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COMPARING BIRD COMMUNITIES IN WILLOW AND MISCANTHUS CROP FIELDS – SUMMER 2024 SURVEY

A BIOMASS CONNECT FIELD REPORT

COMPARING BIRD COMMUNITIES IN WILLOW AND MISCANTHUS CROP FIELDS – SUMMER 2024 SURVEY

PRODUCED BY ED DREWITT

BACKGROUND

Two farms, each containing a different biomass crop (Miscanthus and willow), were visited and surveyed for their birdlife. This report provides a snapshot of the birds using each farm in June 2024.

The Miscanthus crop is grown across seventeen hectares to provide heat for chicken barns at Langaller Farm in Somerset. It is well established and has been grown here since 2006/07. The 2023 crop was cut in April and the new growing crop was up to 1.5 metres in height. Langaller farm is set on rolling hills on the edge of Exmoor and circa 190 metres above sea level. It boasts diverse ancient hedgerows interspersed with oak and ash trees; on the south side the farm borders a maturing and unmanaged hedge line and woodland strip.

The mixed variety willow crop covers 3.95 hectares on Umberleigh Barton Farm, a working mixed farm based in North Devon. It was planted in 2015 and supplies a biomass boiler to provide heating to the various buildings on site. Umberleigh Barton Farm is an organic farm on low lying Devon soil (c. 15 metres above sea level) with young scrub/ sallow bordering the willow crop, trimmed hedgerows, large oak trees, ponds and arable fields (maize and wheat).

METHODS

On the 21st and 22nd June 2024, Ed Drewitt and Kevin Lindegaard, visited Langaller Farm, Somerset. Umberleigh Barton Farm, Devon was then visited on the 22nd and 23rd June. Each site was visited during the evening (19:00-21:30) and early morning (05:15-07:30). The

weather across both locations and days was bright and sunny with excellent visibility and highs of 19° Celsius and lows of 5° Celsius.

Comparisons were made between the bird species and their abundances at the two locations, excluding any species flying over. Two comparisons were made:

- between those species and numbers recorded both in the crops and adjacent habitat on each farm, and
- those species recorded only in the immediate crop.

Species richness refers the number of species recorded and individual bird abundance refers to the overall numbers of birds recorded. The diversity of birdlife was calculated using the Simpson Diversity Index and the Shannon-Weiner Diversity Index which detect how evenly (species evenness) the individuals counted are distributed among the species recorded.

The Simpson Diversity Index[1] looks at the dominance of species in a population by focusing on the abundance of each species recorded. It measures the likelihood of two individuals within a population being of the same species. A population of birds with many species that are evenly distributed are the most diverse; a population with few species that are dominated by one species are the least diverse.

The Shannon-Weiner Index[2] is more sensitive to species richness (rather than the abundance of each species). If the index is high, diversity will be high and there will be uncertainty in which species is detected.

RESULTS

See Appendix 1 and 2 for a summary list of the species and numbers recorded at each farm, including those recorded in the crops. The species have been colour-coded depending on their conservation status in the UK (red, amber or green). Those in red have the most conservation concern while those in green have the least. Some species such as woodpigeon and wren are amber listed due the UK having a considerable proportion of Europe's population.

For more information see: www.bto.org/our-science/publications/birds-conservation-concern[3]

Figures 1 and 2 show the locations in which different species were seen at each farm.

Figure 1: A map showing where a selection of bird species was seen or heard at Umberleigh Barton Farm (willow crop). Red = red listed; orange = amber listed; green = green listed.

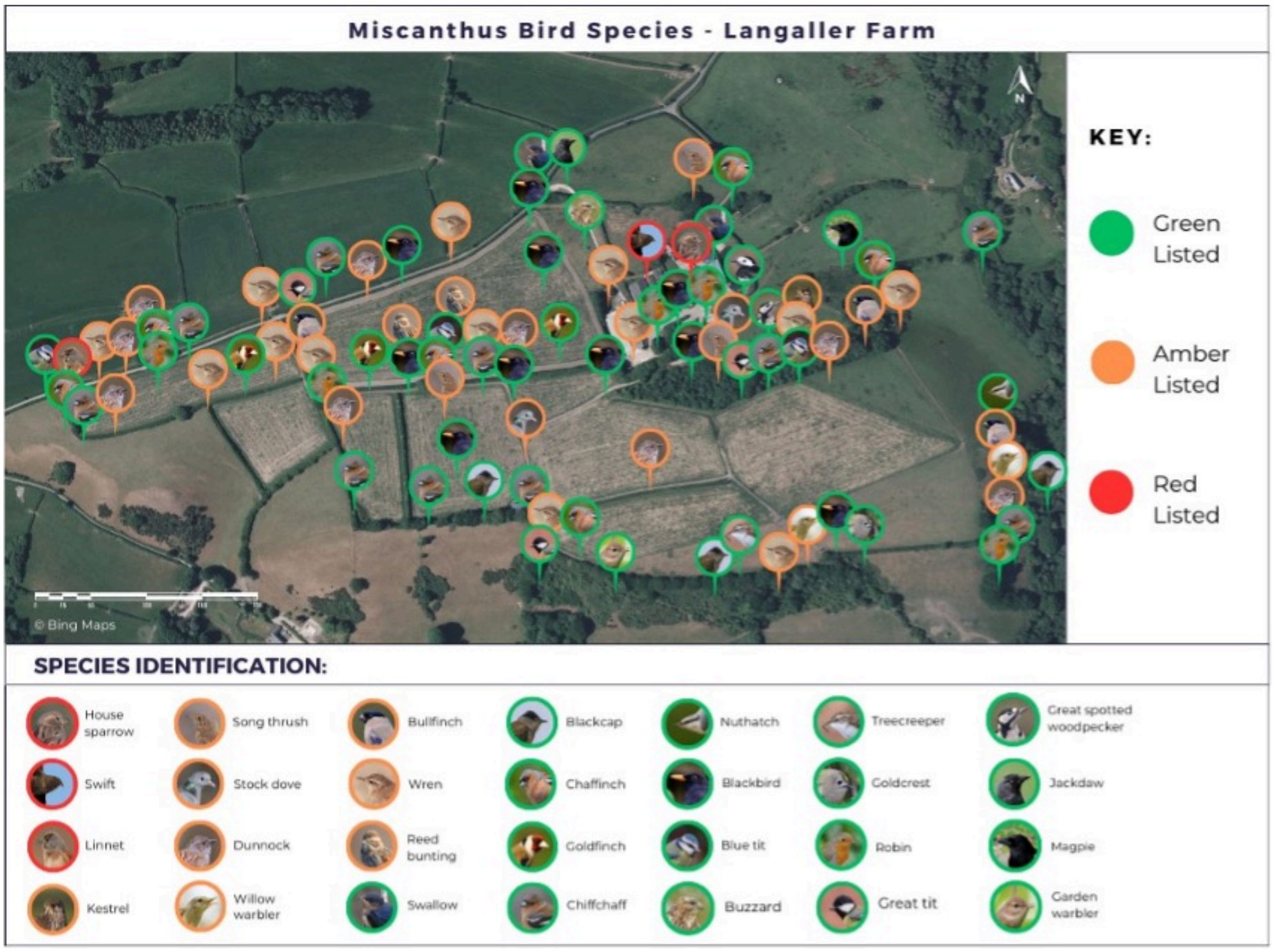

Figure 2: A map showing where a selection of bird species was seen or heard at Langaller Farm (Miscanthus crop). Red = red listed; orange = amber listed; green = green listed.

COMPARING BETWEEN FARMS

Across the general area of each farm, the species richness is almost identical (Table 1). The relative abundance or evenness of species, while a little lower at Langaller Farm, is still high, indicating both farms generally have a high diversity of birdlife.

Umberleigh Barton Farm			
General area		**Immediate crop (willow)**	
Species richness	32	Species richness	15
Individual bird abundance	133	Individual bird abundance	79
Simpson Diversity Index	0.96	Simpson Diversity Index	0.93
Shannon-Weiner Diversity Index	1.41	Shannon-Weiner Diversity Index	1.14
Langaller Farm			
General area		**Immediate crop (miscanthus)**	
Species richness	34	Species richness	7
Individual bird abundance	162	Individual bird abundance	14
Simpson's Diversity Index	0.95	Simpson's Diversity Index	0.91
Shannon-Weiner Diversity Index	1.35	Shannon-Weiner Diversity Index	0.82

Table 1. A comparison of the number species and individual birds recorded at each farm and their diversity indices across the general area (including the crops) and just within the immediate biomass crop.

In just the immediate crop, Umberleigh Barton Farm has double the species richness and almost six times as many individual birds using it compared to Langaller Farm. This is reflected in its higher diversity indices. Although the Simpson Diversity Index shows both crops have a high chance of the species using it being different, the Shannon-Weiner Diversity Index shows that the overall diversity is higher in the willow crop. Seven amber listed species were

found using the willow crop and four amber listed species were found using the Miscanthus crop (see Appendix 1 and 2). Red data species (linnet, skylark, house sparrow and swift) were only using the wider farmland environment.

At Umberleigh Barton Farm, 61% of individual birds were seen or heard in the willow crop; at Langaller Farm only 9% of individual birds were counted in the Miscanthus crop (Table 1). The remaining 91% were in the surrounding ancient hedgerows and larger trees within them.

DISCUSSION

The similar species richness between the two farms indicates that both farms support a diverse range of birdlife despite being so different, although the willow crop supports the greatest number and diversity of birds. While Miscanthus recorded more birds overall, this is likely to be because the area of Miscanthus crop is four times as large as for the willow; therefore, a larger area of adjacent habitat was also surveyed.

Despite being a quarter of the size of the Miscanthus crop, the willow crop supported almost three quarters of the birdlife recorded in the general area at Umberleigh Barton Farm and packed in eighty-one individuals. The Miscanthus crop supported just under a tenth of the birdlife despite covering four times the area of the willow. Importantly, the willow also supported a surprising number of amber listed and declining species that are becoming scarce across farmland in England such as the willow warbler, sedge warbler, bullfinch and reed bunting. It was also promising to see good numbers of some of these species. For example, rather than recording just one willow warbler and one sedge warbler, there was six and two of each respectively singing in the willow itself (and a further two sedge warblers adjacent to the habitat). The wren, which is regarded as amber listed, has this status because the UK holds an important part of the European population.

The small number of invertebrates supported by Miscanthus make it far less attractive to birds and appears to therefore be used by a small number of generalist species such as the blackbird and wren. Despite this, a singing reed bunting in the Miscanthus crop and the sighting of another individual, probably a female close by, does indicate it has some attractiveness to some species. Perhaps its similarity to common reed (*Phragmites australis*) and other grasses that the reed bunting uses on wetlands and along field ditches, makes the Miscanthus also attractive. Both a blackbird and a song thrush sang from electricity cables directly above the Miscanthus crop, although the rest of the time they were seen flying over the crop and into the adjacent hedgerows.

The willow crop in comparison was busy with lots of birds and it was positive to see declining farmland and lowland species, such as bullfinch, willow warbler, sedge warbler and reed bunting, both present and in the case of the two warbler species, singing in such numbers and density. Overall, it is likely the willow crop's attractiveness to insects – and therefore food for birds – and the opportunity for herbaceous plants to grow amongst it, make it popular for a wide range of birds in large numbers. The willow crop forms an extension to the adjacent hedgerows, scrub and herbaceous borders that grow along the railway line and adjacent fields.

For further analysis and differences between the two crops, please refer back to the full, original report, Comparing Bird Communities in Willow and Miscanthus Crop Fields[4].

CONCLUSION

As previously reported for Langaller Farm, the Miscanthus crop appears to support a relatively small number of bird species; instead, birds were using the adjacent hedgerows and woodland. Across the wider farm, there is a high diversity of birdlife. The willow crop at Umberleigh Barton Farm appears to be supporting a higher diversity bird species and a far greater number of birds than Miscanthus. This is probably because it is a better food source for wildlife and therefore is an important and integral part of the mosaic environment on this farm. Like Langaller Farm, Umberleigh Barton also supports a high diversity of birdlife across the wider farm.

The surveys are just a snapshot of birds heard or seen across the three days. Further surveys over a longer period of time would be required to acquire a more robust set of data that can be compared statistically. These surveys do however provide some initial insights and comparisons that may provide further rationale for gathering further evidence and information in the future.

APPENDICES

Umberleigh Barton Farm		
Linnet	1	
Skylark	3	
Bullfinch*	6	
Dunnock*	4	feeding young
Grey wagtail	2	
Mallard	2	
Moorhen	2	
Reed bunting*	4	
Sedge warbler*	6	
Song thrush*	4	
Stock dove	1	low overhead
Whitethroat	1	
Willow warbler*	7	
Woodpigeon	4	
Wren*	11	
Blackbird*	10	
Blackcap*	6	
Blue tit*	4+	family group
Carrion crow	4	
Chaffinch*	4	
Chiffchaff*	6	
Coot	4	(2 young)
Goldcrest*	2	
Goldfinch*	6	
Grey heron	2	
Little grebe	1	
Long-tailed tit*	4+	family group
Mute swan	3	(1 young)
Pied wagtail	1	
Robin*	11	
Swallow	6	

Appendix 1: A summary of the bird species recorded on or over Umberleigh Barton Farm (willow crop). Red = red listed; orange = amber listed; green = green listed. Those marked with an asterisk (*) were recorded in the crop itself.

Langaller Farm		
Herring gull	20+	Overhead
House sparrow	6	
Linnet	3	
Swift	3	
Stock dove	4	
Bullfinch	3	
Dunnock*	9	
Kestrel	1	
Lesser black-backed gull	1	Overhead
Reed bunting*	2	
Song thrush*	4	
Woodpigeon	6	
Willow warbler	2	
Wren*	11	
Blackbird*	14	
Blackcap	3	
Blue tit	3+	
Buzzard	2	
Carrion crow	4	
Chaffinch	5	
Chiffchaff*	10	
Garden warbler	1	
Goldcrest	1	
Goldfinch	8	
Great spotted woodpecker	1	
Great tit	3	
Jackdaw	10	
Magpie	1	
Nuthatch	1	
Pied wagtail	8	
Pheasant*	1	
Raven	1	
Robin	4	
Swallow	25	
Treecreeper	1	

Appendix 2: A summary of the bird species recorded on or over Langaller Farm (Miscanthus crop). Red = red listed; orange = amber listed; green = green listed. Those marked with an asterisk (*) were recorded in the crop itself.

PHOTO CREDITS

Photo credits for Figures 1-2

Photos from Flickr (CC BY 2.0): chaffinch by Alan Cleaver; chiffchaff, great spotted woodpecker, house sparrow, long-tailed tit, treecreeper and wren by Caroline Legg; reed bunting by Gérard Meyer; skylark by Imran Shah; goldcrest by Jo Garbutt; dunnock and linnet by Nick Goodrum; grey wagtail by Nigel Hoult Knight; mistle thrush by Sudge 9000. Photo from Flickr (CC0): pied wagtail by Wildlife Terry. Photos from Wikimedia Commons: magpie by Ross; coot by Rhododendrites; goldfinch by David Friel; buzzard by Charles Sharpe; Blackcap by J. Sharp. Photos from Pexels: chaffinch by Phil Mitchel. Photos from Animalia: Sedge warbler by James Sharp; Common whitethroat by Francesco Veronesi; willow warbler by Derek Keats; barn swallow by Don Henise; common swift by Marton Berntsen; kestrel by Frank Vassen; garden warbler by Billy Lindblom; nuthatch by Jorg Asmus; jackdaw by Matthias Barby. Other photos: mallard, moorhen and blue tit by Ed Drewitt.

ENDNOTES AND HYPERLINKS

1: https://www.rgs.org/media/epqgou23/gaguidetosimpsonsdiversityindex.pdf

2: https://www.researchgate.net/publication/267230639_Beachcomber_Biology_The_Shannon-Weiner_Species_Diversity_Index

3: http://www.bto.org/our-science/publications/birds-conservation-concern

4: https://www.biomassconnect.org/technical-articles/field-report-comparing-bird-communities-in-willow-and-miscanthus-crop-fields/

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