**Supplementary Material**

Effects of seed-rich habitat provision on territory density, home range and breeding performance of European Turtle-doves *Streptopelia turtur*

JENNY C. DUNN, ANTONY J. MORRIS, PHILIP V. GRICE and WILL J. PEACH

**Contents**

Table S1. Seed mixes sown on intervention plot sites during 2011–2012 and 2013–2014.

Table S2. Summary of survey years for all surveyed intervention and control farms.

Table S3. Agri-environment options and weightings used in calculating the seed index for each MCP and predicted home range.

References

Table S1. Seed mixes sown on intervention plot sites during 2011–2012 and 2013–2014. In 2011–2012 the mix was sown at a rate of 20 kg ha-1; in 2013–2014 this was reduced to 15 kg ha-1 to improve vegetation structure so as to increase seed accessibility to ground-foraging birds.

|  |  |  |
| --- | --- | --- |
|  | % weight | |
| Species | 2011–2012 | 2013–2014 |
| Common fumitory *Fumaria officinalis* | 2.88 | 5.00 |
| Corvus red clover *Trifolium pratense* | 14.30 | 10.00 |
| Avoca white clover *Trifolium repens* | 14.30 | 20.00 |
| Virgo black medick *Medicago lupulina* | 14.30 | 20.00 |
| Early English common vetch *Vicia sativa* | 54.1 | 25.00 |
| Common mouse-ear *Cerastium fontanum* | 0.12 | - |
| Bird’s toot trefoil *Lotus corniculatus* | - | 20.00 |

Table S2. Summary of survey years for all surveyed intervention and control farms. Letters in year columns denote actual status during the relevant year. I = intervention; C = control. 2010 is the pre-intervention year.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Farm (Desired status) | 2010 | 2011 | 2012 | 2013 | 2014 |
| 1 (I) | C | I | C | I | C |
| 2 (I) | C | I | C | C | C |
| 3 (I) | C | I | C |  | C |
| 4 (I) | C | I | C |  |  |
| 5 (I) | C | I | I | I | I |
| 6 (I) | C | I | I | I | I |
| 7 (C) | C | C | C |  | C |
| 8 (C) | C | C | C |  | C |
| 9 (C) | C | C | C |  |  |
| 10 (C) | C | C | C |  | I |
| 11 (C) | C | C | C | C | C |
| 12 (C) |  | C | C |  | C |
| 13 (I) |  |  |  | C | I |
| 14 (I) |  |  |  | C | I |
| 15 (C) |  |  |  | C | C |
| 16 (C) |  |  |  | C | C |
| 17 (C) |  |  |  | C | C |
| 18 (C) |  |  |  | C | C |
| 19 (C) |  |  |  | C | C |

Table S3. Agri-environment options and weightings used in calculating the seed index for each MCP and predicted home range. The score for each option is the product of the weighting for seed abundance (Criteria: 1: Relatively low seeding/<15% plant sp. contain seed food or insect-pollinated herbs, seeding not confirmed; 2: >5% desirable plant spp. (*Chenopodium* sp., *Stellaria media*, *Polygonum* spp., etc), seeding confirmed; 15-30% plant sp. contain seed food; 3: >10% desirable plant sp.; >30% plant sp. contain seed food, seeding confirmed) and the weighting for vegetation structure (Criteria: 1: <10% bare ground; 2: 10-25% bare ground; 3: >25% bare ground; height <10cm); the weighted seed index for each MCP/predicted home range was calculated by summing the product of the score multiplied by the area for each available option. References provided are those used to assess seed abundance and structure from either the designated agri-environment option [under Entry-Level or Higher-Level Stewardship (Natural England 2012a, 2012b)], or similar under an alternative voluntary scheme [e.g. Campaign for the Farmed Environment (Laybourn *et al.* 2012)].

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Option (Stewardship code)** | **Seed abundance weighting** | **Vegetation structure weighting** | **Overall weight** | **Reference** | **Total area within predicted MCPs (ha)** |
| Turtle dove plot | 3 | 2 | 6 | Dunn *et al.* 2015 | 12.40 |
| Extended stubble (EF6) | 1 | 3 | 3 | Laybourn *et al.* 2012 (although assessed in winter) | 120.00 |
| Floristically enhanced margin (HE10) | 3 | 1 | 3 | Laybourn *et al.* 2012; Dunn *et al.* 2015 | 3.10 |
| Fallow plots for nesting birds (HF13) | 3 | 2 | 6 | (Laybourn *et al.* 2012) | 38.80 |
| Cultivated fallow (HF20) | 3 | 2 | 6 | (Laybourn *et al.* 2012) | 5.33 |
| Low input spring cereal (HG7) | 1 | 2 | 2 | (Peach *et al.* 2011) | 36.00 |
| Reduced herbicide crop then overwinter stubble (EF15) | 1 | 2 | 2 | (Peach *et al.* 2011) | 1.55 |
| Arable reversion (HD7) | 3 | 2 | 6 | (Laybourn *et al.* 2012) | 2.00 |
| Species-rich grassland (HK15 & HK17) | 2 | 1 | 2 | (FERA 2013) | 46.40 |
| Species-rich semi-natural grassland (HK8) | 2 | 2 | 4 | (FERA 2013) | 0.00 |

**References**

Dunn, J., Morris, A. and Grice, P. (2015) Testing bespoke management of foraging habitat for European turtle doves *Streptopelia turtur*. *J. Nat. Conserv.* 25: 23-34.

FERA (2013) *Monitoring the impacts of Entry Level Stewardship*. York, UK: Food and Environment Research Agency. (Natural England Commissioned Reports, Number 133).

Laybourn, R., Jones, N. and Boatman, N. (2012) *Campaign for the farmed environment annual report - Quality assessments and verification monitoring*. York UK: Food and Environment Research Agency (FERA).

Natural England (2012a) *Entry Level Stewardship: Environmental stewardship handbook. Fourth Edition - January 2013*. Natural England.

Natural England (2012b) *Higher Level Stewardship. Environmental stewardship handbook.* Third Edition. Natural England.

Peach, W., Dodd, S., Westbury, D., *et al.* (2011) Cereal-based wholecrop silages: A potential conservation measure for farmland birds in pastoral landscapes. *Biol. Conserv.* 144: 836-850.