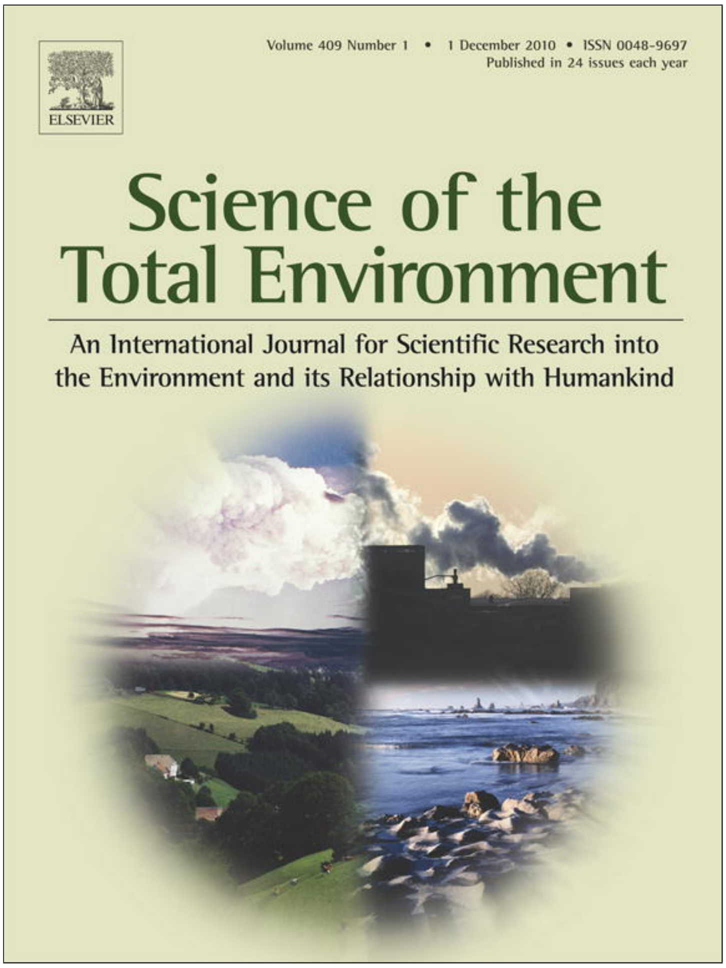
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Effects of Mediterranean dehesa management on epiphytic lichens

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Spanish holm oak (*Quercus ilex* subsp. *ballota*) open woodlands (dehesas) maintain a high diversity of plants and animals compared to other forested Mediterranean habits, but little is known about the responses of epiphytic lichens to different management regimes that are applied to this woodland type. The present study was carried out in central-southern Spain and included four management regimes: agriculture, grazing of sheep, grassland grazed by wild ungulates (deer), and abandoned dehesas covered by shrubs. Total species richness and cover exhibited considerable variation among management regimes. Both parameters tended to decrease with the intensity of management, abandoned dehesas maintaining a higher number of species than more intensively managed habitats. Lichen composition also significantly differed among the four regimes. Nitrophytic species were clearly associated with more intensive management regimes (farming or livestock management), whereas non-nitrophytic species favored abandoned dehesas.

1. Introduction

Historically, most oak forests in the plain areas of the southwestern Iberian Peninsula have been transformed into open woodlands, with scattered trees reaching densities of 10 to 50 trees/ha (Peco et al., 2001). These open woodlands, known as "dehesas" in Spain and "montados" in Portugal, are multifunction farming systems used for grazing, silviculture, and rotation cereal cropping across large private farms (Díaz et al., 1997; Peco et al., 2001). Nowadays, dehesas cover almost 3.1 million ha (Peco et al., 2001), although their low productivity compared to more intensive forms of agriculture has often resulted in their abandonment (Pulido et al., 2001; Peco et al., 2005). However, in some cases, livestock management has intensified, causing overgrazing (Pulido et al., 2001; Peco et al., 2005).

The value of these open woodlands for the conservation of biodiversity has been repeatedly noted, because they maintain a higher diversity of several groups of plants and animals than in other habitats in the same environment (Peco et al., 2001; Díaz et al., 2003). For example, these systems maintain more diverse bird communities than the adjacent treeless pastures, cultivated areas, and even Mediterranean forests (Díaz et al., 2003). In addition, the dehesa land use has been shown to influence the diversity of several groups of organisms (see Martín and López, 2002). Species richness of nesting birds, oligochaetes, and vascular plants is greater in dehesas which have the understory dominated by grasslands, whereas the species richness of meso- and micromammals is highest in dehesas which have the understory covered by shrubs (Díaz et al., 2003). Similarly, Martín and López (2002) concluded that lizards preferentially used forested areas with shrubs but avoided open herbaceous areas.

Epiphytic lichens are especially sensitive to human impacts on forest ecosystems (Bergamini et al., 2005; Werth et al., 2005; Nascimbene et al., 2007; Aragón et al., 2010) because they are poikilohydric and are therefore sensitive to increases in light intensity (Gauslaa and Solhaug, 1996). Forestry, agricultural, and livestock activities may specifically affect the lichen species composition (Nascimbene et al., 2007; Aragón et al., 2010). Clearing of forests and logging can alter the humidity, temperature, and light conditions (Murcia, 1995; Moen and Jonsson, 2003), causing a systematic reduction in populations and local extinction of some cyanolichens and some crustose sorediate species that can only survive at sites with high humidity (Burgaz et al., 1994; Nascimbene et al., 2007; Aragón et al., 2010). Similarly, eutrophication (from agricultural and livestock activities) has been considered as a significant cause of change in epiphytic communities (Ruoss, 1999; Loppi and Pirintsos, 2000; Wolseley et al., 2006; Pinho et al., 2009). In open areas, eutrophication caused by dust particles are considered one of the main causes for the rise in bark pH of *Quercus* trees affecting epiphytic lichens (Loppi and Dominicis, 1996; Pinho et al., 2008). In areas with more agriculture, several authors have linked the increase of nitrates from fertilizers with shifts in lichen composition (Van Herk, 1999; Wolseley et al., 2006; Pinho et al., 2008). Eutrophication from animals and from fertilizers might lead to impoverishment of the epiphytic communities in open woodlands and, depending on the disturbance intensity, can cause species loss (Loppi and Dominicis, 1996; Motiejûnaitë and Faùtynowick, 2005; Pinho et al., 2009; Aragón et al., 2010).

In the present study, we analyzed the response of epiphytic lichens to four different management regimes in open Mediterranean dehesa woodlands: intensive agriculture, grassland used by deer, intensive grazing of sheep, and abandoned dehesas covered by shrubs. This study

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focused on dehesas of holm oak (*Quercus ilex* subsp. *ballota*) with less than 10% canopy cover in central-southern Spain, in an area characterized by a Mediterranean climate (Costa et al., 2001). We hypothesized that differences in species richness and composition under similar environmental conditions would arise due to differences in management intensity. Specifically, we aimed to address the following questions: Do the different management regimes influence the richness and composition of epiphytic lichens? Which species contribute most to differences among the four management regimes?

2. Materials and methods

2.1. Study area

The study area was located in central-southern Spain (4°29′W, 39°23′N) (Fig. 1). The climate is a subhumid continental Mediterranean climate with a mean annual temperature of 14.5 °C and annual precipitation of 680 mm. The study was conducted in open holm oak woodlands. The vegetation structure consisted of a tree layer with a density of 10 to 22 trees/ha combined with either corn and wheat cultivation, a herbaceous layer subject to grazing (predominantly by sheep), or Mediterranean shrublands.

2.2. Experimental design

We established 24 plots, each of 200 × 200 m, grouped according to four different management regimes (Fig. 1, Table 1), 6 plots in each regime: Management regime one (MR1) comprised fenced plots that had been abandoned for the past three decades and that are now covered by Mediterranean shrubs (cover density of 100%) such as *Cistus ladanifer* and *Phillyrea angustifolia*. Management regime two (MR2) comprised plots with a herbaceous layer that supported grazing by wild deer at a density of 40 to 50 animals per 100 ha. Management regime three (MR3) comprised plots used for high-intensity grazing of livestock, with a density of 1500 to 2000 head of sheep per 100 ha. Management regime four (MR4) comprised plots that were mainly used for the cultivation of corn or wheat. The study plots were randomly located within an extensive area that included examples of the four management units (Fig. 1). Plots of MR1 (abandoned dehesas) and MR2 (grassland grazed by deer) were situated inside National Park lands (Fig. 1). All the dehesas were located between 634 and 654 m in altitude ($p = 0.137$), and differences in the slope among the sites were negligible.

We determined the occurrence of epiphytic lichens on 240 holm oak trees (10 trees per plot, randomly selected). Within each plot, we measured the diameter of each tree at breast height (dbh) and the tree density (number of trees per ha). We also recorded the elevation of each plot.

Table 1
Characteristics of the study sites and the species richness (number of lichen species) in each plot. MR1, shrub communities; MR2, grazed by wild ungulates; MR3, grazed by sheep; MR4, agriculture.

Plot no.	Management regime	Elevation (masl)	Mean tree dbh (cm)	Tree density (no./ha)	Species richness (lichens)
1	MR1	638	31.14	13	33
2	MR1	646	29.63	8	32
3	MR1	648	29.17	12	34
4	MR1	645	30.88	22	36
5	MR1	648	29.01	17	35
6	MR1	647	31.18	17	33
7	MR2	634	37.50	8	24
8	MR2	639	34.39	6	27
9	MR2	641	31.36	19	28
10	MR2	640	30.21	11	27
11	MR2	643	30.76	14	27
12	MR2	644	30.49	16	28
13	MR3	650	34.10	8	18
14	MR3	651	32.52	7	18
15	MR3	654	33.95	9	23
16	MR3	650	30.25	14	27
17	MR3	646	29.60	12	27
18	MR3	651	28.74	18	26
19	MR4	647	31.30	6	21
20	MR4	649	30.66	10	21
21	MR4	646	30.68	9	21
22	MR4	650	30.26	14	23
23	MR4	650	30.79	12	22
24	MR4	647	32.19	18	24

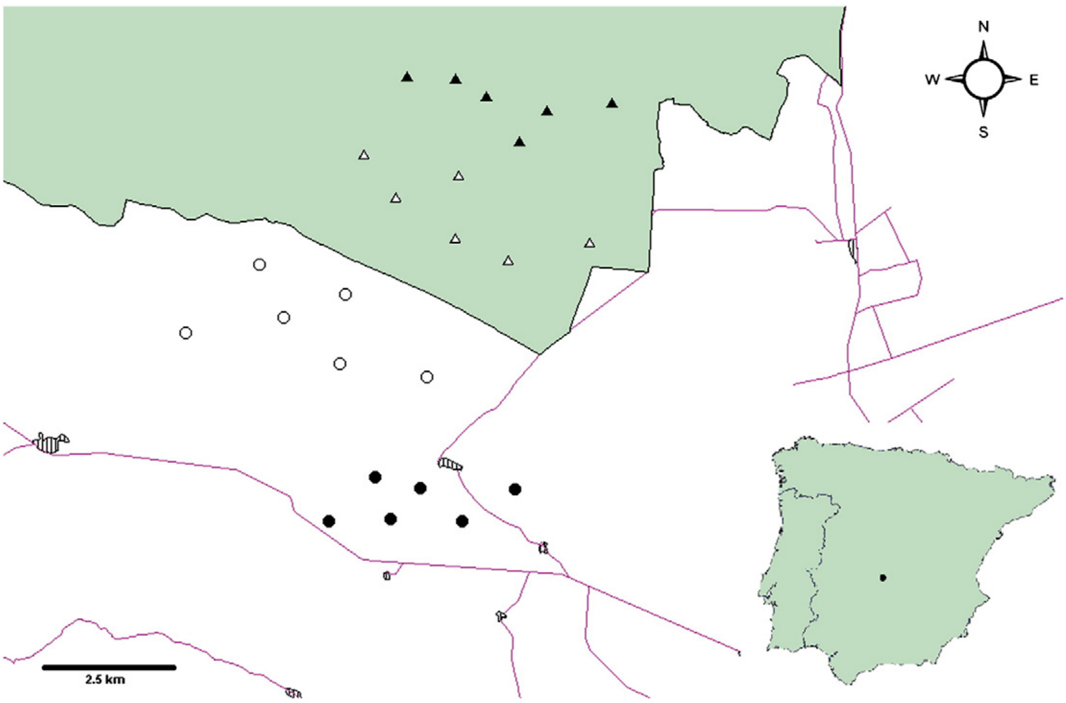

Fig. 1. Map of the study area showing the 24 plots. Gray colour corresponds to National Park lands. MR1, shrub communities (▲); MR2, grazed by wild ungulates (△); MR3, grazed by sheep (○); MR4, agriculture (●). The lines are regional roads and forest paths. Striped polygons correspond to small villages.

Following the method of Belinchón et al. (2007), we established four 15×30 cm grids on the bark of each selected tree: at breast height and at tree base and on the north and south aspects. We used the averages of three data sets (the lichen composition, total species richness, and total lichen cover) for a given sample position. The total species richness was defined as the total number of species found in the four grids per tree. For the lichen composition, we calculated the mean estimated cover of each species (% of the grid area) for the four sample grids. We calculated the total species cover per tree (as a percentage of the grids) using the same method.

2.3. Data analyses

We compared the total species richness and total cover of the lichen communities at the tree level among the four different management regimes and among plots within each management regime by means of a two-way nested analysis of variance (ANOVA) (Quinn and Keough, 2002). If the effect of the main factor was significant, we performed pairwise *post hoc* Bonferroni tests to test for significant differences among groups. Prior to the ANOVA, we used Cochran's C test to confirm the assumption of homogeneity of variances (Underwood, 1997). Total epiphyte cover data were arcsine-transformed to deal with variance heterogeneity. After transformation, variances remained slightly but significantly heterogeneous ($p<0.01$). Despite this, the fact that the design was balanced and had many samples and that differences among treatments (management regimes) were significant at $p<0.0001$ suggested that this slight variance heterogeneity would not cause interpretation problems.

We investigated the effects of the management patterns on the lichen species composition using version 6.1.11 of the PRIMER multivariate statistical analysis software (Anderson et al., 2008). In this analysis, the experimental design included two factors: management regime (four levels, fixed factor) and plot (six levels, random factor nested within management regime), with 10 replicate trees for each plot. The cover data (percentage cover by each lichen per tree) were $\log_{10}(x+1)$ transformed to account for the contributions by both rare and abundant taxa. We used the Bray–Curtis distance measure. We computed a two-dimensional MDS ordination from the species cover values to reveal the degree of similarity between management regimes.

To test whether the four management regimes had significantly different epiphytic lichen species compositions and to detect the effects of plot variability, we performed a two-factor permutational multivariate analysis of variance (PERMANOVA) on the cover data (Anderson et al., 2008). We performed additional pairwise PERMANOVA tests (Anderson et al., 2008) for all data to explore the extent of any differences between the lichen compositions in each pair of management units. For all tests, we allowed 9999 random permutations under the reduced model. To identify the taxa that contributed most of the similarity and dissimilarity among management regimes in the MDS ordination plot, we used the BVSTEP statistical routine. This routine identifies the smallest subset of species capable of reproducing the differences in community patterns among management regimes that were obtained in the MDS ordination (rho = 0.95, with 100 restarts) (Clarke and Warwick, 1998).

3. Results

3.1. Characterization of the patches

We found no significant differences among the four types of dehesas in relation to their environmental and forestry variables. Dbh ranged between 25.82 and 44.60 cm ($p=0.507$) with a mean of 31.62 cm. The tree density ranged between 6 and 22 trees/ha ($p=0.627$).

3.2. Species richness and cover

We recorded a total of 42 epiphytic lichen species on the 240 trees (Appendix A). The total number of species was highest in MR1 (40 species), followed by 29 species in MR2, 27 species in MR3, and 24 species in MR4. We found 12 species exclusively in dehesas with shrubs, whereas *Lecanora horiza* and *Xanthoria parietina* were absent from these areas. The most common species were *Candelaria concolor*, *Lecidella elaeochroma*, *Parmelina tiliacea*, and *Physcia adscendens*, which each appeared on more than 190 trees (Appendix A), whereas *Fuscopannaria mediterranea*, *Parmelia sulcata*, *Pertusaria hemisphaerica* and *Tephromela atra* were found on fewer than five trees (Appendix A).

ANOVA revealed large and significant differences in total species richness and total cover per tree at the management unit level (Table 2). However, in both cases, the variability at the plot level was also significantly different. The subsequent pairwise test revealed significant differences between MR1 and MR2 with respect to MR3 and MR4, but not between MR1 and MR2 or between MR3 and MR4, whereas total cover differed significantly among all combinations of management regimes (Table 4). The total species richness at the tree and plot levels and the total cover values per tree at the tree level decreased with increasing management intensity (Fig. 2).

3.3. Species composition

Multivariate statistical analysis showed that the epiphytic lichen composition was structured according to the different types of management regimes in the dehesas (Table 3). The MDS ordination showed a clear separation between trees in the unmanaged dehesas (MR1) and trees in the other management units (Fig. 3). The subsequent pairwise test revealed significant differences in the constitution of the epiphyte composition between all four management regimes (Table 4). The BVSTEP routine revealed that a subset of nine species (Fig. 4) could explain 95% of the variation in the MDS ordination. When these species were excluded, the next-best model contained 25 species, which explained only 91% of the observed pattern. Of the nine species identified by the BVSTEP routine, five (*L. elaeochroma*, *Phaeophyscia orbicularis*, *P. adscendens*, *P. aipolia*, and *X. parietina*) were nitrophyllous, and they showed the highest occurrence levels at sites with more intensive management. The rest of species were mainly found in the MR1 and declined in cover in the other management regimes (Fig. 4).

4. Discussion

Our results demonstrated that the different management regimes had different effects on the community of epiphytic lichens in holm oak dehesas. The main difference between the four types of dehesa appears to relate to the intensity of management, as there were no significant differences at structural or geographical levels. Abandoned dehesas covered by shrubs maintained more lichen species than the three managed habits. This trend has been observed for other groups of organisms, including mammals (Díaz et al., 1993; Alba et al., 2001) and lizards (Díaz and Carrascal, 1991; Martín and López, 2002). The decrease in lichen richness and also total cover in the more intensively managed dehesas may relate to the nature of these management regimes, as lichens are particularly sensitive to eutrophication of bark by atmospheric deposition, specially inorganic contaminants (ammonia) of agricultural activities and livestock management (Van Herk, 1999, 2001; Wolseley et al., 2006; Pinho et al., 2008, 2009). Both activities are the most

Table 2
Results of the two-way ANOVA for total species richness and for arcsine-transformed total cover per tree. MR, management regime.

	Source	*df*	Mean square	*F*-ratio	*p*
Total species richness	MR	3	211.52	6.95	0.002
	Plot (MR)	20	30.45	3.54	<0.0001
	Error	216	8.59		
Total cover per tree	MR	3	2.69	38.21	<0.0001
	Plot (MR)	20	0.07	1.98	0.008
	Error	216	0.03		

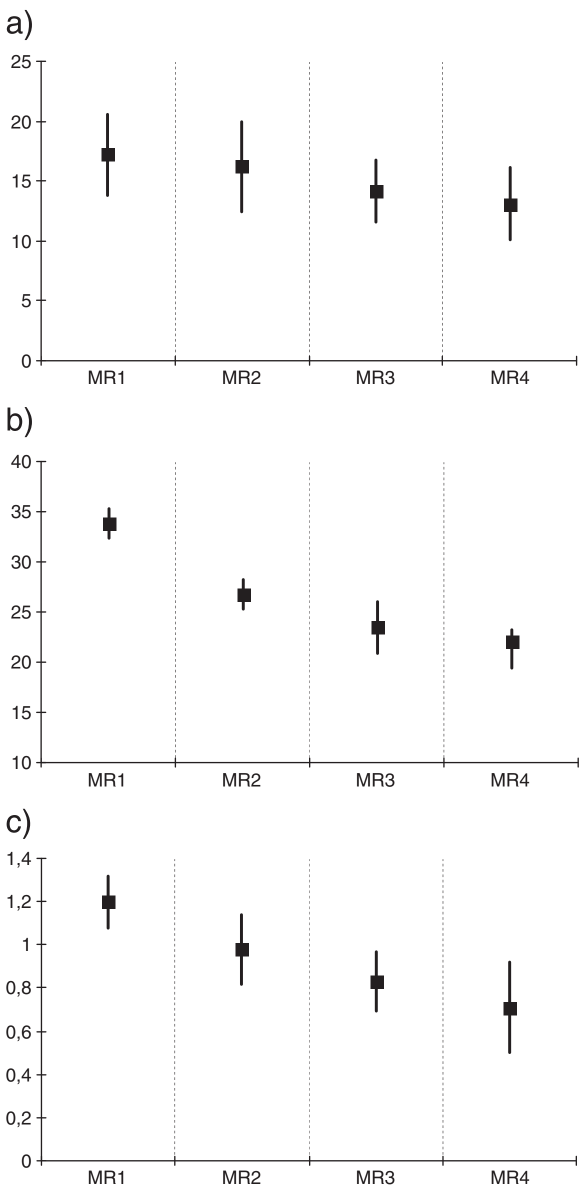

Fig. 2. Total species richness of epiphytic lichens at (a) the tree level and (b) the plot level, and (c) arcsine-transformed total cover per tree at the tree level in the four management regimes. Values represent the means (±SD) of 10 trees per plot. MR1, shrub communities; MR2, grazed by wild ungulates; MR3, grazed by sheep; MR4, agriculture.

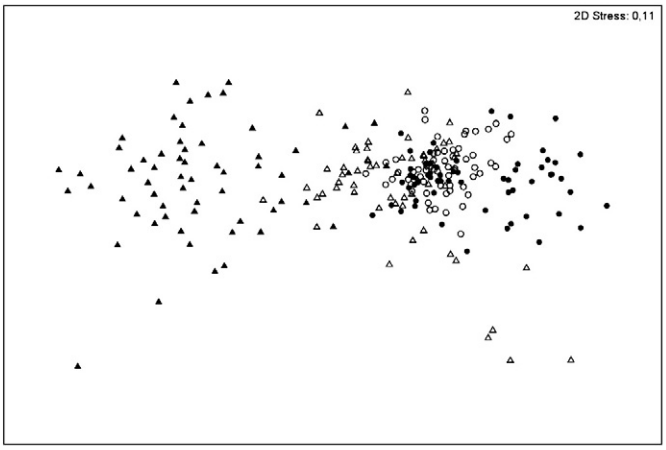

Fig. 3. MDS ordination plot for the samples (trees) from the four different management regimes. MR1, shrub communities (▲); MR2, grazed by wild ungulates (△); MR3, grazed by sheep (○); MR4, agriculture (●).

important source of ammonia in Europe (see Pinho et al., 2009). On the other hand, livestock use of a site adds eutrophic elements and leads to the erosion of bark by herbivores (e.g., red deer, sheep), causing the loss of numerous species in the lower parts of tree trunks (Sarrión and Burgaz, 2002).

The higher species richness in the abandoned dehesas mainly resulted from the contribution of 12 species that were found exclusively in the abandoned dehesas. Cyanobacterial lichens (*Collema* spp. and *F. mediterranea*) preferred the abandoned dehesas. In general, lichen species that contain cyanobacteria as their photosynthetic partner need some degree of shade for their development and stability under dry conditions (Richardson and Cameron, 2004). The abandoned dehesas had better conditions for the development of these species due to the presence of a shrub layer that provided shade and higher humidity on the tree trunks. Because Mediterranean areas are characterized by relatively low rainfall, high temperatures, and a severe seasonal drought, the water availability for theses cyanolichens is strongly determined by the nature of the forest canopy (Burgaz et al., 1994; Aragón et al., 2010). Similar trends have been observed for sorediate and leprarioid species (*Pertusaria* spp. and *Phlyctis argena*), which may be particularly prone to desiccation (Hedenås and Hedström, 2007). These species grew at the tree base under more humid and shady conditions due to the protection provided by the shrub layer. These conditions favor colonization by these sorediate species, which can then displace the more photophyllous foliose thalli (Sarrión and Burgaz, 2002). In the Mediterranean region, the former species prefer sites with high air humidity and often appear in woodlands (Nimis, 1993; Sarrión and Burgaz, 2002).

We found strong similarities in lichen composition within each management regime and clear differences among these units, reflecting differences in the intensity of the management regime. This may have corresponded to a greater concentration of dust in the landscape under the more intensive management regime. Nitrophytic species revealed by the BVSTEP analysis showed the highest occurrence levels at sites with more intensive management. Fuertes et al. (1996) suggested that livestock management and the canopy structure of the "Spanish dehesas" determined a notable change in epiphytic lichen composition increasing the nitrophytic and crustose species respect to less-managed forest. In the agricultural and livestock landscapes, these species may be favored by increased deposition of nutrient-bearing dust (Hedenås and Ericson, 2004; Motiejûnaitë and Faùtynowick, 2005; Aragón et al., 2010). Under the more xeric climatic conditions of the Mediterranean area, Loppi and

Table 3
Results of the two-factor PERMANOVA analysis by management regime (MR) and plot.

Source	*df*	Mean square	Pseudo-*F*	*P*	CV (%)
MR	3	46,074	31.83	0.0001	27.27
Plot (MR)	20	1447.7	2.85	0.0001	9.69
Residual	216	507.12			22.19
Total	239				

Table 4
Results of the pairwise PERMANOVA test (for the lichen composition) and pairwise ANOVA (for the total species richness and lichen cover per tree) between management regimes. MR1, shrub communities; MR2, grazed by wild ungulates; MR3, grazed by sheep; MR4, agriculture. Level of significance.

	Lichen composition	Species richness	Species cover
MR1 versus MR2	0.0015	0.736	<0.001
MR1 versus MR3	0.0017	<0.001	<0.001
MR1 versus MR4	0.0023	<0.001	<0.001
MR2 versus MR3	0.0024	0.002	<0.001
MR2 versus MR4	0.0041	<0.001	<0.001
MR3 versus MR4	0.0026	0.405	0.009

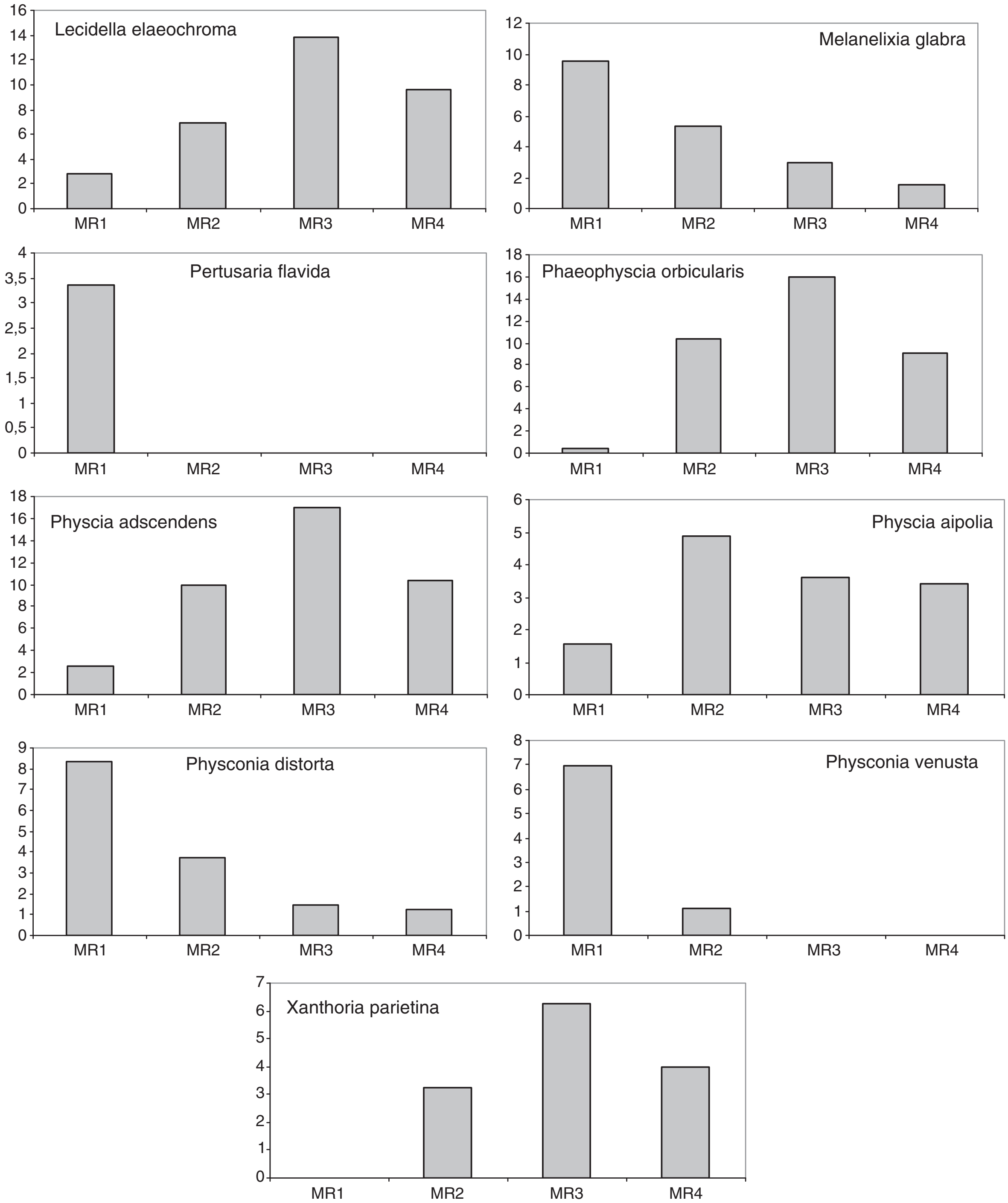

Fig. 4. Mean cover in each management regime of the nine epiphyte species revealed by the BVSTEP routine that could explain 95% of the variation in the MDS ordination. Note the different scales used on the y-axis of these graphs. MR1, shrub communities; MR2, grazed by wild ungulates; MR3, grazed by sheep; MR4, agriculture.

Dominicis (1996) showed a higher frequency of nitrophytic species in agricultural landscapes as a result of the increased raising of dust in these areas, although the nitrogen content and pH of the tree bark in these areas did not differ from those in non-agricultural areas. However, some authors have found that atmospheric ammonia, either direct impact or indirect impact by changing bark pH, shifts lichen communities from oligo- to nitrophytic species (e.g., Ruoss, 1999; van Herk, 1999, 2001; Wolseley et al., 2006; Pinho et al., 2008, 2009).

The rest of species revealed by the BVSTEP were *Melanelixia glabra*, *Physconia distorta*, *Physconia venusta* and *Pertusaria flavida*. These were intermediate to non-nitrophytic species that mainly grow in unmanaged dehesas (MR1), and their occurrence decreased with increasing management intensity. In this sense, some authors (Loppi and Dominicis, 1996; Pinho et al., 2008, 2009) found that the abundance of non-nitrophytic species increased in plots located at greater distance from the dust source, under less-disturbed environmental conditions, although the pattern of abundance of nitrophytic species was much more variable under more disturbed conditions.

Finally, an important part of the variability (ANOVA, PERMANOVA) was at tree level. It might be related to microclimatic differences due to the size and density of the crown. The large crowns of the trees in the dehesas have severe influence on the light, temperature and moisture of the tree trunks (Costa et al., 2001).

We conclude that the richness and composition of epiphytic lichen communities in Mediterranean holm oak dehesas are affected by the intensity of management. The less intensively managed stands are species richer than more intensively managed stands. Furthermore, the composition of the lichen communities differs among management regimes. The most non-nitrophytic species only grow in abandoned dehesas, whereas the nitrophytic species prefer more intensively managed sites.

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Appendix A

Number of trees on which each species appears and the mean cover per tree in the four management regimes. Base = tree base; BH = tree breast height; MR1 = shrub communities, MR2 = grazing by wild ungulates, MR3 = grazing by sheep, MR4 = agriculture. Cyanolichens (*); Nitrophytes (Nimis, 1993) (+).

Epiphyte	Number of trees							Mean cover (%) per tree			
	Base	BH	MR1	MR2	MR3	MR4	Total	MR1	MR2	MR3	MR4
Anaptychia ciliaris	2	5	5	0	0	0	5	0.22	0.00	0.00	0.00
Caloplaca ferruginea	24	101	23	22	31	31	107	0.68	0.80	1.20	0.97
+*Candelaria concolor*	128	173	30	52	53	57	192	1.58	6.50	4.97	5.13
+*Candelariella vitellina*	5	74	6	11	22	37	76	0.10	0.24	0.57	0.89
**Collema furfuraceum*	19	9	23	0	0	0	23	1.27	0.00	0.00	0.00
**Collema occultatum*	5	2	5	0	0	0	5	0.15	0.00	0.00	0.00
**Collema subflaccidum*	31	16	35	0	0	0	35	3.65	0.00	0.00	0.00
Evernia prunastri	23	64	38	21	12	0	71	2.27	0.79	0.30	0.00
Flavoparmelia soredians	9	35	8	22	3	6	39	0.76	0.00	0.00	0.00
**Fuscopannaria mediterranea*	4	0	4	0	0	0	4	0.32	0.84	0.07	0.12
Lecanora carpinea	9	26	5	5	11	7	28	0.12	0.13	0.18	0.17
+*Lecanora chlarotera*	96	158	31	41	50	47	169	0.98	1.66	3.70	2.27
+*Lecanora horiza*	16	31	0	8	7	17	32	0.00	0.25	0.17	0.41
Lecanora intumescens	16	40	12	11	8	15	46	0.23	0.28	0.19	0.27
+*Lecidella elaeochroma*	181	293	43	58	60	60	221	2.78	6.97	13.81	9.66
+*Lecidella pulveracea*	25	31	2	15	8	12	37	0.04	1.68	0.54	0.40
Melanelixia fuliginosa	19	35	30	2	6	0	38	2.02	0.07	0.11	0.00
Melanelixia glabra	121	161	55	46	42	25	168	9.58	5.37	3.02	1.52
Ochrolechia pallescens	1	7	8	0	0	0	8	0.19	0.00	0.00	0.00
Parmelia sulcata	2	2	3	0	0	0	3	0.42	0.00	0.00	0.00
Parmelina quercina	10	66	16	30	7	16	69	0.52	1.16	0.24	0.34
Parmelina tiliacea	151	190	57	49	52	36	194	16.16	6.87	4.39	3.08
Pertusaria albescens	49	5	46	0	4	0	50	9.25	0.11	0.18	0.00
Pertusaria coccodes	7	0	7	0	0	0	7	0.26	0.00	0.00	0.00
Pertusaria flavida	31	27	40	0	0	0	40	3.35	0.02	0.00	0.00
Pertusaria hemisphaerica	2	0	2	0	0	0	2	0.59	0.00	0.00	0.00
+*Phaeophyscia orbicularis*	170	157	7	49	59	60	175	0.37	10.38	15.99	9.14
Phlyctis argena	17	0	17	0	0	0	17	2.71	0.00	0.00	0.00
+*Physcia adscendens*	178	173	25	58	60	60	203	2.65	9.88	17.01	10.42
+*Physcia aipolia*	149	152	28	46	46	43	163	1.55	4.89	3.62	3.41
+*Physcia tenella*	99	114	6	45	34	42	127	0.37	5.92	2.63	2.08
+*Physconia distorta*	94	119	54	36	33	24	147	8.34	3.72	1.47	1.27
+*Physconia enteroxantha*	143	161	55	42	44	30	171	5.97	4.67	4.03	3.94
Physconia perisidiosa	15	20	12	12	0	0	24	1.12	0.48	0.10	0.05
Physconia venusta	43	37	40	15	0	2	57	6.97	1.12	0.00	0.03
Ramalina farinacea	5	44	24	17	5	0	46	1.07	0.38	0.07	0.00
Ramalina fraxinea	1	6	6	0	0	0	6	0.19	0.00	0.00	0.00
+*Rinodina colobina*	83	14	7	17	29	31	84	0.47	0.35	0.05	0.21
Rinodina exigua	34	21	14	15	3	14	46	0.67	2.86	3.50	2.63
Rinodina pyrina	23	11	2	2	19	4	27	0.07	0.07	0.52	0.09
Tephromela atra	3	2	2	2	0	0	4	0.06	0.04	0.00	0.00
+*Xanthoria parietina*	110	131	0	50	59	58	167	0.00	3.22	6.28	3.99

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