Selection of potential focal bird species for a refined risk assessment of pesticides in Switzerland: methodology

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Background

Pesticides are subjected to ecotoxicological risk assessments in the process of national authorization^[6]. If a pesticide does not pass the first-tier risk assessment, a refined risk assessment is required. For birds, it is possible to refine the exposure component of the risk using "focal species"[3]. These species are, other than the fictitious first-tier species, real bird species actually occurring and feeding in the crop at the time of pesticide application. Therefore, using focal species, realism can be added to the risk assessment.

Focal species in a crop can vary among different parts of Europe. They have to be evaluated at a national level, as they are not defined in the Guidance Document [3].

Thus, potential focal species were determined for different crops in Switzerland.



Methods

The selection procedure for focal species followed a pragmatic approach, without performing new field studies.

First, all potential candidate focal bird species were listed based on a comprehensive literature research from Swiss and European ornithological literature, from several EU pesticide evaluations, and from already available documents on focal species from other European countries [2, 4, 5, 7, 8].

Then, the most relevant species for Swiss agriculture were selected by Swiss ornithologists, not considering rare, vulnerable nor "pest" species.

Some references

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- 7. www.vogelwarte.ch Published and unpublished documents on focal species from Sweden, Norway, UK, Germany, France and Spain

Factors for selection

All these relevant bird species were then judged with regard to their suitability as focal species for a range of different crops at different growth stages. The crops included i.a. cereals, maize, sugar beet, potatoes, oil seed rape, orchards, vineyards and vegetables, according to the crop categories defined in [3]. The key criteria were i) strong association with the crop (access and utilization), ii) high abundance in the crop (frequency and distribution), and iii) high intake of contaminated food per body weight.

i) Association with the crop (AxU-Index)

The association of a species with a crop is high. when

A: a large proportion of the population accesses the crop for feeding (access), and U: individuals are expected to feed on a high amount of food in this crop (utilization).

Both factors were estimated independently by Swiss ornithologists based on literature and expert knowledge. The evaluation was usually congruent; deviations were individually discussed and adjusted.

		Factor A: A	ccess to cul	ture			
		high	moderate	low			
		(>60%)	(30-60%)	(<30%)		AxU Category	AxU Index
or U: Utilization by duals	very high (>50%)	very high	very high	high		very high	4
	high (25-50%)	very high	high	moderate		high	3
	moderate (5-25%)	high	moderate	low		moderate	2
Facto	low (<5%)	moderate	low	low		low	1

ii) Abundance in the crop (DxF-Index)

The bird abundance relevant to the agricultural area is dependent on

F: the frequency of the species in Switzerland (breeding pairs), and

D: the distribution of the species in the agricultural area.

Both factors were estimated based on recent Swiss bird census and distribution maps [4, 5].

		Factor D: D	stribution on	agricultural	surfa	ce	
		high (>75%)	moderate (30-75%)	low (<30%)		DxF Category	DxF Index
Factor F. Frequency (breeding pairs)	very high (>150'000)	very high	very high	high		very high	4
	high (70'000- 150'000)	very high	high	moderate		high	3
	moderate (7'000-70'000)	high	moderate	low		moderate	2
	low (<7'000)	moderate	low	low		low	1

iii) Food intake per body weight (FIR/bw)

The intake of pesticide through consumption of contaminated food is high if a bird is small (low body weight, bw) and has a high food intake rate (FIR). The bw for each bird species was a mean of the range of values reported by [4]; the FIR was calculated based energy expenditure, energy in food and assimilation efficiency of each relevant food type [3].

The parameters mentioned above were then multiplied to give a final estimation of the suitability of each species to act as a focal species in a certain crop and growth stage.

> Suitability index = AxU-Index * DxF-Index * FIR/bw

For each culture and growth stage, two to four focal species with the highest suitability index were selected, one for each feeding habit (insectivorous, herbivorous. granivorous, vermivorous).

Results

The resulting list of the potential focal bird species for different cultures and growth stages are reported in the poster WE 050.

Summary

refinement risk For of the assessment of pesticides to birds, more realistic exposure estimates are needed, including the use of focal species.

The poster presents the approach of Switzerland to select the potential species relevant for focal bird Switzerland in different crops.

Key criteria for selection:

i) strong association with the crop (access and utilization)

ii) high abundance in the crop (frequency and distribution)

iii) high food intake per body weight suitability index

The most suitable focal species were selected (highest suitability index).

•The focal species can be used to achieve a crop-specific and more realistic risk assessment of pesticides for birds.

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