

### 1.3 Impact of non-professional use of plant protection products on honeybees in Belgium

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#### Abstract

Next to the impact of professional use of plant protection products (PPPs), honeybees also suffer from the non-professional use of PPPs. Various studies focus on the professional use, while the impact of non-professional use is often neglected. In this study, an attempt has been made to estimate the impact of non-professional use of PPPs on honeybees.

The exposure of honeybees was assessed using the total sale figures of crop protection products for non-professional use. The risk for bees was estimated using equation 1<sup>1</sup>

$$RQ_{bees} = \frac{Conc_{pesticide} \times HRD}{LC_{50,orale}} \quad \text{Equation 1}$$

with  $RQ_{bees}$ , the risk quotient;  $Conc_{pesticide}$  the concentration of the crop protection product (g/kg); HRD, the highest recommended dosage (kg/ha) and  $LC_{50, orale}$  median lethal dose for the oral exposure of bees to the PPP. Data used in the study were supplied by the Belgian Association of Plant Protection Products Producing Companies and covered more than 90% of the Belgian market. The impact of the non-professional use of PPPs was calculated for the period of 2005 to 2012. The impact of PPPs on honeybees depended on the type of pesticide, application equipment and particular user.

The total non-professional use of crop protection product has decreased significantly from 2,110 ton to 241 ton active ingredient. However, the decrease is mainly caused by the decreased use of only two active ingredients namely sodium chlorate and iron(II) sulfate. The total use of chemical crop protection products other than sodium chlorate and iron(II) sulfate increased slightly. The total impact on the honeybees decreased with 60% over the period of 2005 to 2012. Insecticides had the largest impact on bees. Five active ingredients account up to 90% of the total impact. Imidacloprid alone however accounts for 60% of the total impact on bees. Looking at the type of application technique, the aerosols had the highest impact on the honeybee.

We can conclude that the impact of the non-professional use of PPPs decreased over the period of 2005 to 2012. A decreased impact combined with a slight increase of the total use of active ingredients indicates a systematic replacement of toxic active ingredients by less toxic alternatives. The data used in this research make it impossible to incorporate temporal allocation of the impact on the honeybees by use of chemical PPPs. However, use of data about sales of products is more cost effective and reliable than data of real use.

#### References

<sup>1</sup>Guidance Document on Terrestrial Ecotoxicology under Council Directive 91/414/EEC (SANCO/10329/2002) rev.2 final, 17.10.2002, p.1 - 39.