

LAND SUITABILITY TO FORESTRY USES OF THE NATURAL PARK «DESPEÑAPERROS»

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This work evaluates the capacity of forest uses of the soils of the Natural Park of Despeñaperros applying a parametric system of evaluation «Evaluator» that has already been rehearsed in other protected Mediterranean regions of Andalusia. Through selected chemical properties of the soil relationships settle down between the different edaphic formations and their aptitude for the development of six vegetations, with the objective of contributing to their conservation and use rationalisation.

Key words: parametric system of evaluation, natural park, soils, forestry use.

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ПРИГОДНОСТЬ ЗЕМЕЛЬ ПРИРОДНОГО ЗАПОВЕДНИКА «DESPEÑAPERROS» ДЛЯ ЦЕЛЕЙ ЛЕСОВОДСТВА

Некорректная эксплуатация природных ресурсов вызывает изменение физических свойств почвы, поэтому необходимо проводить исследования, которые помогут в создании принципов для рационального использования земли и ее параллельной консервации. Для достижения этой цели необходимо обладать информацией о богатстве, географических свойствах и типологии почвы, возможностях и ограничениях, налагаемых различными способами ее использования.

В данной работе оценивается способность лесопользования земель природного парка Despeñaperros, применяя параметрическую систему оценки «Evaluator», которая уже применялась в иных регионах Средиземноморья Андалусии.

Ключевые слова: параметрическая система оценки, природный заповедник, почва, лесопользование.

The indiscriminate exploitation of the natural resources causes the alteration of the physical conditions of the soil, for this reason it is necessary to carry out a rational study that contemplates in a combined way the use of the land and the conservation of the soils, for what is necessary to have relative information to the resources, of the localisation and typology of the soils, of their possibilities and their limitations in front of different uses, as well as of the levels of impact of these performances in the future, objectives that are gotten by means of an evaluation of lands.

For it, this work evaluates the capacity of forest uses of the soils of the Natural Park of Despeñaperros applying a parametric system of evaluation «Evaluator» that has already been rehearsed in other protected Mediterranean regions of Andalusia. Through selected chemical properties of the soil relationships settle down between the different edaphic formations and their aptitude for the development of six vegetations (Holm-oak wood, Cork-oak wood, Pinewood, Gall-oak wood, Brushwood and Pasture), with the objective of contributing to their conservation and use rationalisation.

MATERIAL & METHODS

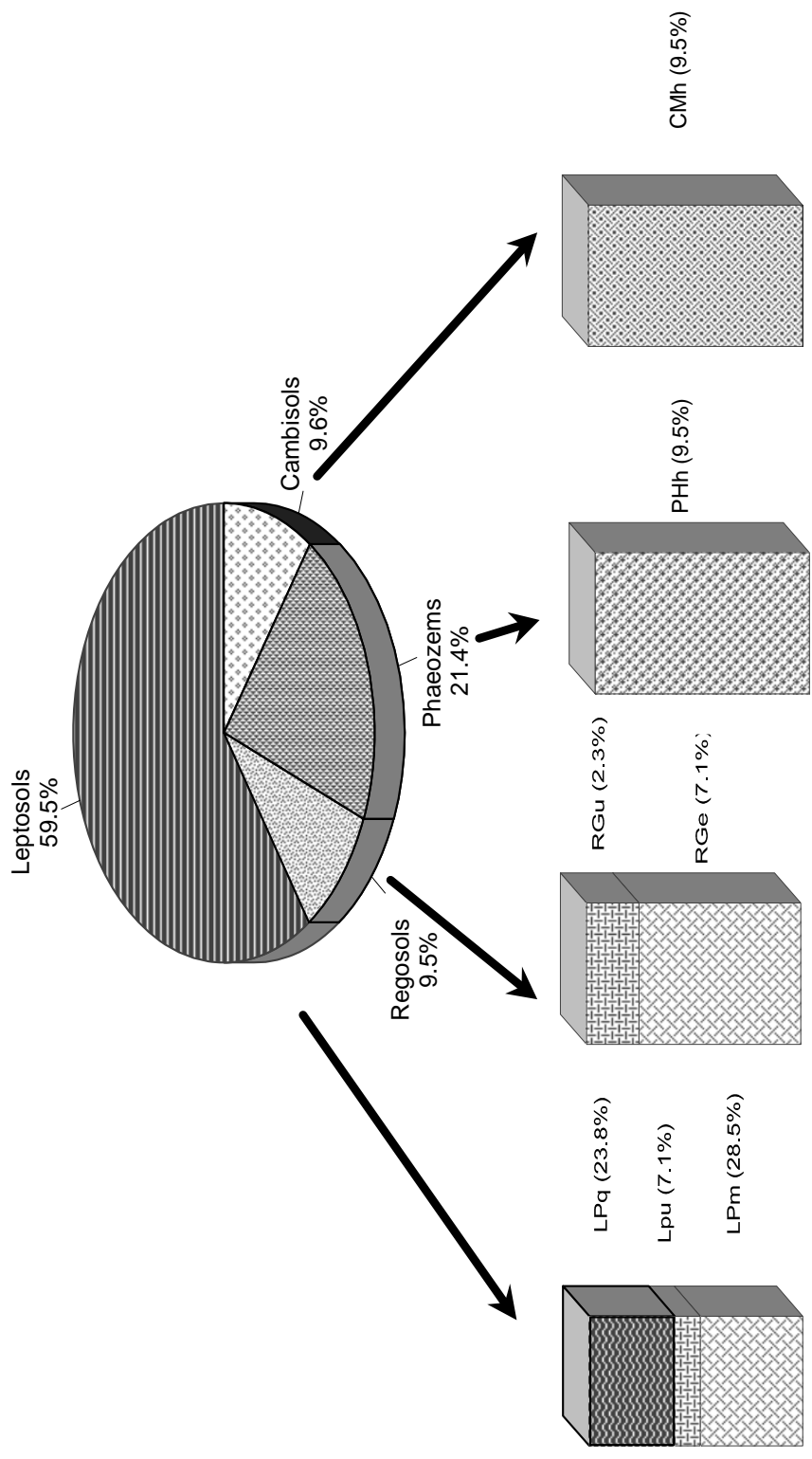
The study area is located in the north of the county of Jaén, and it constitutes a protected natural area of 7.717 there is. The soil survey allowed to pick up 16 profiles of soils and 42 drilling expeditious. In each edaphic horizon (profiles) and control sections (drilling): s1 (0–25 cm); s2 (25–50 cm); s3 (50–75 cm) it was determined: organic matter (Sims and Haby, 1971), nitrogen (Duchaufour, 1975), pH in water and potásic chloride (Gutian-Ojea & Carballas,

Table 1

Chemical data of the different units of soils of the P.N. «Despeñaperros» for control sections

		pH	MO	N	Fe	Cu	Mn	Zn	Ca	Mg	Na	K	P	CO ₃ ⁼	Grava
LPm	s1	×	71.5	1.79	0.1655	0.0013	0.1717	0.0017	2.0911	0.1733	0.2222	0.2445	0.0111	0	328
	s2	σ	5.5	0.13	0.0260	0.0003	0.0615	0.0003	0.4210	0.0111	0.0406	0.0447	0.0004	0	26
	s3	σ	18.5	0.72	0.0738	0.0005	0.0314	0.0007	0.8703	0.1000	0.2058	0.1365	0.0077	0	329
LPu	s1	×	4.4	0.16	0.0127	0.0001	0.0217	0.0001	0.1374	0.0162	0.0227	0.0241	0.0008	0	54
	s2	σ	5.3	0.53	0.1433	0.0003	0.0014	0.0007	0.9376	0.1116	0.1403	0.0796	0.0057	0	147
	s3	σ	0.2	0.08	0.0270	0.0001	0.0001	0.0002	0.3127	0.0272	0.0197	0.0115	0.0008	0	124
LPq	s1	×	5.3	1.43	0.1054	0.0012	0.0482	0.0017	1.0205	0.1692	0.1993	0.2882	0.0106	0	277
	s2	σ	13.5	0.28	0.0393	0.0006	0.0226	0.0011	0.2092	0.0263	0.0548	0.0975	0.0015	0	58
	s3	σ	21.0	0.60	0.0200	0.0014	0.0175	0.0008	0.5864	0.1194	0.2397	0.3104	0.0060	0	311
RGe	s1	×	53.6	1.35	0.1550	0.0022	0.1867	0.0038	2.3740	0.2546	0.2397	0.3822	0.0102	0	301
	s2	σ	8.2	0.20	0.0390	0.0003	0.0530	0.0009	0.4357	0.0302	0.0410	0.0559	0.0007	0	45
	s3	σ	56.0	1.43	0.1100	0.0018	0.3841	0.0043	2.3160	0.2356	0.2597	0.3668	0.0110	0	417
RGu	s1	×	23.3	0.56	0.0510	0.0006	0.2078	0.0028	0.7090	0.0870	0.0870	0.1257	0.0008	0	103
	s2	σ	17.5	0.65	0.0700	0.0022	0.0362	0.0011	1.0089	0.1641	0.1798	0.2801	0.0070	0	171
	s3	σ	17.5	0.25	0.0475	0.0009	0.0212	0.0004	0.0249	0.0249	0.0999	0.0701	0.0015	0	98
RGu	s1	×	5.0	0.70	0.1325	0.0016	0.0475	0.0005	0.7156	0.1596	0.5049	0.2597	0.0033	0	87
	s2	σ	5.6	1.60	0.1525	0.0005	0.0250	0.0014	1.6103	0.1590	0.1598	0.1004	0.0112	0	399
	s3	σ	36.0	0.90	0.0152	0.0004	0.0004	0.0008	0.5169	0.0996	0.0599	0.0307	0.0037	0	240
		×	4.5	0.80	0.0325	0.0001	0.0005	0.0007	0.2087	0.0798	0.0400	0.0299	0.0043	0	119

The data are expressed in g/Kg



Percentual distribution of the soils of the Natural Park «Despeñaperros»

1976), carbonates (Duchaufour, 1975), macronutrient availables (G.T.N.M.A., 1976), micronutrient availables (Pinta, 1971), Phosphorous assimilable (Williams, 1941) and andy gravel, being expressed the results g/kg .

For the analysis of data the integrated statistical package BMDP was used (Dixon, 1985), and the additive parametric evaluation of the physical-chemical properties of the soils of the Park, was carried out with the computer program «Evaluator» (Del Toro, 1996), which keeps in mind the selection of good forest atmospheres for each type of vegetation, its characterisation physical-chemistry, the selection of chemical parameters of reference, its weight according to the different control sections, homogeneity of this parameters, obtaining of the levels of adaptability, definition of the evaluation index and definition of the aptitude classes (optimum, very good, good, moderate and inadequate) for each one of the studied forest species.

RESULTS

The soil survey made in the area has allowed integrating them in 4 groups according to the approaches of FAO (1991): Leptosols, Regosols, Cambisols and Phaeozems. The taxonomic units of soils according to the same approaches are leptosols móllic (LPm), úmbric (LPu), lithic (LPq); regosols eutric (Rge), umbric (Rgu); phaeozems haplic (PHh), lúvic (PHl); and cambisols haplic (CMh). In the graph 1 the percentual distribution of the units of soils is presented in the natural park.

The table 1 samples the data chemical employees in the evaluation according to the taxonomic units of soils. As it can be appreciated they are acid soils, with values means in soil pasta saturated in water that they oscillate between 4.5 and 6.1; the contents in organic matter are relatively high, with high values in surface around 10 %, and although the contents diminish as the depth of the soil increases in the sections of control s2 the levels they stay next to 3 %; the low contents of nitrogen, around 0.15 % in the superficial sections, seem to indicate that the mineralization processes are blocked.

With regard to the macro and micronutrients available, the soils with a mollic horizon present high contents of *Fe*, *Cu*, *Mg*, *K* (almost 50 % of difference) and *Mn* and *Zn* (almost a 75 % higher), with regard to the rest of the soils with other types of diagnostic horizons, while the rest of nutrients presents similar values.

The computer program «Evaluator» (Del Toro, 1996), used to carry out the evaluation of the soils, it relates the values of the evaluation index, calculated starting from certain physical and chemical properties of the soils, with 5 aptitude classes for the 6 studied vegetable species. In the table 2 the relationships are shown between the values of the evaluation index and the aptitude classes.

Table 2

Relationship between evaluation index / aptitude classes

	Optimum	Very good	Good	Moderate	Inadequate
Holm-oak wood	> 75.32	75.31–68.54	68.53–52.81	52.80–46.03	≤ 46.02
Gall-oak wood	> 73.71	73.70–66.08	66.07–46.60	46.59–38.97	≤ 38.96
Cork-oak wood	> 85.96	85.95–75.95	75.94–50.15	50.14–40.14	≤ 40.13
Pinewood	> 70.10	70.09–63.86	63.85–48.89	48.88–42.65	≤ 42.64
Brushwood	> 77.33	77.32–68.62	68.61–47.31	47.30–38.60	≤ 38.59
Pasture	> 82.54	82.53–71.86	71.85–46.79	46.78–36.11	≤ 36.10

The results of the evaluation, table 3, they indicate that none of the edaphic units presents an optimum and/or very good aptitude. Leptosols and regosols are included in the inadequate class for holm-oak wood and, in general, they are not very capable also for gall-oak wood; on the other hand, the edaphic units cambisols are shown, for 75 % of the samples, inadequate for gall-oak wood and pasture. So much stops pinewood as for brushwood the samples are distributed equally among the 3 aptitude classes, although the umbric properties of Leptosols and Regosols are especially negative for these vegetations. Finally, the cork-oak wood seems to be the most capable species for its use in this park, since Regosols, Cambisols and especially Phaeozems presents a capacity of good to moderate.

Table 3

**Evaluation of the soils according to the aptitude classes being based
on their chemical properties for the different forest uses**

		LPm	LPu	LPq	Rge	Rgu	PHh	PHl	CMh
Cork-oak wood	Optimum	0	0	0	0	0	0	0	0
	Very good	0	0	0	0	0	0	0	0
	Good	8	33	30	33	0	75	80	50
	Moderate	67	33	30	67	100	25	20	50
	Inadecuate	25	34	40	0	0	0	0	0
Holm-oak wood	Optimum	0	0	0	0	0	0	0	0
	Very good	0	0	0	0	0	0	0	0
	Good	0	0	0	0	0	25	20	0
	Moderate	0	0	0	0	0	25	20	50
	Inadecuate	100	100	100	100	100	50	60	50
Brushwood	Optimum	0	0	0	0	0	0	0	0
	Very good	0	0	0	0	0	0	0	0
	Good	0	0	20	0	0	25	0	25
	Moderate	8	0	10	33	0	25	40	25
	Inadecuate	92	100	70	67	100	50	60	50
Pasture	Optimum	0	0	0	0	0	0	0	0
	Very good	0	0	0	0	0	0	0	0
	Good	0	0	50	0	0	25	0	0
	Moderate	17	33	40	66	0	25	60	25
	Inadecuate	83	67	10	34	100	50	40	75
Pinewood	Optimum	0	0	0	0	0	0	0	0
	Very good	0	0	0	0	0	0	0	0
	Good	8	0	20	33	0	50	40	25
	Moderate	50	33	20	33	0	25	20	0
	Inadecuate	42	67	60	34	100	25	40	75
Gall-oak wood	Optimum	0	0	0	0	0	0	0	0
	Very good	0	0	0	0	0	0	0	0
	Good	0	0	0	0	0	50	0	0
	Moderate	8	0	0	33	0	0	20	25
	Inadecuate	92	100	100	67	100	50	80	75

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