

Example of a Conceptual Garden Scenario and Potential for Ecosystem Services and Ecological Modelling to Support the Regulatory Process

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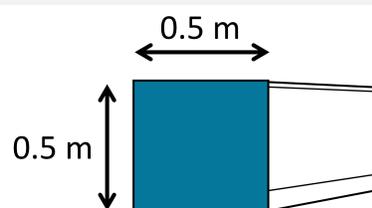
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At the present time, outdoor risk assessments of biocidal consumer products are typically based on the impact they have on the immediate treated area. This approach to product assessment, by focussing on the fraction of impacted soil, disregards the actual role of the product, which is to provide a service at the garden scale. It is proposed that the actual impact of the product should be assessed at the treated garden scale and, ultimately, at the wider urban environment scale.

Treated area

At the scale of the directly impacted soil, it is expected that some effects would be observed within the pest species and non-target organisms, in particular towards sensitive trophic levels (e.g. insect harbourage and nests).

Recolonisation of the treated area will be observed, subject to dissipation of the substance

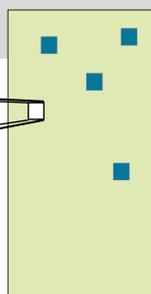


E.g. ant nest treatment
5 spot applications

Garden scale

Infestation would be controlled. Non-target organisms may be exposed to the substance when entering treated areas. Garden populations are expected to be mobile and in some case avoidance may be observed.

Local pest and potential non-target species populations will be subject to recovery



PT18 ESD typical garden
500 m²: 0.25% treated

Urban area scale

The impact of the product on target and non-target species populations would depend on the number of users. At this larger scale, the potential impact on species populations is likely to be significantly offset by a variety of refugia, acting as sources of recolonization and allowing robust bounce back.



Ecological relevance of the treated area

By focussing on the local scale, a number of factors are ignored (dissipation, mobility, population recovery) and the relative significance of the treated area with respect to the urban environment is ignored (e.g. lawn, patio, edge of a fence...).

Specific protection goals linked to ecosystem services and functions, with a distinction between off-field and in-field areas, have been proposed by EFSA. For example, in a draft scientific opinion on in-soil organisms currently under public consultation (EFSA, 2016), negligible effects (<10%) on abundance/biomass of earthworms are proposed off-field, while small effects (<35%) of up to months (in duration) could be tolerated in-field. This indicates how an exposure event may be assessed with regards to spatial scale and time. In addition, a typical urban environment is more diverse than a corresponding agricultural area and the smaller impacted areas would facilitate external recovery.

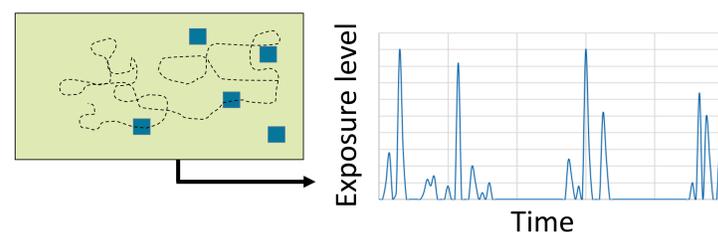
Table 1 : Magnitude of effects that might be tolerated without impairing the general protection goal, for Non-Target in-soil organisms (source: EFSA, 2016)

In-soil organism	Effects magnitude (timescale)	
	Off-field	In-field
Earthworm, terrestrial gastropods	<10%	10-35% (months)
Enchytraeids, microarthropods, macroarthropods, nematodes, mycorrhiza, other fungi and protozoa	<10%	10-35% (months) 35-65% (weeks)
Soil bacteria and Archaea	<10%	10-35% (months) 35-65% (weeks) >65% (days)

Potential for developments supported by ecological modelling:

Local soil concentrations are generally compared with endpoints from laboratory studies obtained under constant exposure conditions. Depending on species behaviour, exposure to biocidal products may be intermittent (right) and landscape and population models can give a clearer understanding of the impact on individuals and the wider population.

Individual/population survival and recovery



What impact on garden ecology can we realistically expect from the use of biocidal products?

In addition to ecological ecosystem services (such as biodiversity), gardens deliver important social and bio-physical ecosystem services (e.g. aesthetical values, social relations, recreation) that may be most desirable to individual owners. It should be noted that the management of private gardens is determined by the owner and that, for example, the impact of converting a vegetated garden to a more inert state (e.g. patio, shed) will have a larger effect on the ecological aspects of a garden than the occasional use of pest control products.