (deep pit, high rise)	4.15E-03	7.27E-03
10		Laying hens in compact battery cages	3.75E-03	6.48E-03
11		Laying hens in free ranges with litter floor (partly litter floor, partly slatted)	9.59E-03	1.84E-02
12		Broilers in free range wiht litter floor	2.68E-03	4.63E-03
13		Laying hens in free range with grating floor (aviary system)	5.61E-03	9.78E-03
14		Parent broilers in free range with grating floor	2.23E-03	3.83E-03
15		Parent broilers in rearing with grating floor	4.77E-03	8.33E-03
16		Turkeys in free range wiht litter floor	5.04E-03	8.86E-03
17		Ducks in free range wiht litter floor	5.42E-03	9.52E-03
18		Geese in free range with litter floor	3.81E-03	6.61E-03

Clothianidin: expected concentration in soil after the use of Agita 10 WG in stables.

index (i1)	Category	Subcategory	Arable land PIEC soil # N Standard (mg a.i. /kg soil)	Grassland PIECsoil after 4 application s* (mg a.i. /kg soil)
1	Cattle	Dairy cattle (housed during grazing season)	9.57E-04	2.62E-03
		Dairy cattle (outdoors during grazing season	2.27E-03	6.22E-03
2		Beef cattle (housed during grazing season)	6.03E-04	1.66E-03
		Beef cattle (outdoors during grazing season)	1.35E-03	3.71E-03
3		**Veal calves**	**4.05E-03**	**1.11E-02**
4	Pigs	Sows	2.30E-03	6.31E-03
5		Sows in groups	2.50E-03	6.86E-03
6		Fattening pigs	1.84E-03	5.04E-03
7	Poultry	Laying hens in battery without treatment (aeration)	1.36E-03	3.73E-03
8		Laying hens in battery with treatment (belt drying)	1.95E-03	5.35E-03
9		Laying hens in battery cages with forced drying (deep pit, high rise)	1.27E-03	3.48E-03
10		Laying hens in compact battery cages	1.14E-03	3.14E-03
11		Laying hens in free ranges with litter floor (partly litter floor, partly slatted)	2.93E-03	8.79E-03
12		Broilers in free range with litter floor	8.18E-04	2.24E-03
13		Laying hens in free range with grating floor (aviary system)	1.71E-03	4.70E-03
14		Parent broilers in free range with grating floor	6.79E-04	1.86E-03
15		Parent broilers in rearing with grating floor	1.46E-03	4.00E-03
16		Turkeys in free range wiht litter floor	1.54E-03	4.22E-03

17	Ducks in free range wiht litter floor	1.66E-03	4.54E-03
18	Geese in free range with litter floor	1.16E-03	3.19E-03

B.2 Non-professional biocidal uses
None.

Public literature:
Below, the preliminary results of a public literature survey are presented (see addendum).

Wu (2011) measured thiamethoxam in brood combs in the USA. The substance was found in 1 of the 13 samples, at a level of 38 ppb. The combs were contaminated with many other substances. Most frequently detected were a number of miticides used by beekeepers against Varroa. Delayed development was observed in bees reared in contaminated combs in a cage set-up. However, it is difficult to correlate this effect specifically to thiamethoxam because combs were contaminated with a cocktail of substances and may have contained also more pathogens than control combs. Also, this study does not include the implications for colony survival in the longer term.

Several large-scale monitoring studies were performed in which pesticide residues in bee hives were measured.

In a broad survey of pesticide residues, which was conducted on samples from migratory and other beekeepers across 23 USA states, one Canadian province and several agricultural cropping systems during the 2007–08 growing seasons, Mullin et al (2010) found thiamethoxam in only 0.3% (1 sample) of 350 pollen samples (at a level of 53.3 ppb). They also found 98 other pesticides and metabolites in mixtures up to 214 ppm in bee pollen alone, which according to them represents a remarkably high level for toxicants in the brood and adult food of this primary pollinator. They conclude that the effects of these materials in combinations and their direct association with CCD or declining bee health remains to be determined.

In a large study in Germany (Genersch et al., 2010), many pesticides (including miticides) were found in honeybee colonies. Thiamethoxam was not detected but it is unclear if it was included in the analysis. In this study, factors which significantly influenced overwintering succes were 1) high varroa infestiation level; 2) infection with deformed wing virus (DWV) and acute bee paralysis virus (ABPV) in autumn; 3) queen age; 4) weakness of the colonies in autumn. No effects could be observed for Nosema spp. or pesticides. The authors however consider that further investigations and controlled experiments are necessary to clarify the relation between pesticides and honeybee colony health in the long-term.

In a study in France (Chauzat et al, 2009), honeybee colony health was studied in relation to pesticide residues found in colonies. Thiamethoxam was not included in the analysis but other substances were found. No signficant relationship was found between the presence of pesticide residues and the abundance of brood and adults, nor between colony mortality and pesticide residues. The authors conclude that more work is needed to determine the role these residues play in affecting colony health.

The (thiamethoxam and other) residues reported in these publications cannot be linked to a certain (type of) use. Thus, from the public literature the only conclusion that can be drawn with certainty is that in some countries thiamethoxam is found in different bee matrices in the field. In these matrices usually a mixture is present of many pesticidal substances. So far, no statistical correlation has been found between the presence of pesticide residues in colonies and honeybee health in the long-term. Other factors than pesticides háve been shown to be linked to overwintering succes, though.

In the Netherlands, relatively high bee losses have been seen in recent years (increased mortality after winter). These losses have mainly been attributed to beekeeping practice with regard to pests and diseases, especially the *Varroa* mite, since it has been found that adequate and timely Varroa treatment reduces winter mortality (personal communication bijen@wur and professional beekeepers; Van der Zee & Pisa 2011). Also, reduction of forage is likely to play a role. The relationship between pesticides and bee mortality has not been studied in the Netherlands so far.

A recent United Nations report (UNEP 2011) considers the status of honeybees and other pollinators worldwide. In Europe, North-America and Asia, increased bee losses have been reported. However, the symptoms seen are diverse. From Africa, reports of losses have only come from Egypt. In Australia, no increased honey bee losses have been reported (it is noted that the Varroa mite has not yet been introduced to this continent, except in New Zealand).

The UNEP report names many possible threats to pollinators:

- Habitat deterioration, with reduction of food sources (and habitat, for certain wild pollinators).
- Increased pathologies.
- Invasive species (the parasitic mite *Varroa destructor* is named as the most serious threat to apiculture globally).
- Pesticide use (chronic herbicide use and spray drift from broad spectrum insecticides; possible effects of chronic sublethal exposure to systemic insecticides, however this still needs to be proven in the field).
- Beekeeping activities.
- Climate change.

The conclusion of the UNEP report shows the complexity of the bee decline issue and is presented here in full:
Currently available global data and knowledge on the decline of pollinators are not sufficiently conclusive to demonstrate that there is a worldwide pollinator and related crop production crisis. Although honey bee hives have globally increased close to 45% during the last 50 years, declines have been reported in several locations, largely in Europe and Northern America. This apparent data discrepancy may be due to interpretations of local declines which may be masked by aggregated regional or global data. During the same 50-year period, agricultural production that is independent from animal pollination has doubled, while agricultural production requiring animal pollination has increased four-fold (reaching 6.1% in 2006). This appears to indicate that global agriculture has become increasingly pollinator dependant over the last 50 years. However, human activities and their environmental impacts may be detrimental to some species but beneficial to others, with sometimes subtle and counter-intuitive causal linkages. Pollination is not just a free service but one that requires investment and stewardship to protect and sustain it. There should be a renewed focus on the study, conservation and even management of native pollinating species to complement the managed colony tradition. Economic assessments of agricultural productivity should include the costs of sustaining wild and managed pollinator populations.

Many research networks and policy programmes have been created worldwide to study and counter pollinator decline (see the UNEP report for an overview).

Based on the available information it cannot be concluded that there is a link between thiamethoxam and the relatively high winter mortality in honeybee colonies observed in the Netherlands in recent years. Clearly, bee decline is caused by (an interaction of) a number of factors. Therefore, there is currently not enough evidence to justify a ban of thiamethoxam or other neonicotinoid products based on public literature. It should be noted that other (European and elsewhere) countries have not taken such steps either (with some exceptions where clear acute bee poisoning due to suboptimal sowing circumstances was observed; this has not been the case in the Netherlands).

Ctgb is considering to request a monitoring programme to further investigate the role that neonicotinoid substances play in bee decline. As this is suggested in the ‘Inclusion Directive’. A decision on this matter will be taken at the end of the re-evaluation.

Cresswell (2011) has recently published a paper which questions the statistical power of honeybee field tests to show sublethal effects. This issue pertains to all pesticide risk assessments, not only to neonicotinoids, and will be considered by a European working group which has not started yet. The Netherlands will participate actively in this working group. As the impact of this paper as of yet is unclear, Ctgb will assess using the European harmonized methodologies.