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DIRECTORATE-GENERAL FOR HEALTH AND FOOD SAFETY

Food and feed safety, innovation
Pesticides and biocides

Risk Manager Consultation on Specific Protection goals for bees

Background information

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In 2019 the Commission mandated EFSA to revise the EFSA Bee GD (2013)[1].

In this mandate EFSA is asked:

- To take into account comments from Member States and stakeholders
- To take into consideration natural background mortality of bees
- To review the requirements for higher tier testing, in particular by reconsidering the magnitude of detectable effects vs the statistical power and validated population modelling in light of realistic agro-environmental conditions
- To take into account planned and on-going discussions initiated by the Commission on defining specific environmental protection goals and review the risk assessment guidance based on the specific protection goals agreed during this process.

Many comments on the EFSA Bee GD (2013), received since 2013 from both Member States and stakeholders were related to the specific protection goal, i.e. that only effects on colony size smaller than 7% are acceptable. The comments received challenged the scientific basis for the value of 7%, pointed at the difficulties to measure variations in this range compared to the natural background variability in colony size, mentioned the crudeness of the methods to measure these effects and its impacts on the statistical power requirements for semi- field and field tests.

1. Link with the horizontal project on 'Specific protection goals for the environmental risk assessment of plant protection products'

The Commission initiated in 2018, after discussion at the Standing Committee for Plants[2], Animals, Food and Feed, a project to (re)define specific protection goals for environmental risk assessment of pesticides. The method proposed by EFSA in 2010[3] and 2016[4]was used as a starting point of the work. This project is still on-going.

The workshop with national authorities and stakeholders in February 2020 "*Specific protection goals for the environmental risk assessment of plant protection products – moving on with EFSA method",* which focused on STEP 1 of the EFSA method, confirmed that that the ecosystem service 'pollination' is potentially affected by the use of pesticides

[1] European Food Safety Authority, 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, 268 pp., doi:10.2903/j.efsa.2013.3295

[2] https://ec.europa.eu/food/sites/food/files/plant/docs/sc_phyto_20180719_ppl_sum.pdf

[3] EFSA Panel on Plant Protection Products and their Residues (PPR); Scientific Opinion on the development of specific protection goal options for environmental risk assessment of pesticides, in particular in relation to the revision of the Guidance Documents on Aquatic and Terrestrial Ecotoxicology (SAN-CO/3268/2001 and SANCO/10329/2002). EFSA Journal 2010;8(10):1821. [55 pp.] doi:10.2903/j.efsa.2010.1821

[4] EFSA Scientific Committee, 2016. Guidance to develop specific protection goals options for environmental risk assessment at EFSA, in relation to biodiversity and ecosystem services. EFSA Journal 2016;14(6):4499, 50 pp. doi:10.2903/j.efsa.2016.4499

STEP 2 of the EFSA method consists in defining suitable and representative Service Providing Units (SPUs) for each Ecosystem Services (ES) possibly affected. It is assumed that by protecting the contributing SPUs, ES will also be preserved. The risk assessment remains focussed on the selected SPUs. By carefully selecting SPUs who represent different biology groups and are considered sensitive, this approach achieves a higher protection of biodiversity compared to a focus of the risk assessment on ES.

In 2013, EFSA had identified as service providing units honey bees, bumble bees, and solitary bees for the ecosystem service pollination (STEP 2 of the EFSA method).

It is therefore considered that the current risk manager consultation and the potential review of the specific protection goal for bees as described below is in line with the principles of the general project by Commission on 'Specific protection goals for the environmental risk assessment of plant protection products' (see table below).

Steps in EFSA 2010/2016 to derive SPG	**EFSA 2013**	**To be confirmed by risk managers 2020**
Step 1 Definition of ES	Pollination, food and genetic resources provisioning, and cultural service**.** A focus on pollination would cover the other ES identified in 2013 (food and genetic resources provisioning, and cultural service).	The SPG project confirmed pollination as ES.
Step2 Selection of SPU	Honey bees, bumble bees and solitary bees	Based on EFSA's publications, honey bees, bumble bees and solitary bees are confirmed as Service Providing Units for the ecosystem service pollination.
Step3 Specific protection goal per SPU (five interrelated dimensions)	<u>Ecological Entities</u>: Colony/population <u>Attribute</u>: Colony strength (honeybees, bumble bee), population abundance (solitary bees). Colony strength is defined operationally as the number of bees it contains (= colony size). <u>Magnitude</u>:	Not yet defined, discussion to be initiated with the current risk manager consultation.

Steps in EFSA 2010/2016 to derive SPG	EFSA 2013	To be confirmed by risk managers 2020
	Negligible effect. It is such if statistically distinguishable from "small effects" The effect was considered negligible when the magnitude is below 7%. Temporal scale: not defined i.e. any time Spatial scale: edge of field *it is important to note that the SPG, in particular, the Magnitude of the effect (i.e. effect sizes), have been defined principally by reference to honey bee colonies. In the case of other bees, the same magnitude has been extrapolated to colony-level impacts (for other social bees, such as bumble bees) or to population sizes (solitary bees).*	

SPGs are defined for a high-level tier (the so-called reference tier). Once defined they will be translated to (or used as reference point to calibrate) the lower tiers of the risk assessment framework. This is illustrated below in Figure 7. EFSA needs the input of risk managers on the SPG, in order to move forward with the review of the RA scheme for bees.

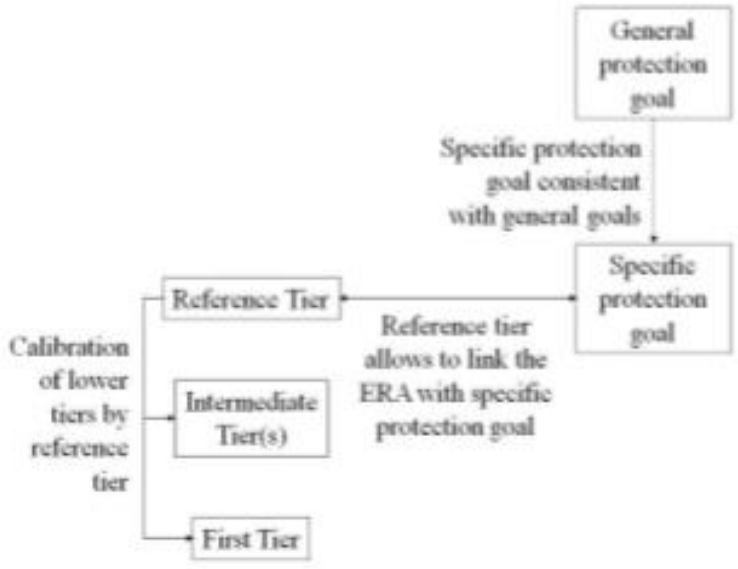


Figure 7 of EFSA (2010): Illustration of the relationship between tiers of the risk assessment process and protection goals, in the approach used by the PPR Panel.

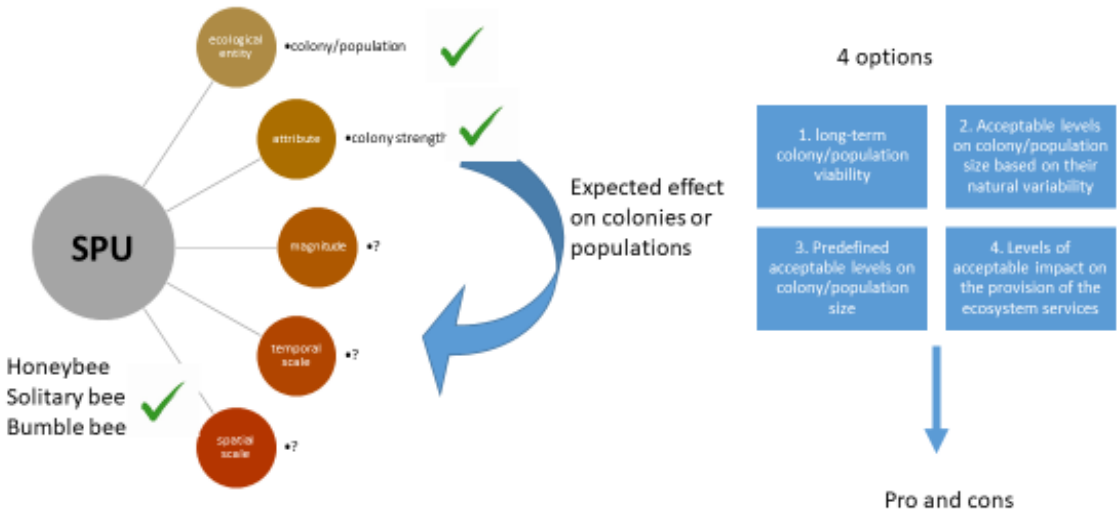
2. Options to move forward to review the specific protection goal for bees.

In its document for the risk managers consultation, EFSA proposes 4 approaches to move forward in the process of defining specific protection goals. For each of the approaches, the document by EFSA illustrates the associated scientific data and process, the advantages, and the limitations.

The different approaches vary as regards the underlying scientific data and the focus given to the relevant SPUs or to the provision of the ecosystem services.

Risk managers are consulted on the choice on the most appropriate scientific process because of its implications on the Specific Protection Goals and the reference Tier for the risk assessment (see figure below for reference to the concept of "reference tier"). The preferred approach will be the basis for further work. Pending on the approach selected, risk managers will be asked in a next consultation round to further define the choice of the SPG (for instance by agreeing on an (un)acceptable effect level', and the temporal and spatial scale).

It should be noted that EFSA currently considers that no suitable models are available for populations of solitary bees and the possibility for the use of a model for bumblebees will be examined. Furthermore experimental field data for both bumble bees and solitary bees is scarce. Therefore extrapolation from honeybees will still be necessary for solitary bees and possibly also for bumblebees. Appendix 1 contains an overview of the biological differences between honeybees, bumble bees and solitary bees.



3. Next steps for risk managers.

In its document EFSA proposes 4 approaches to move forward in this process of defining specific protection goals which will be further explained in a dedicated meeting on 30 June 2020. During this meeting, a discussion aiming at decision making on the approach to follow is also planned.

At the PAFF meeting on 16-17 of July 2020, a final endorsement of the approach is envisaged, which would also include a discussion on the dimensions for the specific protection goal for bees within the chosen approach.

Appendix Overview of difference between honeybees, bumble bees and solitary bees

	SOCIAL INSECTS		
	Honeybees (Apis ssp)	**Bumblebees (Bombus ssp.)**	**Solitary Bees**
Life form	permanent nests and live well organised colonies or "societies" of around 50,000 to 60,000 workers. Swarm during May and June.	Smaller colonies, around 120 workers, but sometimes as small as 40 workers, Do not swarm.	Single, do not swarm. Species of mining bees can often be seen nesting in aggregations,
Nesting	In the wild, honeybees make their nests in the cavities of trees or buildings. In domestication, they are kept in manmade hives,	Most bumblebee species nest underground in old rodent dens, but some will occupy cavities in birdhouses or wood piles Bumblebee queens must start their colonies from scratch.	Each female solitary bee constructs her own nest e.g. in underground burrows, cavities, dry plant stems. Once a nest is found, she will collect materials to create the cells for the eggs.
Queen	Every hive has a queen, the largest bee in the hive that lays eggs after a mating flight. May naturally live for 2 to 4 sometimes 5 years.	Have a queen, that survives and hibernates as the only one of the colony, so lifespan of a year.	No queen
Eggs	Queen lays up to 2000 eggs per day in wax cells.	Queen lays eggs and hatches them initially, then the initial hatched worker bumblebees will take over hatching and he foraging.	Each female bee lays 20 to 30 eggs during her life.
Larvae & Pupae	Honey bee larvae hatch from eggs in 3 to 4 days. They are then fed by worker bees and develop through several stages in the cells. Cells are capped by worker bees when the larva pupates.	Initially feed by queen than by first workers. Fed with pollen.	Larvae feeds on what was provided in the egg cell.
Males	Middle sized bees in the hive, called drones. mate with queens from other hives. Lifespan around 40 days.	Male lifespan a few months	Males exist, emerge a couple of weeks before females.
Females	Smallest bees in the hive, are the workers with multiple tasks such collecting pollen and nectar, feeding larvae, cooling the hive, cleaning the hive. Lifespan of ca. 40 days.	Female lifespan a few months	Females exist, emerge a couple of weeks later than males Females choose whether to lay male or female egg.
Feed	Feed nectar and pollen. Pollen collection via a pollen basket on their legs. They also require water to maintain osmotic homeostasis, prepare liquid brood food, and to cool the hive through evaporation.	Feed on nectar, using their hairy tongue to lap up the liquid. Use pollen to feed larvae.	Feed. Do not form a pollen basket like honey bees, loose big quantity of nectar and pollen while transport, fly and therefore pollinate more often than honey bees.
Hibernate	Stop flying when the temperature drops below about 10°C and crowd into the central area of the hive to form a "winter cluster". The worker bees huddle around the queen bee at the center of the cluster, shivering to keep the center, to keep the right temperature. During winter, they consume their stored honey to produce body heat..	Only queen hibernates, others die before autumn.	Hibernating as pupae in the cocoon to emerge as young adult in following spring or early summer.
Defense	Sting when hiver is endangered and die after sting.	Only sting if aggravated and do not die afterwards.	Usually not aggressive, some of the species do not even have a; stings normally less harmful than the ones from honey bees.
Honey	Produce honey for food and it is stored in winter. Honey is gathered by humans for consumption. Apiculture is practiced for millennia.	Produce a form of honey, which is collected in nectar pots to be eaten by the colony. However, the process of concentrating, capping, and the making of honey combs does not happen in bumblebee colonies, nor is nectar stored over winter, since only the queen survives and hibernates. Have temporary nectar stores.	Do not produce honey

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