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Classification and mapping of Spanish Mediterranean mixed forests
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Supplementary Material

Tab. S1 - Classification of native forests in the Spanish Forest Map 1:50.000.

1. Monospecific forests
1.1. Broad-leaved forests
1.1.1. Deciduous or mascescent forests
. Beech forests (*Fagus sylvatica*)
. Oak forest (*Quercus robur* and/or *Q. petraea*
. Birch forests (*Betula* spp.)
. Hazelnut forests (*Coryllus avellana*)
. Downy oak forests (*Quercus pubescens*)
. Pyrenean oak forests (*Q. pyrenaica*)
. Algerian oak forests (*Q. canariensis*)
. Chestnut forests (*Castanea sativa*)
. Ash forests (*Fraxinus* spp.)
1.1.2. Perennial forests
. Holly forests (*Ilex aquifolium*)
. Holm oak forest (*Quercus ilex*)
. Cork oak forests (*Q. suber*)
. Olive tree forests (*Olea europaea* var. *sylvestris*)
. Arbutus forests (*Arbutus unedo*)
. Carob forests (*Ceratonia siliqua*)
1.2. Coniferous forests
1.2.1. Fir forests
.White fir forests (*Abies alba*)
. Spanish fir forests (*A. pinsapo*)
1.2.2. Juniper forests
. Phoenicean juniper forests (*Juniperus phoenicea*)
. Juniper forests (*Juniperus* spp.)
. Spanish juniper forests (*J. thurifera*)
. Canary juniper forests (*J. turbinanta*)
1.2.3. Pine forests
. Scotch pine forests (*Pinus sylvestris*)
. Mountain pine forests (*P. uncinata*)
. Stone pine forests (*P. pinea*)
. Aleppo pine forests (*P. halepensis*)
Austrian pine forests (*P. nigra* subsp. *salzmannii*)
. Maritime pine forests (*P. pinaster*)
. Maritime pine forests in the Mediterranean region (*P. pinaster* subsp. *mesogeensis*)
. Canary pine forests (*P. canariensis*)
2. Mixed forests
2.1. Broad-leaved mixed forests
2.1.1. Broad-leaved mixed forests in the Alpine biogeographical region
2.1.2. Broad-leaved mixed forests in the Atlantic biogeographical region

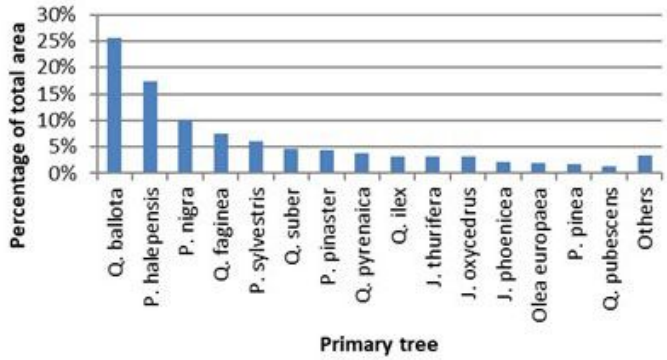
2.1.3. Broad-leaved mixed forests in the Mediterranean biogeographical region
2.1.4. Broad-leaved mixed forests in the Macaronesian biogeographical region
. Macaronesian heaths
. Macaronesian laurel forests
. Other Macaronesian mixed forests
2.1.5. Palm forest (Phoenix sp.) mixed with other species
2.2. Conifer mixed forests
2.2.1. Conifer mixed forests in the Alpine biogeographical region
2.2.2. Conifer mixed forests in the Atlantic biogeographical region
2.2.3. Conifer mixed forests in the Mediterranean biogeographical region
2.2.4. Conifer mixed forests in the Macaronesian biogeographical region
2.3. Conifer and broad-leaved mixed forests
2.3.1. Conifer and broad-leaved mixed in the Alpine biogeographical region
2.3.2. Conifer and broad-leaved mixed forests in the Atlantic biogeographical region
2.3.3. Conifer and broad-leaved mixed forests in the Mediterranean biogeographical region
2.3.4. Conifer and broad-leaved mixed forests in the Macaronesian biogeographical region

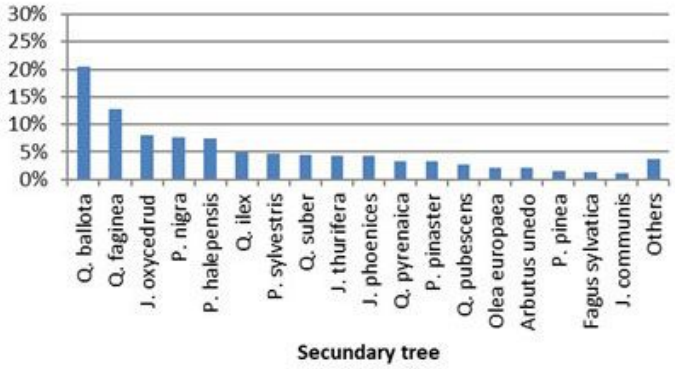
Tab. S2 - Classification of the mixed forest types proposed for Mediterranean Spain. Ecorreg = Ecoregions (Galicia-Herbada et al. 2011) (Fig. S3, Tab. S1). Only those ecoregions where the presence of each mixed group was statistically significant (Pearson Chi-square test with significance level of 0.05 and pair comparisons using Bonferroni corrections) are shown.

Mixed forests	Variations (sub-types)	Area (ha)	Eco-region	Main species
1. Sub-Atlantic: mixed forests taking up Mediterranean-Eurosiberian transition areas in acidic soils.	1.1 Deciduos- marcescent mixed forests in the Cantabric and Iberian range mountains with chesnut, sessile/pedunculated oak, beech, birch and Pyrenean oak.	55,855 (2.4%)	2, 5	*Quercus. pyrenaica, Betula spp, Q. robur, Q. petraea, Castanea sativa, Fagus sylvatica*
	1.2 Mixed forests with chesnut, Pyrinean oak and/or cork oak in the Central range, Sierra Morena and Sierra Nevada mountains.	16,022 (0.69%)	4	*Quercus pyrenaica, Castanea sativa, Q. suber*
	1.3 Evergreen-marcescent mixed forests with holm oak and Pyrinean oak.	46,237 (1.99%)	4,5	*Quercus pyrenaica, Q. ilex subsp. ballota*
	1.4 Oak-pine mixed forests with Pyrinean oak and/or maritime pine and/or Scots pine	39,950 (1.72%)	4,5	*Quercus pyrenaica, Pinus pinaster, P. sylvestris*
	1.5 Oak-Ash mixed forest	8,783 (0.38%)	4,5	*Quercus pyrenaica, Fraxinus angustifolia*
	1.6 Marcescents mixed forest with Portuguese and Pyrinean oaks	15,922 (0.68%)	5	*Quercus pyrenaica, Q. faginea susp. faginea*
2. Sub-Mediterranean: mixed forests taking up Mediterranean-Eurosiberian transition areas over alkaline soils	2.1 High diversity mountain Sub-Mediterranean forests	45,4774 (19.55%)	6,9	*Pinus sylvestris, P. nigra* subsp. *salzmannii, P. halepensis, Quercus pubescens, Q. faginea* subsp. *faginea Q. ilex* subsp. *ballota, Fagus sylvatica, Juniperus oxycedrus, J. phoenicea*
	2.2 Oak-Juniper mixed forests with Portuguese oak, holm oak and Spanish juniper	40,386 (1.74%)	6	*Q. faginea* subsp. *faginea, Q. ilex* subsp. *ballota, Juniperus thurifera*
	2.3 Portuguese and holm oak mixed forests	213,365 (9.17%)	6,7	*Q. faginea* subsp. *faginea, Q. ilex* subsp. *ballota*
3. Northeastern Sub-Mediterranean: high diversity Mediterranean-humid mixed forests. Acidic and alkaline soils		186,815 (8.03%)	6	*Pinus sylvestris, P. nigra* subsp. *salzmannii, P. halepensis, Quercus pubescens, Q. faginea* subsp. *faginea Q. ilex* subsp. ilex, *Fagus sylvatica. Juniperus oxycedrus, J. phoenicea, Q. petraea, Q. robur, Q. suber*
4. Continental: mixed forests living in the Iberian	4.1 Continental conifers mixed forests with Scotch	63,629 (2.74%)	6	*Pinus sylvestris, P. nigra* subsp. *salzmannii, Juniperus*

Mixed forests	**Variations (sub-types)**	**Area (ha)**	**Eco-region**	**Main species**
plateaus. Alkaline soils.	pine, Austrian pine and Spanish juniper			*thurifera*
	4.2 Holm oak and Spanish Juniper mixed forests	84,288 (3.62%)	6	*Q. ilex* subsp. *ballota, Juniperus thurifera*
5. Eastern Montane Mediterranean: mixed forests living in the mountain areas in alkaline soils	5.1 Pine mixed forests	13,3729 (5.75%)	3,7	*P. nigra* subsp. *salzmannii, P. halepensis, P. pinaster*
	5.2 Holm oak-Austrian pine mixed forests	66,013 (2.84%)	6,7	*P. nigra* subsp. *salzmannii, Q. ilex* subsp. *ballota*
6. Eastern low lands Mediterranean: mixed forests living in the low lands in alkaline soils	6.1 Holm oak and junipers mixed forests	20,9254 (9%)	3,6,7	*Quercus ilex* subsp. *ballota, Juniperus oxycedrus, J, phoenicea*
	6.2 Aleppo pine-Holm oak with junipers mixed forests	19,7891 (8.51%)	3,6,7	*Pinus halepensis Quercus ilex* subsp. *ballota, Juniperus oxycedrus, J, phoenicea*
7. Western Mediterranean : mixed forests living in Western Iberia in acidic soils	7.1 High diversity ombrophilous oaks mixed forests	158,681 (6.82%)	4	*Quercus ilex* subsp. *ballota, Q. faginea* subsp. *broteroi, Q. suber, Q. pyrenaica*
	7.2 Holm and cork oak mixed forests	95,581 (4.11%)	3,4	*Quercus ilex* subsp. *ballota, Q. suber*
	7.3 Holm and prickly juniper mixed forests	44,884 (1.93%)	4	*Quercus ilex* subsp. *ballota, Juniperus oxycedrus*
	7.4 Cork oak and pines mixed forest with maritime, Aleppo and stone pines	17,846 (0.77%)	3,8	*Quercus suber, Pinus pinaster, P. halepensis, P. pinea*
	7.5 Holm oak and pines mixed forests with maritime and stone pine	22,991 (0.99%)	4	*Quercus ilex* subsp. *ballota, Pinus pinaster, P. pinea*
8. Humid thermophile: mixed forests living in the Termomediterranean belt with humid conditions. Acidic soils	8.1 Cork and Algerian oak mixed forests	17,391 (0.75%)	8	*Quercus suber, Q. canariensis*
	8.2 Cork oak and olive mixed forests	25,984 (1.12%)	8	*Quercus suber, Olea europaea var. sylvestris, Arbutus unedo*
9. Dry thermophile: mixed forests forests living in the Meso-Termomediterranean belts with dry conditions. Alkaline soils.	9 Aleppo pine garrigues	109,528 (4.71%)	3, 8	*Pinus halepensis Olea europaea var. sylvestris, Ceratonia siliqua, Juniperus oxycedrus*
Total area		2,325,802 (100%)		

Fig. S1 - Percentage of total area of the main tree species coexisting in mixed forests: Primary tree is the SFM50 field in which the species with the greatest share of the polygon is represented. Secondary tree and Tertiary tree are the fields where the second and the third species are represented.





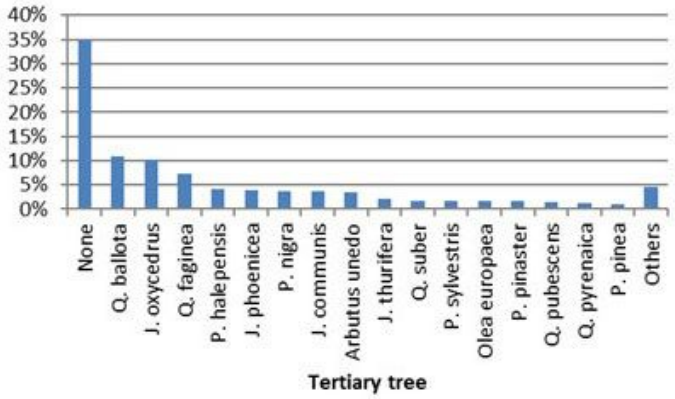


Fig. S2 - Main trios identified.

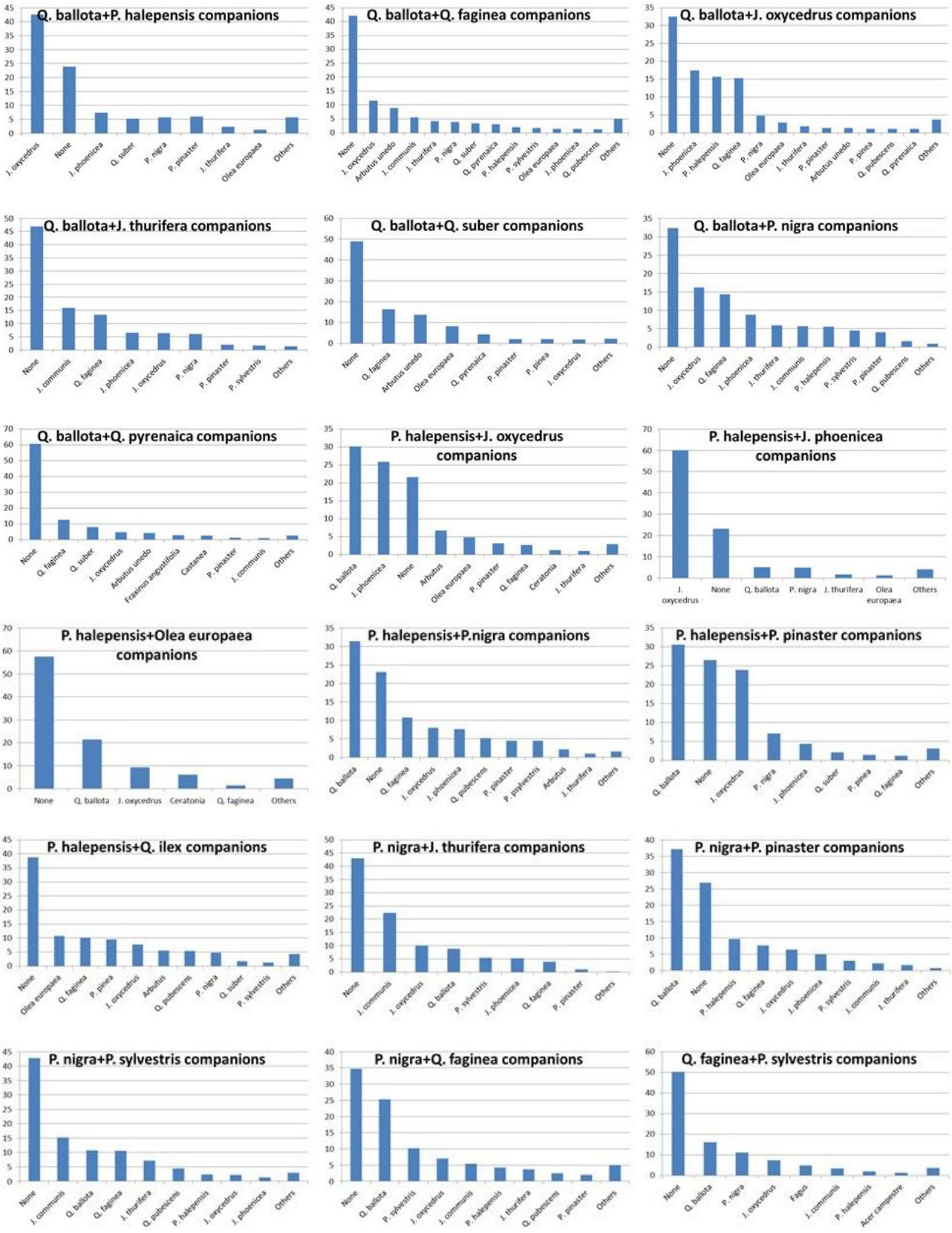


Fig. S2 - Main trios identified (continued).

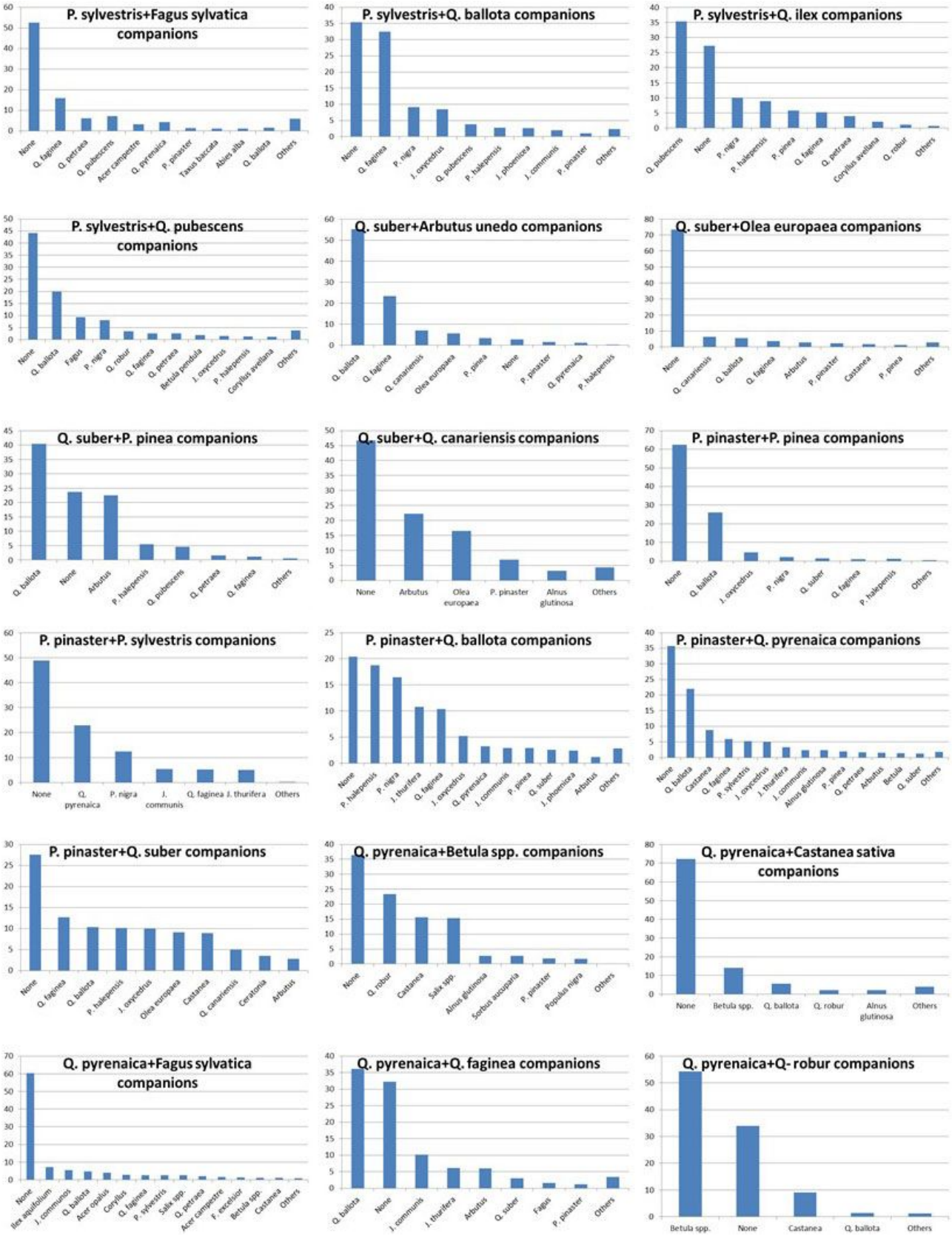


Fig. S3 Geographical distribution of Spanish Ecoregions to level 2 from Galicia-Herbada et al. 2011).

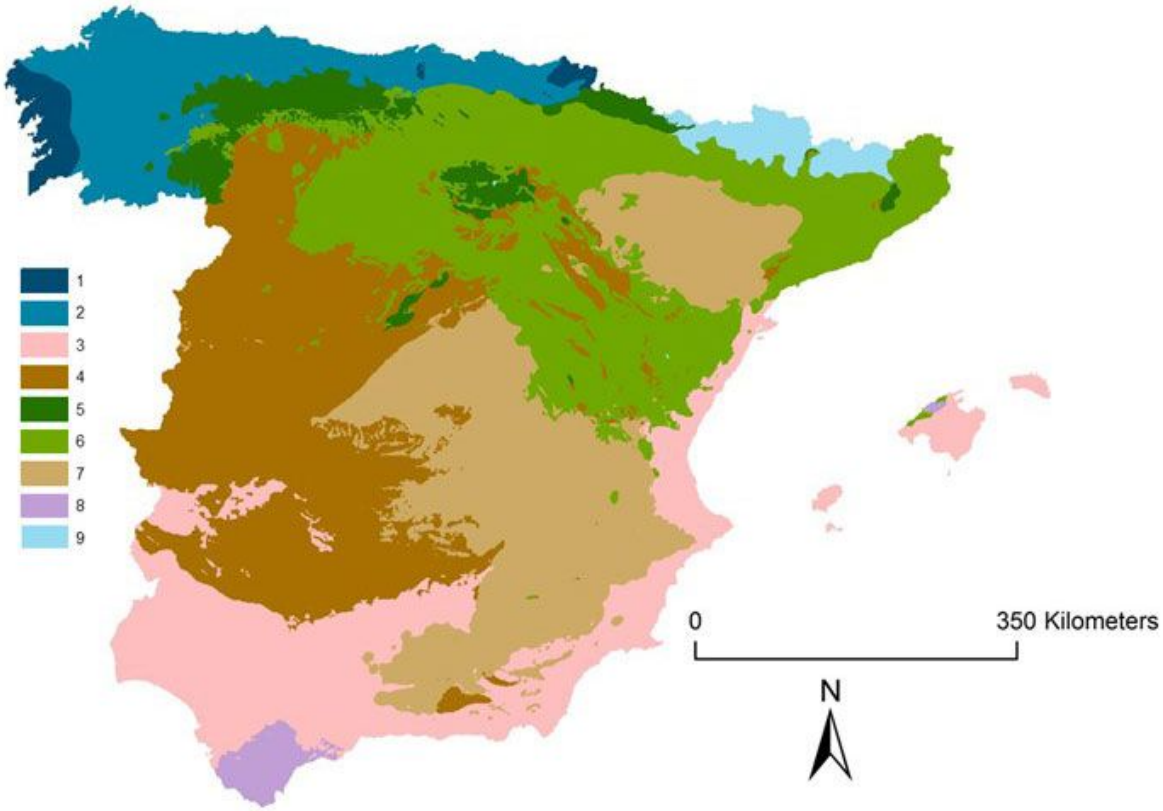


Fig. S4 - Distribution of the Sub-Atlantic subtypes of Mediterranean mixed forests. Numbers and grey shades represent the distribution of Spanish Mediterranean Ecoregions (Galicia-Herbada et al. 2011) (see Tab. S1 for environmental descriptors of the Ecoregions).

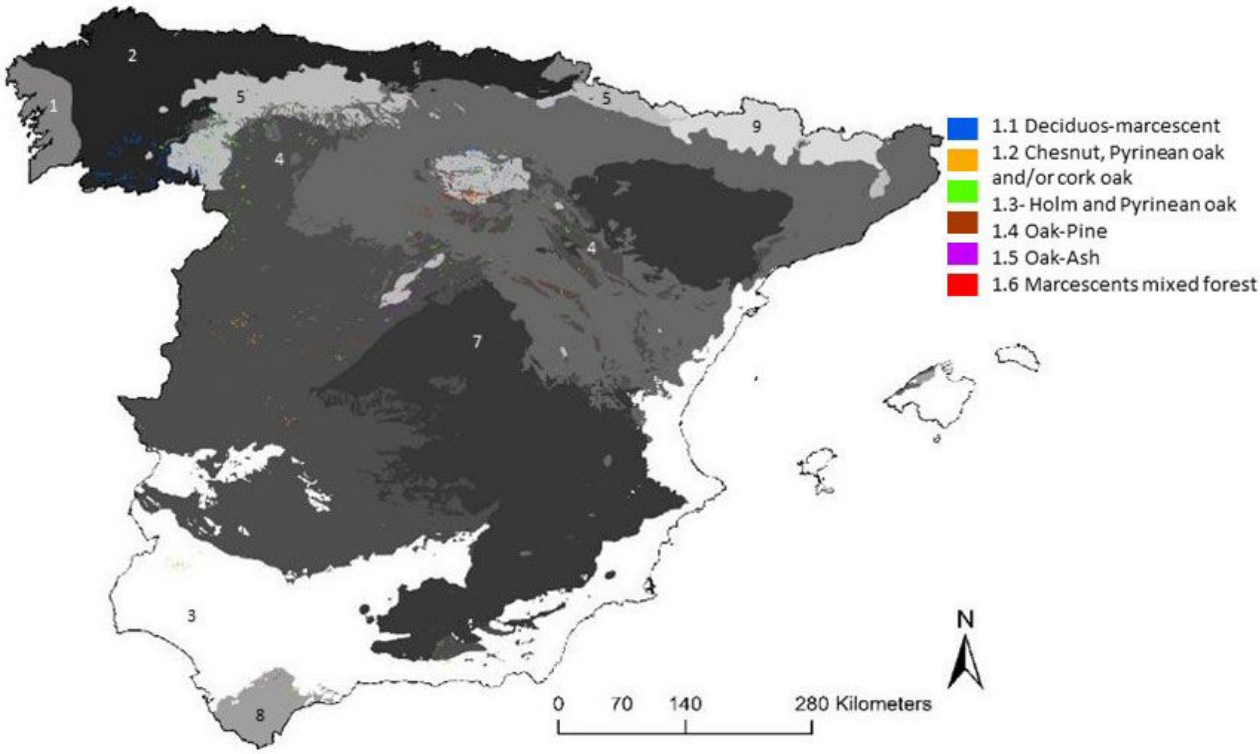


Fig. S5 - Distribution of Sub-Mediterranean subtypes of Mediterranean mixed forests and of the Northeastern Sub-Mediterranean type. Numbers and grey shades represent the distribution of Spanish Mediterranean Ecoregions (Galicia-Herbada et al. 2011) (see Tab. S1 for environmental descriptors of the Ecoregions).

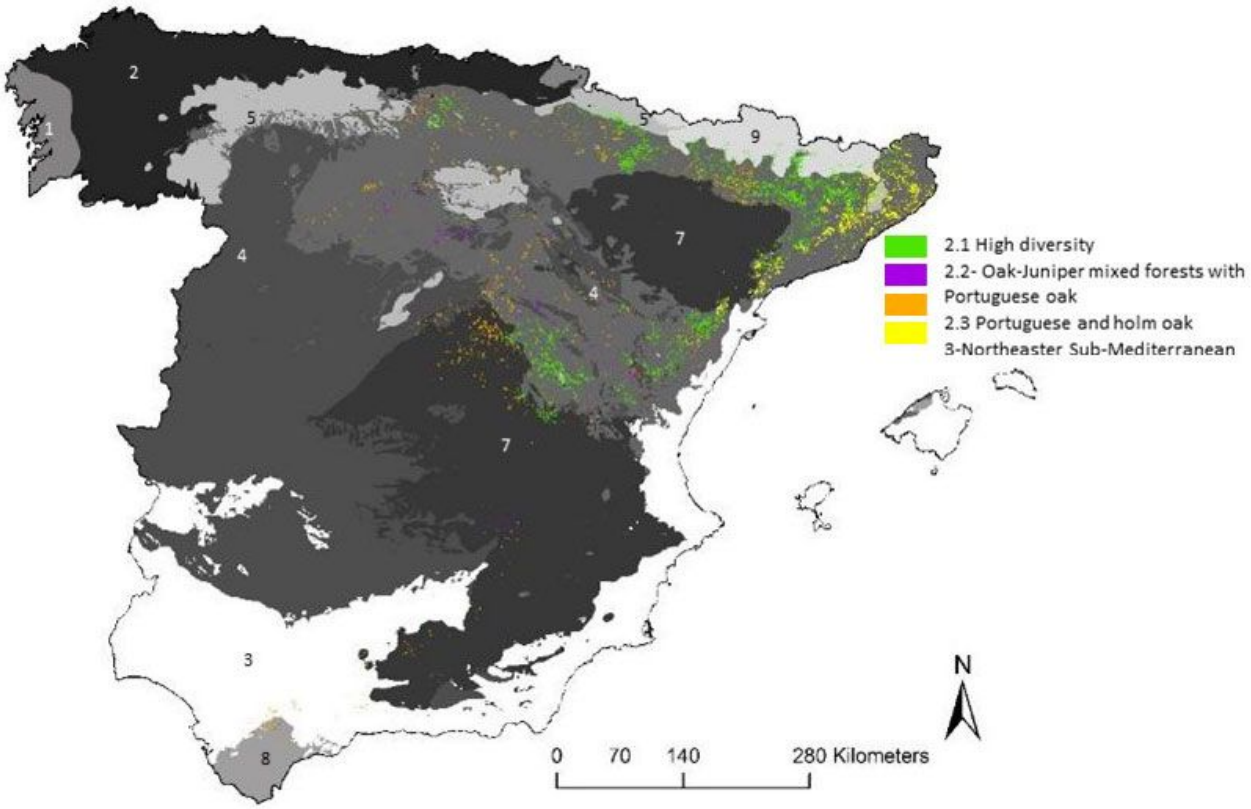


Fig. S6 - Distribution of the Continental, Eastern Montane Mediterranean and Eastern lowland Mediterranean subtypes of Mediterranean mixed forests and of the Northeaster Sub-Mediterranean type. Numbers and grey shades represent the distribution of Spanish Mediterranean Ecoregions (Galicia-Herbada et al. 2011– see Tab. S1 for environmental descriptors of the Ecoregions).

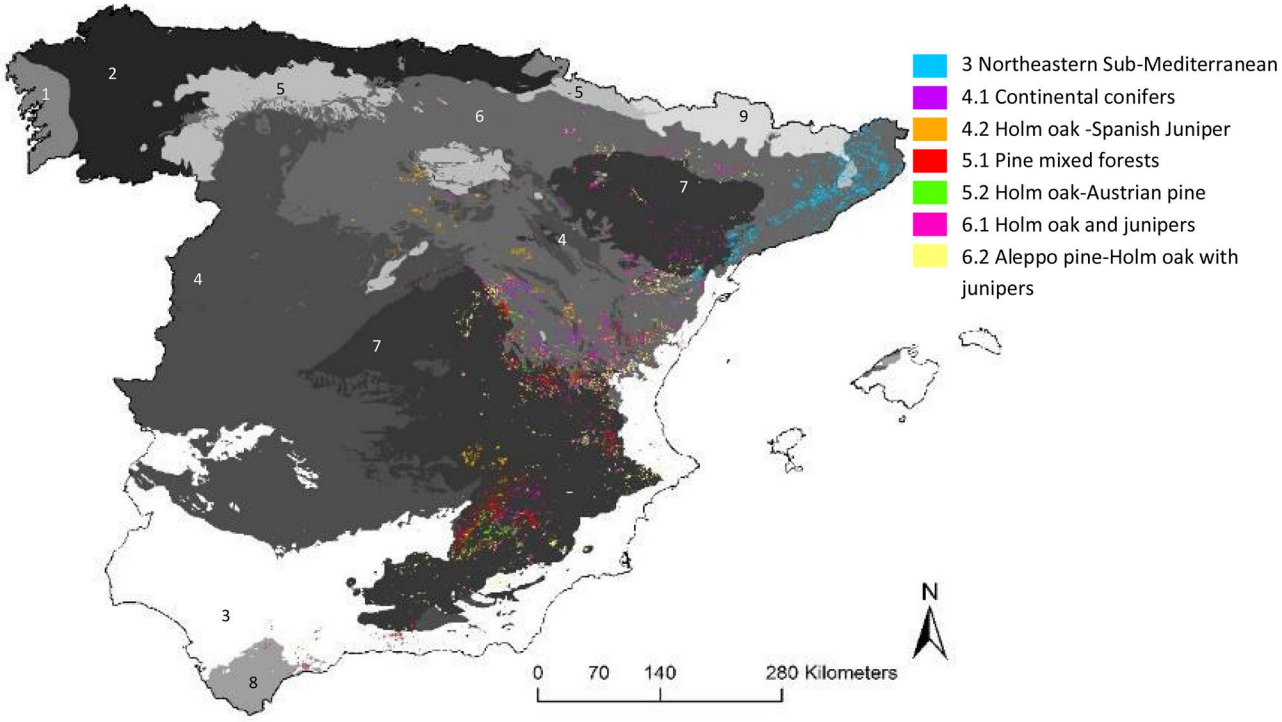


Fig. S7 - Distribution of Western Mediterranean subtypes of Mediterranean mixed forests. Numbers and grey shades represent the distribution of Spanish Mediterranean Ecoregions (Galicia-Herbada et al. 2011 – see Tab. S1 for environmental descriptors of the Ecoregions).

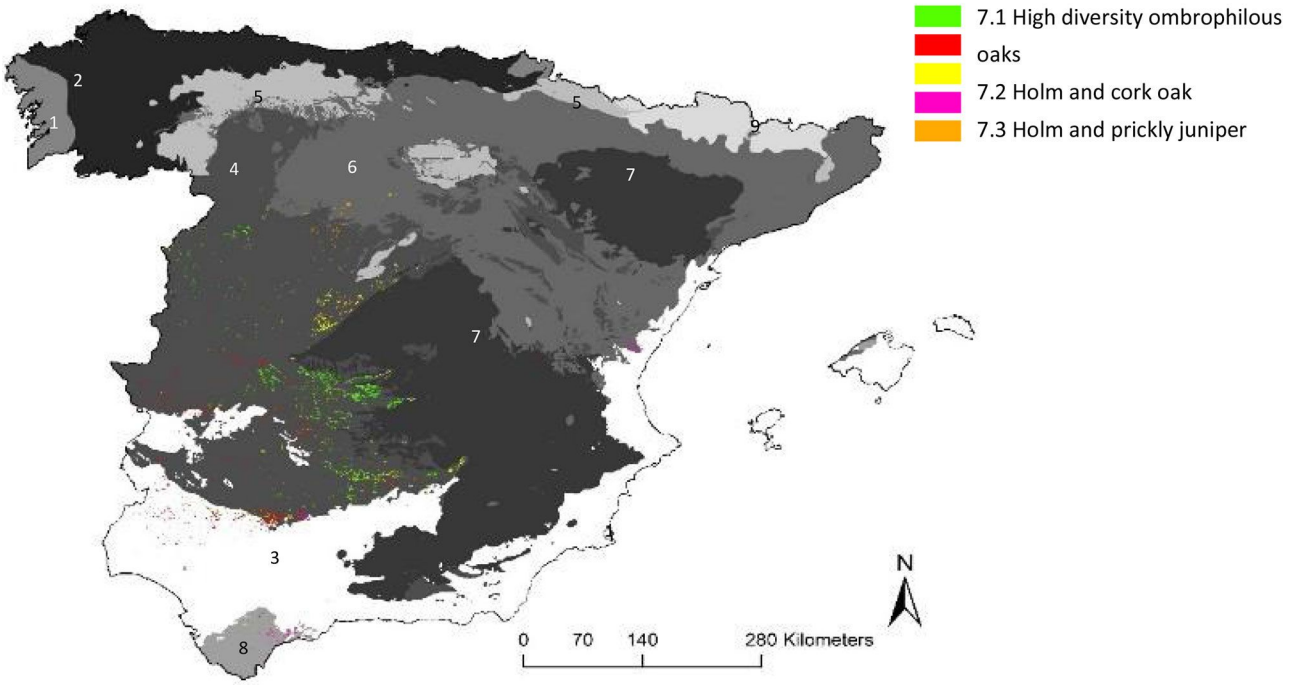


Fig. S8 - Distribution of thermophilic subtypes of Mediterranean Mixed Forests. Numbers and grey shades represent the distribution of Spanish Mediterranean Ecoregions (Galicia-Herbada et al. 2011 – see Tab. S1 for environmental descriptors of the Ecoregions).