

HOME RANGE & HABITAT USE by TWO FARMLAND BIRDS in CEREAL LANDSCAPES in CENTRAL EUROPE - results from industry studies



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INTRODUCTION

For the **risk assessment to birds** from Plant Protection Products (PPPs), EFSA Guidance Document¹ gives the option to refine exposure estimates by conducting **generic field studies** => data on the use of specific crops by particular species in different regions.

At the request of industry, several studies were carried out based on **radio-tracking**², a highly accurate methodology for the monitoring of individuals. These studies are primarily used to estimate the Proportion of an animal's daily diet obtained in a Treated habitat (PT).

However, scope of the studies reaches further: they contain also a wealth of further information that allows accurate assessments of the home ranges and general habitat preferences of birds in agricultural environments. Data obtained provide **detailed knowledge of fundamental interest** for ornithologists, conservation scientists and experts in agri-environmental policy.

MATERIAL & METHODS

Data is presented of 3 radio-tracking studies on two species (**skylark** and **yellowhammer**, typical farmland species³) in areas with predominance of cereals during the **drilling season in autumn**. Birds were captured inside or in the direct surrounding of a freshly drilled cereal field, equipped with radio-transmitters and radio-tracked to determine location and behaviour.

Radio-tracking: performed as continuous sessions over the daily activity period, repeated during 1 to 5 days for some birds, and completed by occasional location checks over the study duration.

Habitat mapping: carried out at a spatial scale from single bird home ranges (HR) up to hundreds of hectares of the study area. The results of the habitat mapping and of the locations obtained by radio-tracking were fed into a computer-based geographical information system (GIS)⁴.

RESULTS & DISCUSSION

Drilling period of winter cereals = **dynamic environment** with continuous changes in the landscape due to harvesting, harrowing, ploughing, drilling of winter cover, combined with standing crops.

HOME RANGES of YELLOWHAMMER and SKYLARK

- Based on all daily continuous radio-tracking sessions:
A common characteristic for both species was the high inter- but also intra-individual variation in home range size (Table 1). Only for skylarks, the mean size was rather constant among locations and years (≈ 31 ha).
- Based on repeated tracking sessions of the same bird:
Consecutive daily home ranges of the same bird overlapped partially (overall, around 30% of area, Fig. 2) but still showed high flexibility.
- Based on all known locations per bird over full study duration:
The total home ranges, including repeated daily sessions and occasional checks of the individuals, were in general noticeably larger than the largest single daily one (yellowhammer: mean difference = $46.4 \text{ ha} \pm 54.8$; skylark: mean difference = $77.1 \text{ ha} \pm 146.9$).

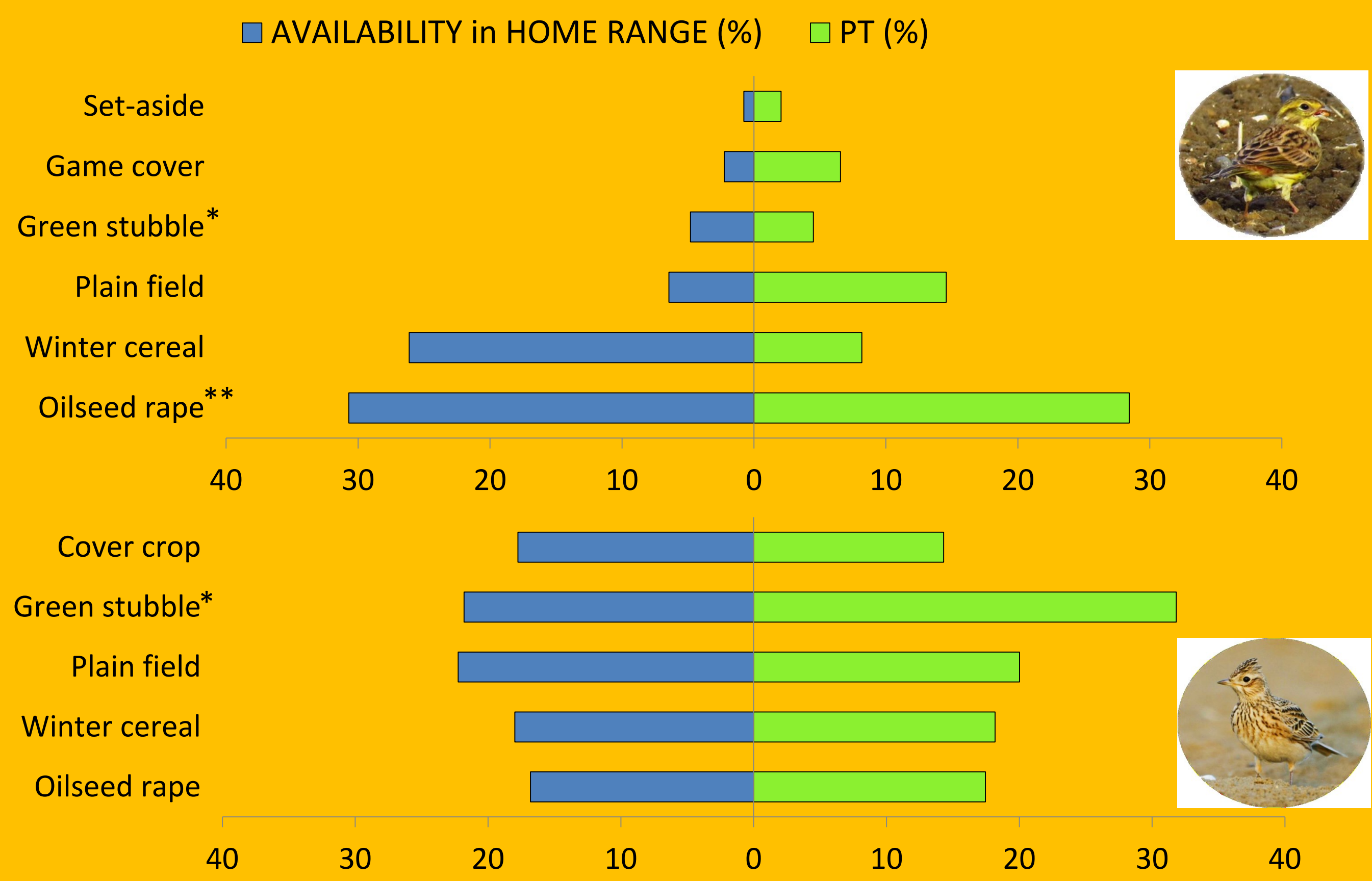


Fig.3: Relationship between mean habitat areas in home range of birds and their corresponding mean PT value
*old cereal field, already harrowed but with stubble left and new green cover **mostly drilled directly over cereal stubbles
***not shown in Fig.3 as these habitats (hedges, forests) are not agricultural and were therefore not mapped

Table 1: Variation in the home range sizes during radio-tracking sessions

HOME RANGE SIZE (ha)	Inter-individual variation (single sessions)			Intra-individual variation (Max. diff. in HR size of repeated sessions)
	DE 2005	UK 2018	ALL	ALL
YELLOWHAMMER				
n birds	11	20	31	10
n sessions	11	20	31	36
Mean	43.3	15.2	25.2	96.3
Median	18.8	10.2	11.5	51.4
Min. - Max.	4.4 - 225.6	0.7 - 79.7	0.7 - 225.6	11.9 - 346.5
SD	64.7	17.8	42.2	111.7
SKYLARK				
n birds	8	21	29	11
n sessions	8	21	29	34
Mean	31.1	31.5	31.4	74.9
Median	9.2	27.3	10.1	57.5
Min. - Max.	3.2 - 182.5	0.2 - 108.7	0.2 - 182.5	1.6 - 385.5
SD	61.3	33.7	41.8	110.1

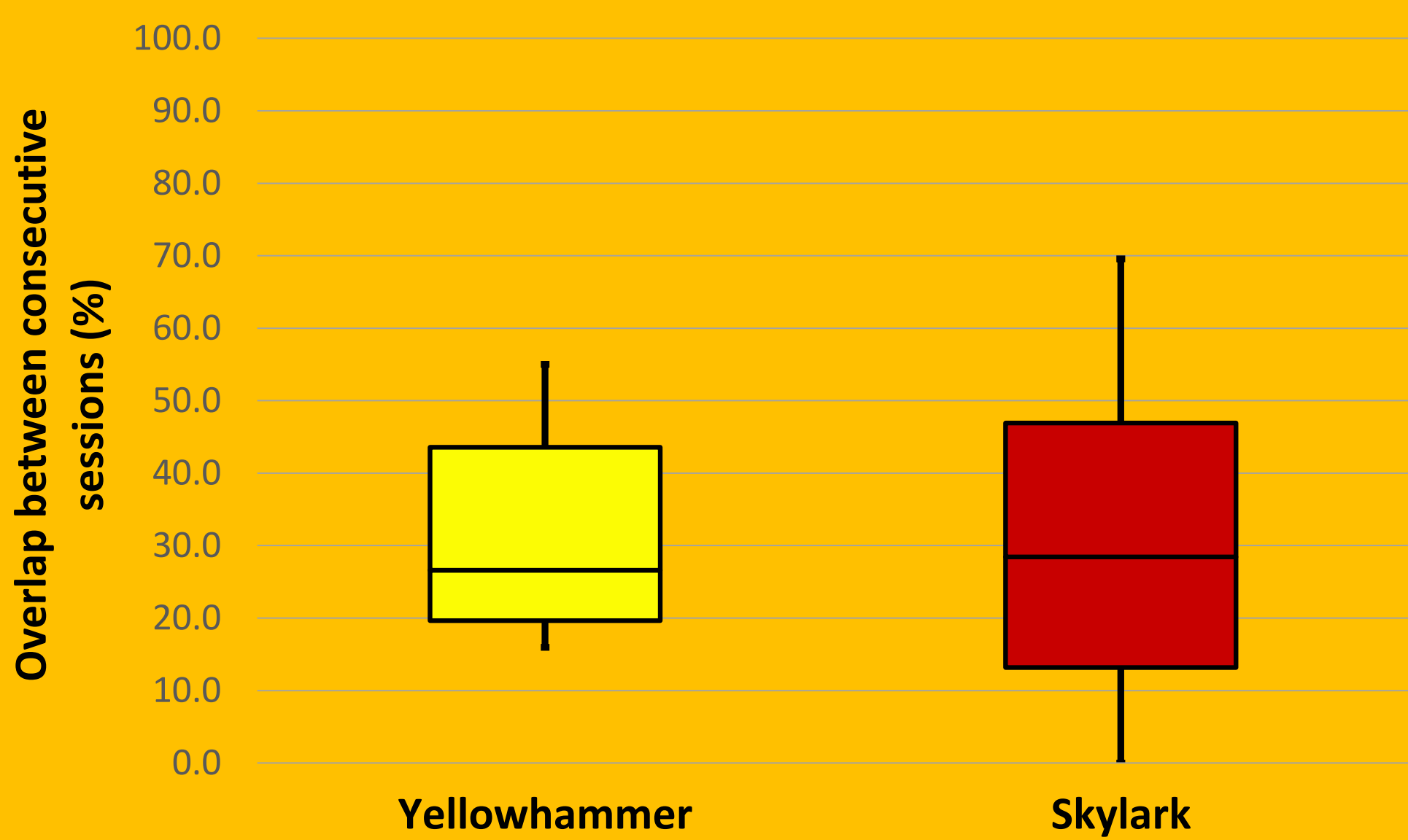


Fig. 2:Overlap between two consecutive radio-tracking sessions (mean interval between sessions = 1 day): the proportion of area used in the second session and shared with the first session is represented.

HABITAT USE and PREFERENCES

- Yellowhammers spent their time in heterogeneous habitats but showed strong preferences towards permanent vertical structures (hedges and borders of forest patches, PT = 43.95***). Oilseed rape (drilled fields directly over stubble) and plain fields were their agricultural preferred habitats.
- Skylarks were regularly found on the agricultural fields; they used almost exclusively open farmland with little or no presence of surrounding vertical structures like hedgerows or small forests (Fig. 1). The most attractive crops for skylarks in autumn were fields of green stubble and plain fields with grain leftovers and self-sown vegetation.
- For both species, in spite of the general availability of freshly drilled cereal fields during the study period, overall these were not the favoured foraging habitat (Fig. 3).

CONCLUSIONS

- ✓ Sizes of individual home ranges differed considerably, showing inter- but also intra-individual variation that indicates **high flexibility in the daily individual behaviour**.
- ✓ Both species showed their **habitat preferences** clearly, agricultural landscapes with open areas for the skylark and heterogeneous agricultural landscapes with vertical structures (hedges, small forests) for the yellowhammer.
- ✓ **Preferred crops in autumn** differed between the species; skylarks spent their time in green stubble and plain fields while yellowhammers showed strong preference for hedges, small forests and oilseed rape fields (direct drill).

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Acknowledgements:
This project was sponsored jointly by BASF SE and BAYER AG. We are thankful to all the enthusiastic field staff of the studies in 2005, 2016 and 2018.



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