

A Proposal on How to Consider ‘Vulnerable Species’ in Bird Focal Species Selection

Ines Hotopp¹, Anja Russ¹, Benedikt Gießing¹, Christian Wolf¹, Steven Kragten², Arnd Weyers³, Marie Fan⁴, Dennis Sprenger⁵

¹ tier3 solutions, Germany; ² Syngenta Agro GmbH, Germany; ³ Bayer AG, Crop Science division; ⁴ BASF France S.A.S., France; ⁵ Corteva Agriscience, Germany

[E-mail contact: ines.hotopp@tier3.de]

Background

The revised EFSA 2023 Guidance Document for Birds and Mammals [1] emphasises vulnerability as criterion rather than prevalence for focal species (FS) selection. Weyers et al. (2022) [2] suggest to rank FS candidates according to their expected magnitude of exposure by calculating a species-specific daily dietary dose (DDD). With this, species experiencing a higher exposure would be ranked as potentially more vulnerable and are identified as candidates for focal species. The DDD is calculated using – among others – the estimated ‘proportion of diet an individual obtains from the (potentially) treated crop’ (PT). A real PT is assessed through a radio-tracking field study, but not for all species such field data are available. Here, the suitability of the frequency of occurrence in the surveys (FO_{survey}) conducted in each study field during FS field studies as a proxy for PT in theoretical DDD (DDD_{survey}) calculations for the purpose of ranking FS according to their potential vulnerability is investigated.

Method

Evaluation of the suitability of using FO_{survey} as proxy for PT:

$$DDD = PT/100 \cdot FIR/bodyweight \cdot RUD$$

FO_{field} = percentage of investigated fields in which a species was observed

FO_{survey} = 90thile of the percentage of investigated surveys during which a species was recorded, excluding fields without observations

- 10 case examples of pairs of PT studies and FS studies in the same crop and BBCH stage
- statistical comparison of empirical PT values with FO_{survey} values using GLMM
- statistical comparison of DDD_{survey} and FO_{field} depending on food source for the analysis of differences between the former approach using FO_{field} [3] and the newly suggested approach using GLMMs
- differentiation between survey methods transect count and scan sampling

Example 1: All vulnerable species likely covered by the FS selected according to the former FO_{field} > 20% criterion approach [3]:

	FO _{field} [%]	FO _{survey} (90 th percentile) [%]	DDD _{survey}	PT (90 th percentile consumer)
Species 1	100.00	97.04	8.19	0.35 (n=20)
Species 2	100.00	81.19	7.82	0.39 (n=20)
Species 3	75.00	61.30	6.54	0.19 (n=20)
Species 4	25.00	49.97	6.32	-

Example 2: Species 2 identified as vulnerable FS candidate that was not considered by the former FO_{field} > 20% criterion approach:

	FO _{field} [%]	FO _{survey} (90 th percentile) [%]	DDD _{survey}	PT (90 th percentile consumer)
Species 1	36.67	100.00	2.21	0.09 (n=20)
Species 2	16.67	86.67	2.01	-
Species 3	36.67	100.00	1.96	0.77 (n=20)
Species 4	66.67	100.00	1.93	1.00 (n=20)

Results

Comparison between PT and FO_{survey}

- positive correlation indicating potential suitability of FO_{survey} as PT proxy
- significant for transect count method (Fig. 1)
- not sufficient data points for scan sampling method
- sufficient number of surveys necessary for meaningful results

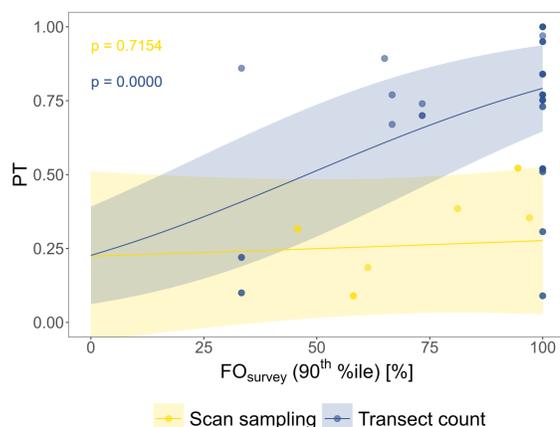


Fig. 1: PT vs FO_{survey}. Lines depict the prediction of the GLMM, shaded areas show the upper and lower confidence limit of the prediction.

Comparison between FO_{field} and DDD_{survey}

- positive correlation
- significant for all food types and survey method combinations (Fig. 2)
- points with low FO_{field} but high DDD_{survey} indicate vulnerable species that were not considered as FS before

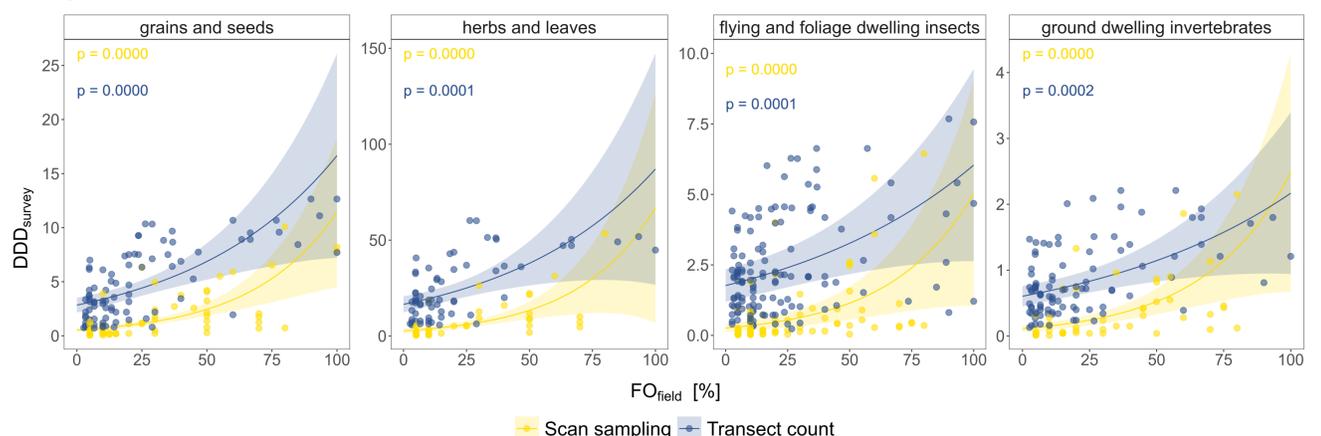


Fig. 2: DDD_{survey} vs FO_{field}. Lines depict the prediction of the GLMMs, shaded areas show the upper and lower confidence limit of the prediction.

Conclusion

The analysis suggests that FO_{survey} can be considered as a proxy for the PT during the calculation of a DDD when ranking the potential focal species, but is not a substitute for the PT in any case. FO_{survey}-values obtained based on only few surveys seem to be insufficient as a proxy for PTs in the calculation of a DDD_{survey} due to the resulting limited range of FO_{survey}-values. The number of PT values that could be assigned to FO_{survey} calculated with scan sampling data was low. This is likely the reason for the non-significance in the statistical analysis of this method. Additional data, especially for the scan sampling method would be helpful to strengthen the observed relationship.

The former approach using the 20% FO_{field} cut-off criterion produces similar results to the approach introduced here using DDD_{survey} in many cases. However, compared to the focal species selected with the former approach, in some cases additional species are identified by this new approach and would need further consideration.

References

- [1] EFSA (European Food Safety Authority), Aagaard A, Berny P, Chaton PF, Antia AL, McVey E, Arena M, Fait G, Ippolito A, Linguadoca A, Sharp R, Theobald A, Brock T (2023). Guidance on the risk assessment for Birds and Mammals. EFSA Journal 2023; 21(2):7790, 300 pp.
- [2] Weyers A., Sprenger D & Kragten S (2022) Focus matters – Bird focal species for higher tier risk assessment. Poster at SETAC Copenhagen.
- [3] EFSA 2009. Guidance on Risk Assessment for Birds and Mammals on request from EFSA. EFSA Journal 7(12):1438. doi: 10.2903/j.efsa.2009.1438.

