

Birds in a complex agricultural landscape in Central Greece: the role of landscape elements and the landscape matrix

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Supplementary material

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TABLE S1. List of assessed patch- and landscape predictors in every plot. Resulting from the CCA, only eight patch-level predictors were withheld for the analysis, indicated with an asterisk (*). For the landscape-level predictors, the MN (mean) equals the sum, across all patches in the landscape, of the corresponding patch metric values, divided by the total number of patches

<i>Patch level predictors</i>	<i>Abbreviation</i>	<i>Description</i>
<i>Quercus coccifera</i> (high stem) cover*	Qchstcov	Full-grown tree with a stem higher than 2 m
<i>Quercus coccifera</i> (low stem) cover	Qc(lst)cov	Single or multiple low-stem (1-1.5 m) tree, intermediate form between a full-grown tree and a shrub
<i>Quercus coccifera</i> (bush) cover*	Qc(bsh)cov	Bushes and/or shrub (0.1-1.5 m), without a well developed stem and often 'sculpted' by grazing of livestock
<i>Pyrus amygdaliformis</i> (high stem) cover	Pa(hst)cov	Full-grown tree with a stem higher than 2 m
<i>Pyrus amygdaliformis</i> (low stem) cover	Pa(lst)cov	Single or multiple low-stem (1-1.5 m) tree, intermediate form between a full-grown tree and a shrub
<i>Pyrus amygdaliformis</i> (bush) cover	Pa(bsh)cov	Bushes and/or shrub (0.1-1.5 m), without a well developed stem and often 'sculpted' by grazing of livestock
Amount of vegetation patches*	veg_pat	Amount of high (> 1 m) dense vegetation structures and patches within a defined plot
Ground vegetation cover	g_veg	Amount of poor to rich herb layer
Deciduous vegetation cover*	v_d(c)	Amount of deciduous species (<i>Juglans regia</i> , <i>Fraxinus ornus</i> , <i>Paliurus spina-christi</i> , <i>Celtis australis</i> , <i>Sambucus nigra</i> , <i>Populus</i> sp., <i>Crataegus</i> sp. and <i>Ulmus</i> sp.)
Crop cover*	crop(c)	Amount of agricultural of cropland
Presence of large hedgerows	b_hdgr	Presence/absence of high and dense hedges, consisting of large bushes and full-grown trees, with less human intervention
Presence of small hedgerows	s_hdgr	Presence/absence of small and scattered hedge rows and single bushes, also holding full-grown deciduous trees, with dispersed xerolithic walls
Presence of flowing water	f_water	Presence/absence of flowing water
Dry	dry	Presence/absence of dry soils
Presence of rocks and rocky soil	rocks	Presence/absence of naked rock (absence of a true soil layer)
Presence of heaps of stones*	hos	A proxy for unfenced collective grazing grounds with high anthropogenic disturbances such as livestock grazing, always recognizable by piled stones
Presence of xerolithic walls	x_walls	Presence/absence of piled rocks without the use of cement. They indicate the boundaries of the small scale
Degree of grazing pressure*	graz_p	Qualitative determination of grazing pressure by trampling and grazing damage to vegetation and soil cover, presence of unpalatable annuals, 'sculpted' bushes and a decrease of plant coverage

TABLE S1. continued

<i>Patch level predictors</i>	<i>Abbreviation</i>	<i>Description</i>
Presence of humans	humans	Presence/absence of human disturbances (active road, passage of shepherds, traces of recent and persistent human presence etc.)
<i>Landscape level predictors generated by Fragstats (and units)</i>	<i>Abbreviation</i>	<i>Description from McGarigal et al. (2002)</i>
Mean area of a patch (ha)*	AREA_MN	Equals the area (m ²) of the patch, divided by 10000 (to convert to hectares)
Edge density (m ha ⁻¹)	ED	Equals the sum of the lengths (m) of all edge segments in the landscape, divided by the total landscape area (m ²), multiplied by 10000 (to convert to hectares)
Mean perimeter-area ratio (none)	PARA_MN	A measure of shape complexity that equals the ratio of the patch perimeter (m) to area (m ²)
Mean edge contrast (%)*	ECON_MN	A relative measure of the amount of contrast (not all edges are treated equal) along the patch perimeter. It equals the sum of the patch perimeter segment lengths (m) multiplied by their corresponding contrast weights, divided by total patch perimeter (m), multiplied by 100 (to convert to a percentage)
Simpson's diversity index (none)*	SIDI	A diversity measure representing represents the probability that any 2 pixels selected at random would be different patch types

TABLE S2. List of 26 breeding bird species used for the analysis in the study area with scientific name, abbreviation (based on scientific names), common English name and species abundance

Scientific name	Abbreviation	Common name	Number of individual observations
<i>Hippolais pallidus</i>	Apal	Eastern olivaceous warbler	26
<i>Cettia cetti</i>	Ccet	Cetti's warbler	10
<i>Carduelis chloris</i>	Cchl	Greenfinch	16
<i>Coturnix coturnix</i>	Ccot	Quail	15
<i>Cuculus canorus</i>	Ccan	Cuckoo	20
<i>Dendrocopos syriacus</i>	Dsyr	Syrian Woodpecker	15
<i>Emberiza cirius</i>	Ecir	Cirl bunting	71
<i>Emberiza melanocephala</i>	Emel	Black headed bunting	53
<i>Frigilla coelebs</i>	Fcoe	Finch	37
<i>Galerida cristata</i>	Ccri	Crested lark	91
<i>Garrulus glandarius</i>	Ggla	Jay	35
<i>Lanius collurio</i>	Lcol	Red-backed shrike	16
<i>Lanius minor</i>	Lmin	Less grey shrike	20
<i>Lanius senator</i>	Lsen	Woodchat shrike	35
<i>Luscinia megarhynchos</i>	Lmeg	Nightingale	115
<i>Melanocorypha calandra</i>	McaK	Calandra lark	12
<i>Emberiza calandra</i>	Mcal	Corn bunting	130
<i>Oenanthe oenanthe</i>	Ooen	Wheatear	21
<i>Oriolus oriolus</i>	Oori	Golden oriole	19
<i>Parus lugubris</i>	Plug	Sombre tit	13
<i>Parus major</i>	Pmaj	Great tit	43
<i>Streptopelia decaocto</i>	Sdec	Collared dove	46
<i>Streptopelia turtur</i>	Stur	Turtle dove	54
<i>Sylvia cantillans</i>	Scan	Subalpine warbler	69
<i>Sylvia communis</i>	Scom	Whitethroat	122
<i>Turdus merula</i>	Tmer	Blackbird	55

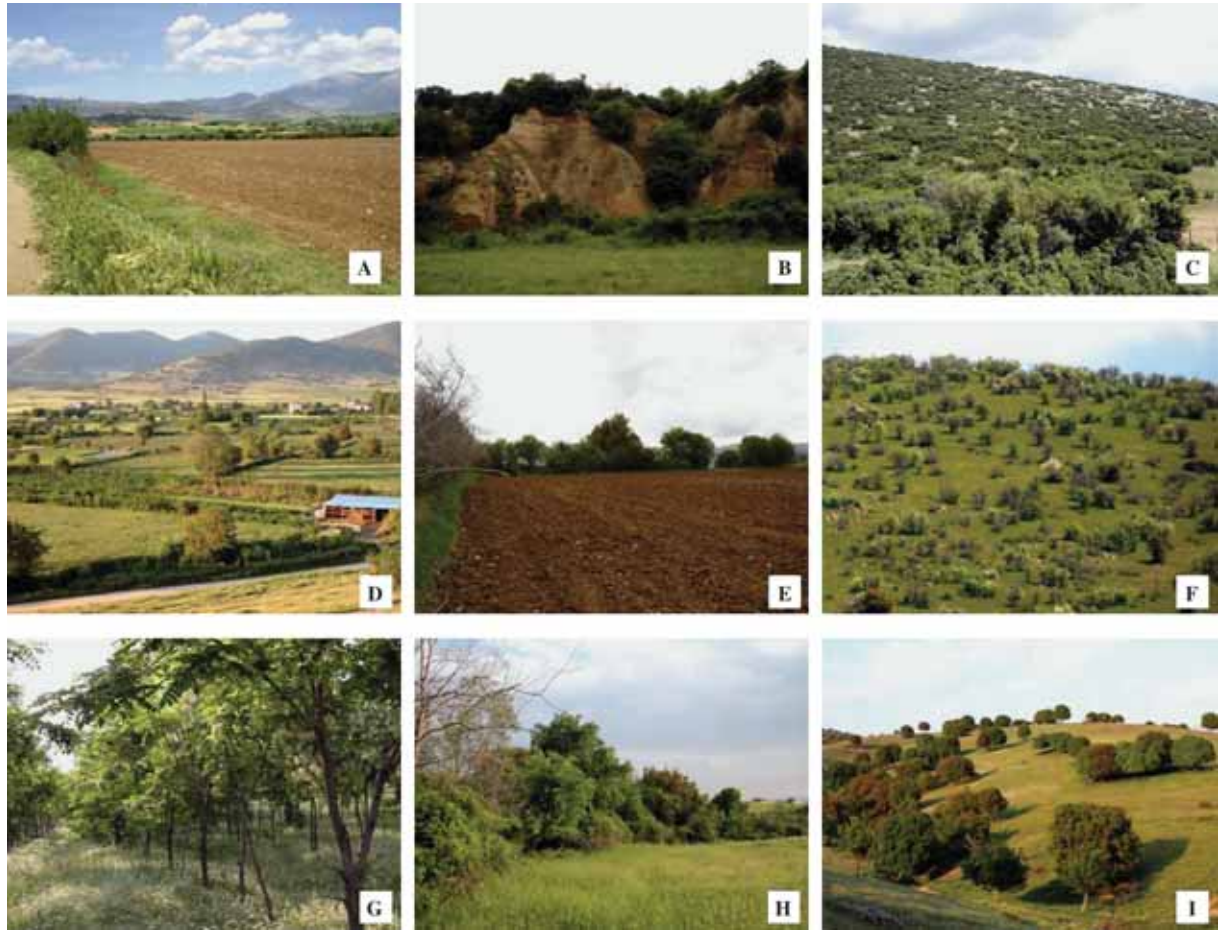


FIG. S1. Photos of 8 defined landscape types in the Livadi-Dolichi area: (A) Cropland, (B) Badlands, (C) *Q. coccifera* thicket, (D & E) hedgerows, (F) Grassland with scattered *Q. coccifera* and *P. amygdaliformis* ('commons'), (G) Plantations of *R. pseudoacacia* (as shown here) or fruit crops, (H) Rivulet accompanying vegetation and (I) Dehesa of high stem *Q. coccifera* trees.