

PLANT DIVERSITY OF THE SCI ES0000213 - SERRES DE MARIOLA I EL CARRASCAR DE LA FONT ROJA AND CURRENT STATUS OF ITS POPULATIONS OF PROTECTED SPECIES IN THE VALENCIAN COMMUNITY



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INTRODUCTION AND OBJECTIVES

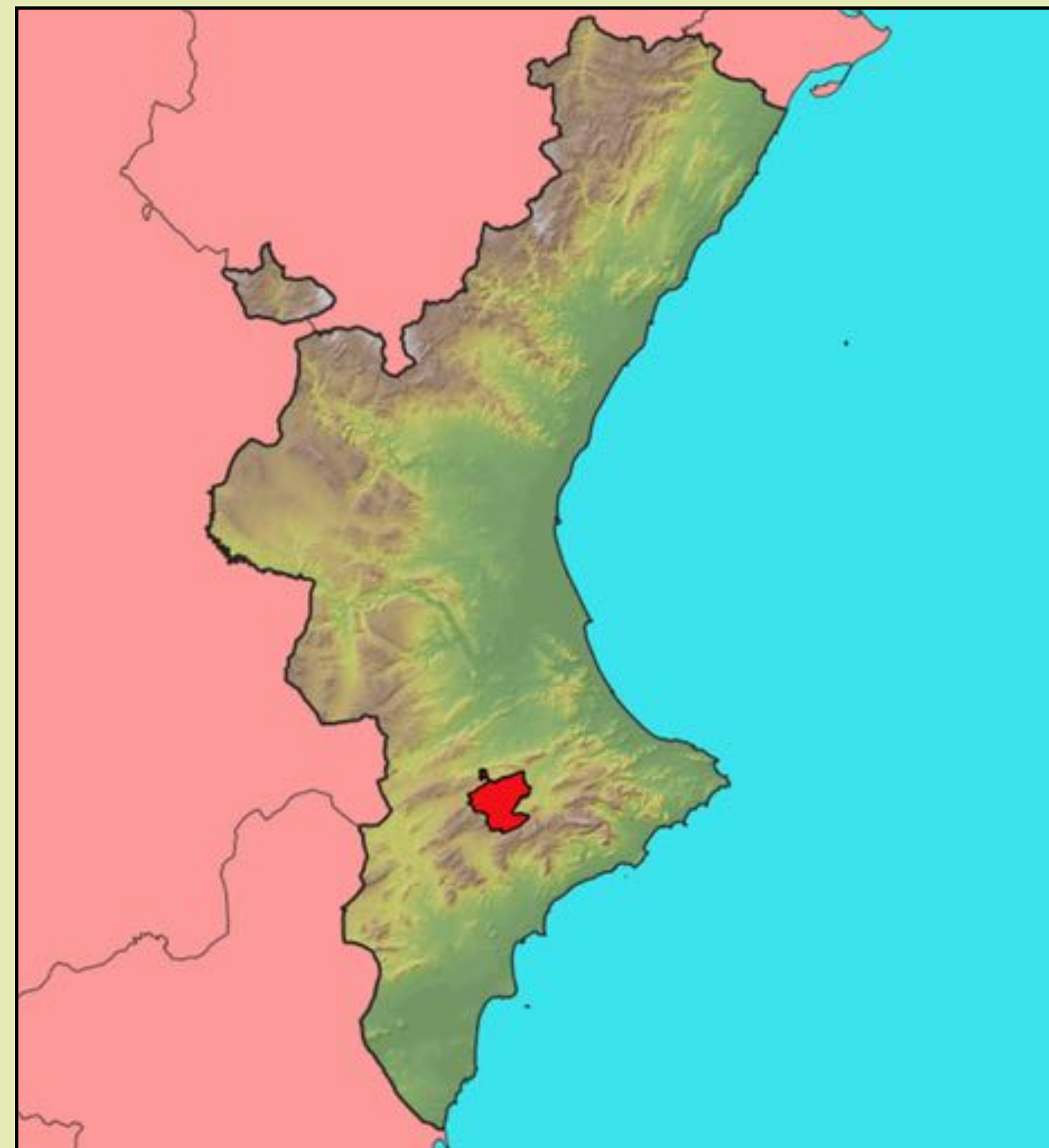
The SCI ES0000213 is located in the SE of the Iberian Peninsula, in the S of the province of Valencia and the N of Alicante, in the northeastern part of the Betic System, with 19.946 ha of which 14.835 ha are included in the natural parks of the Carrascar de la Font Roja and the Serra de Mariola. The altitudes oscillate between 410 m from the closest point to Ontinyent and 1.390 m from the top of Montcabrer and 1.352 m from the top of Menejador, with the upper Thermo-Mediterranean, lower Mesomediterranean and upper Mesomediterranean thermotypes, and the dry and sub-humid ombrotypes.

Throughout the area there is a mosaic of natural formations from gall oaks, holm oak groves and scarce mixed forests, kermes oak groves, poplar groves, oleander and willow groves and various scrublands and grasslands of great interest, as well as numerous rock-dwelling communities. Along with the natural formations there are numerous traditional crops that still inhabit various species associated with the crop that must be preserved.

The objective of the study is to obtain the total floristic diversity of the SCI as well as the current situation of the protected species present.



Map 1. Valencian Community (Southern Spain) in the Mediterranean Region



Map 2. SCI ES0000213 in Valencian Community

MATERIAL AND METHODS

To achieve the proposed objectives, field work has been carried out in the 284 1km² UTM grid cell in which the SCI or the PORN areas of both natural parks are included. A bibliographic review has also been carried out, as well as a visit to various herbaria with material from the area (SERRA & SOLER, 2011; SERRA & AL., 2012; SERRA & AL., 2019).

To census and position the individuals of the populations of protected species, the GPS of mobile devices has been used and was embedded in the eOruxMaps program and then the position has been corrected using the orthophoto after uploading the data into the viewer of the Valencian Cartographic Institute (<https://visor.gva.es/visor/>).

CONCLUSION

Protected Species	Category of Endangered	Number of 1km ² UTM grid cell	Populations	Censuses	Last year with observations
<i>Anacamptis papilionacea</i> subsp. <i>grandiflora</i>	EX	5	5	74	2022
<i>Festuca patula</i>	EX	2	1	29	2022
<i>Apium repens</i>	VU	0	?	?	1956
<i>Euphorbia nevadensis</i> subsp. <i>nevadensis</i>	VU	2	2	80	2019
<i>Himantoglossum hircinum</i>	VU	2	2	3	2019
<i>Baldellia ranunculoides</i>	PNC	1	1	?	2020
<i>Festuca nevadensis</i>	PNC	5	5	?	2013
<i>Himantoglossum robertianum</i>	PNC	9	9	12	2022
<i>Iberis pectinata</i>	PNC	4	4	?	2013
<i>Ophrys incubacea</i>	PNC	13	11	206	2021
<i>Orchis purpurea</i>	PNC	17	13	326	2020
<i>Phyllitis scolopendrium</i> subsp. <i>scolopendrium</i>	PNC	3	1	37	2021
<i>Saponaria officinalis</i>	PNC	1	?	?	1986
<i>Saxifraga longifolia</i>	PNC	1	1	?	2004
<i>Sterbergia colchiciflora</i>	PNC	13	12	820	2021
<i>Anacamptis fragrans</i>	G	1	1	40	2021
<i>Anagallis tenella</i>	G	5	6	?	2015
<i>Asplenium trichomanes</i> subsp. <i>inexpectans</i>	G	3	3	?	2016
<i>Caralluma munbyana</i> subsp. <i>hispanica</i>	G	2	1	73	2014
<i>Cephalaria syriaca</i>	G	3	2	29	2013
<i>Crambe hispanica</i> subsp. <i>glabrata</i>	G	2	2	30	2017
<i>Crataegus granatensis</i>	G	1	1	?	2006
<i>Epipactis tremolsii</i>	G	0	?	?	1988
<i>Festuca plicata</i>	G	3	2	?	2019
<i>Gagea wilczekii</i>	G	15	11	?	2016
<i>Helianthemum angustatum</i>	G	1	1	200	2019
<i>Laurus nobilis</i>	G	15	15	?	2023
<i>Limodorum trabutianum</i>	G	5	5	45	2021
<i>Linaria oligantha</i> subsp. <i>valentina</i>	G	5	5	1430	2021
<i>Lythrum tribracteatum</i>	G	1	1	20	2023
<i>Mimularia dichotoma</i>	G	1	1	?	2019
<i>Monotropa hypopitys</i>	G	1	1	?	2011
<i>Nepeta tuberosa</i> subsp. <i>reticulata</i>	G	4	2	?	2016
<i>Ophrys ficalhoana</i>	G	2	2	?	2013
<i>Ophrys santonica</i>	G	1	1	?	2022
<i>Orchis anthropophora</i>	G	8	6	37	2022
<i>Populus x canescens</i> [alba x tremula]	G	11	9	?	2023
<i>Potamogeton coloratus</i>	G	2	2	?	2023
<i>Quercus serrata</i>	G	2	1	?	2022
<i>Sideritis chamaedryfolia</i> subsp. <i>chamaedryfolia</i>	G	0	?	?	1792
<i>Sorbus torminalis</i>	G	3	1	?	2009
<i>Taxus baccata</i>	G	8	2	141	2015
<i>Zinnichella peltata</i>	G	2	2	?	2012

Category of endangered: In danger of extinction (EX); Vulnerable (VU); Protected not Cataloged (PNC); Guarded (G)

Table 1. Protected species with number of 1km² UTM grid cell, known populations, individuals censused, and last year of census

Of the 43 taxa studied, 4 do not present recent locations in this century, so their search should be a priority. Of the other 38 taxa, at least their location in a 1km² UTM grid cell is known. The populations of some of them have been censused at the minimum once.

Of the 5 most threatened taxa 4 have been censused, it has been observed that their populations are very precarious, especially *Himantoglossum hircinum*, of which only 3 individuals have been located but they do not flower every year. *Apium repens* has not been observed since 1956, so it is recommended to prospect in all the wet spots of the SCI in case there is still an unknown population. *Festuca patula* has suffered a very significant decrease in its numbers due to trampling and browsing by introduced Barbary sheep (*Ammotragus lervia*) and mouflons (*Ovis musimon*), so the populations of these non-native herbivores must be urgently controlled so that they do not cause the local extinction of this taxon that it only has two sites in the Valencian Community. On the other hand, the largest population of *Anacamptis papilionacea* subsp. *grandiflora* has been growing thanks to its protection with an exclusion fence that prevents trampling and browsing by wild boars and other herbivores present in the area.

Of the remaining taxa, there are 3 others (*Epipactis tremolsii*, *Saponaria officinalis* and *Sideritis chamaedryfolia*), for which there is no exact record of where they were collected, so the search must focus on their habitat and their most likely flowering time. In the case of *Sideritis chamaedryfolia*, described in 1797 from a sandy area then present in the SCI, its habitat could have disappeared a long time ago due to agricultural use of the area.

As for the remaining 35, the populations of another 19 taxa have been censused, resulting in a low number of individuals and a serious risk of disappearance of *Ophrys ficalhoana* (2 individuals), *O. santonica* (2 individuals) and *Monotropa hypopitys* (7 individuals). The latter could have disappeared after inadequate forestry work that modified its shady habitat, creating areas of great sunshine. *Quercus cerrifolia* also has only 2 individuals but a seed collection program has been started that can increase its population.

Other taxa such as *Himantoglossum robertianum* or *Lythrum tribracteatum* also have a very low number of individuals, so management of the habitat in which they are found is crucial to maintain their populations and even increase them. In the case of *L. tribracteatum*, it is necessary to maintain the surface of temporary flooding and summer drought so that its low population can remain or increase.

Some taxon needs to be relocated to confirm its presence and that it is not taxonomic confusion with others more frequent in the area, such as *Crataegus granatensis* or *Baldellia ranunculoides*.

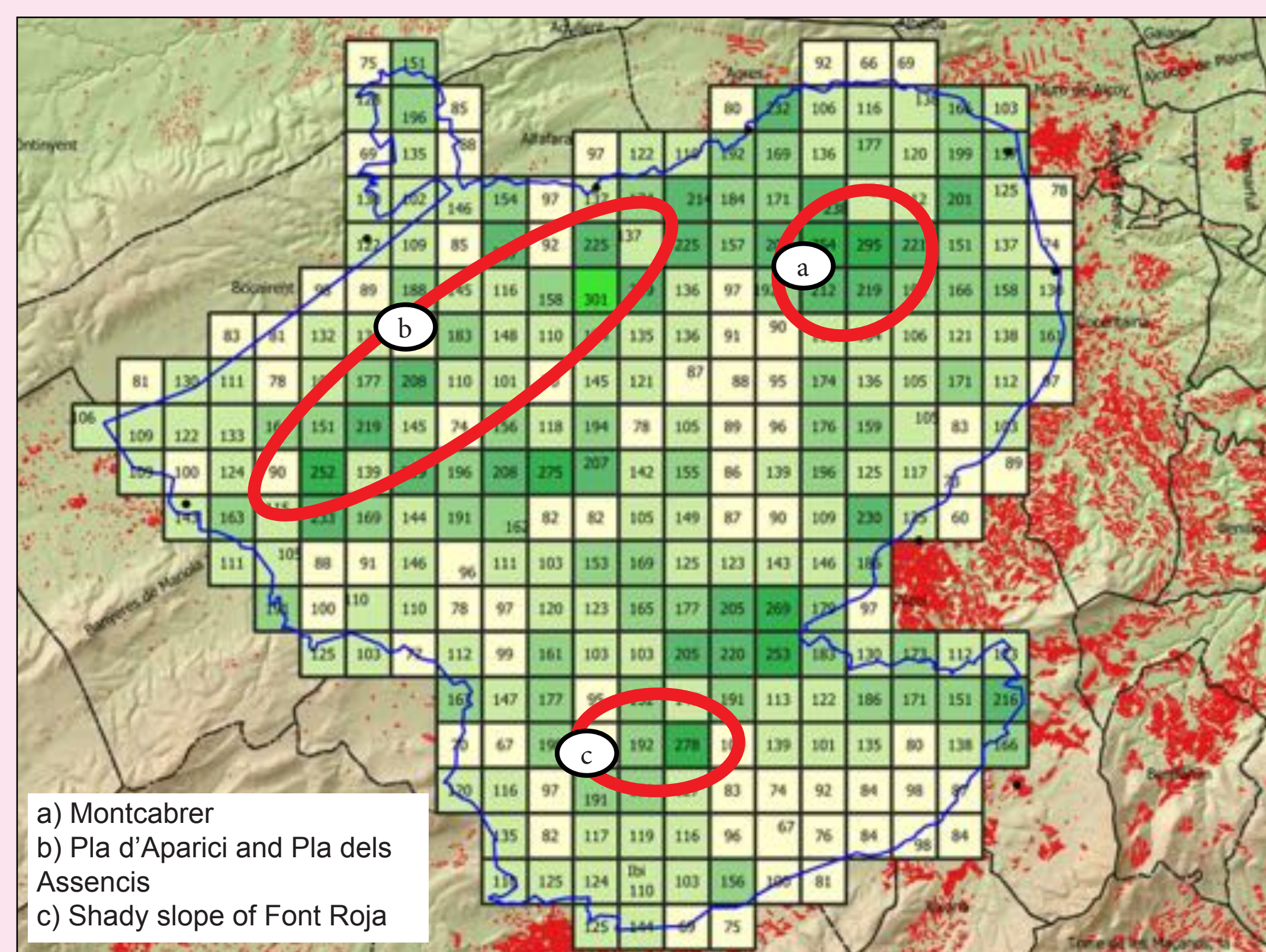
Finally, of the 16 taxa that have never been censused, censusing is a priority, especially those that are likely to be rarer such as *Baldellia ranunculoides* or *Saxifraga longifolia*.

In addition, an updated census for all of them would also be needed for the management of the declared ENPs in the area of the SCI. In some cases, population reinforcement or exclusion fencing is recommended to ensure their survival in the SCI due to the fragile and scarce nature of their populations, as well as the threats to which they are subjected. Namely, herbivory and trampling of mouflons, Barbary sheep and wild boars (*Sus scrofa*), the collection of flowers for ornamental reasons or forestry work, as for instance the species *Himantoglossum hircinum*, *H. robertianum*, some populations of *Orchis purpurea*, *Festuca patula*, *Monotropa hypopitys*, *Ophrys santonica* or *Taxus baccata*.

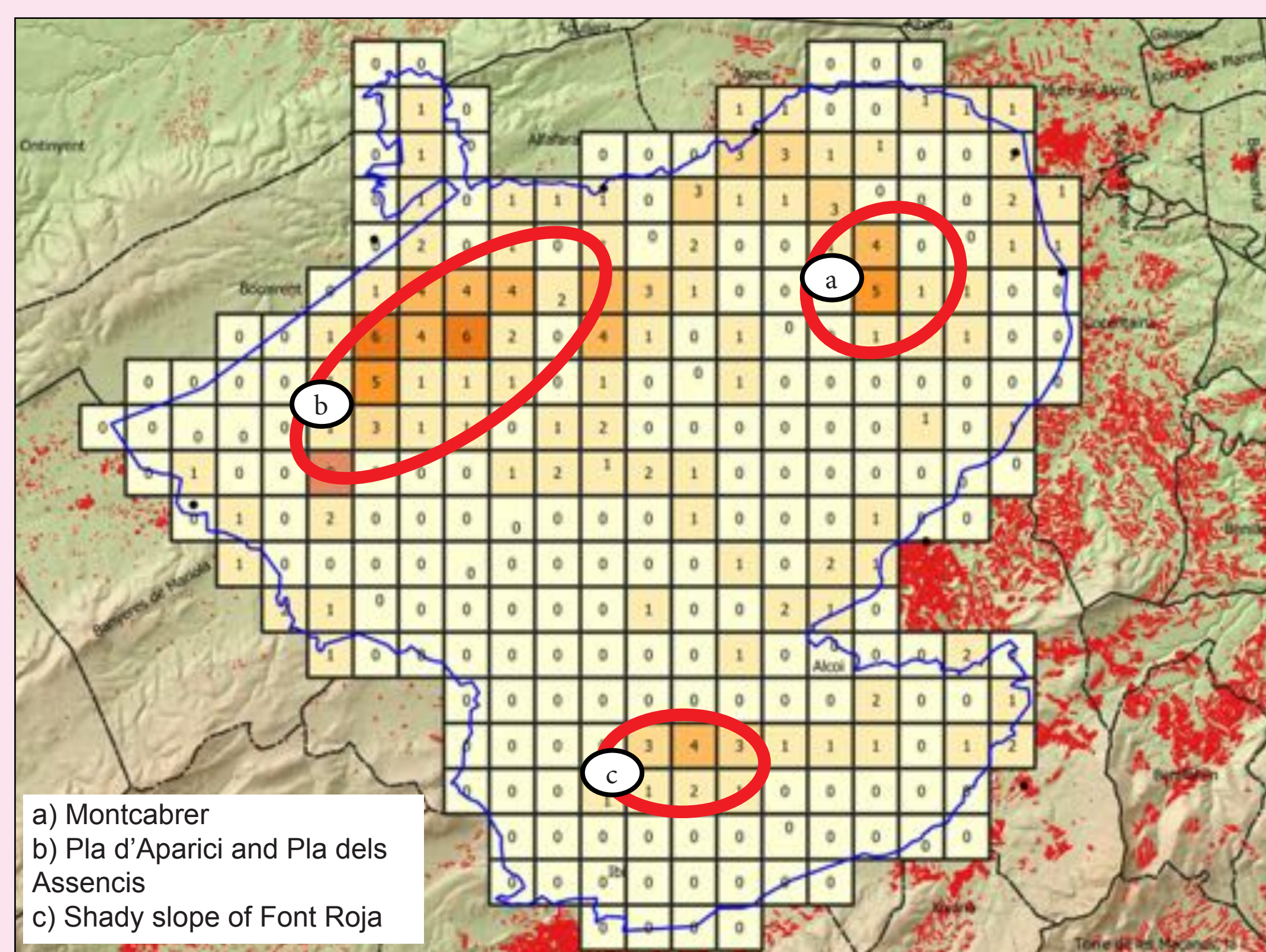
RESULTS AND DISCUSSION

Regarding the results, 1.341 taxa have been located from 67.890 records (17.171 bibliographic records, 3.809 herbarium sheets, and 46.910 direct field observations). Of the 1.341 taxa present or mentioned, 43 are included in Decree 70/2009 that regulates the Valencian Catalog of Threatened Flora Species (ANON, 2009; 2013; 2022). Of which, 2 are in the category of endangered (*Anacamptis papilionacea* subsp. *grandiflora* and *Festuca patula*), the following 3 as vulnerable (*Apium repens*, *Euphorbia nevadensis* subsp. *nevadensis*, and *Himantoglossum hircinum*), other 28 as Guarded and the last 10 Protected Not Cataloged.

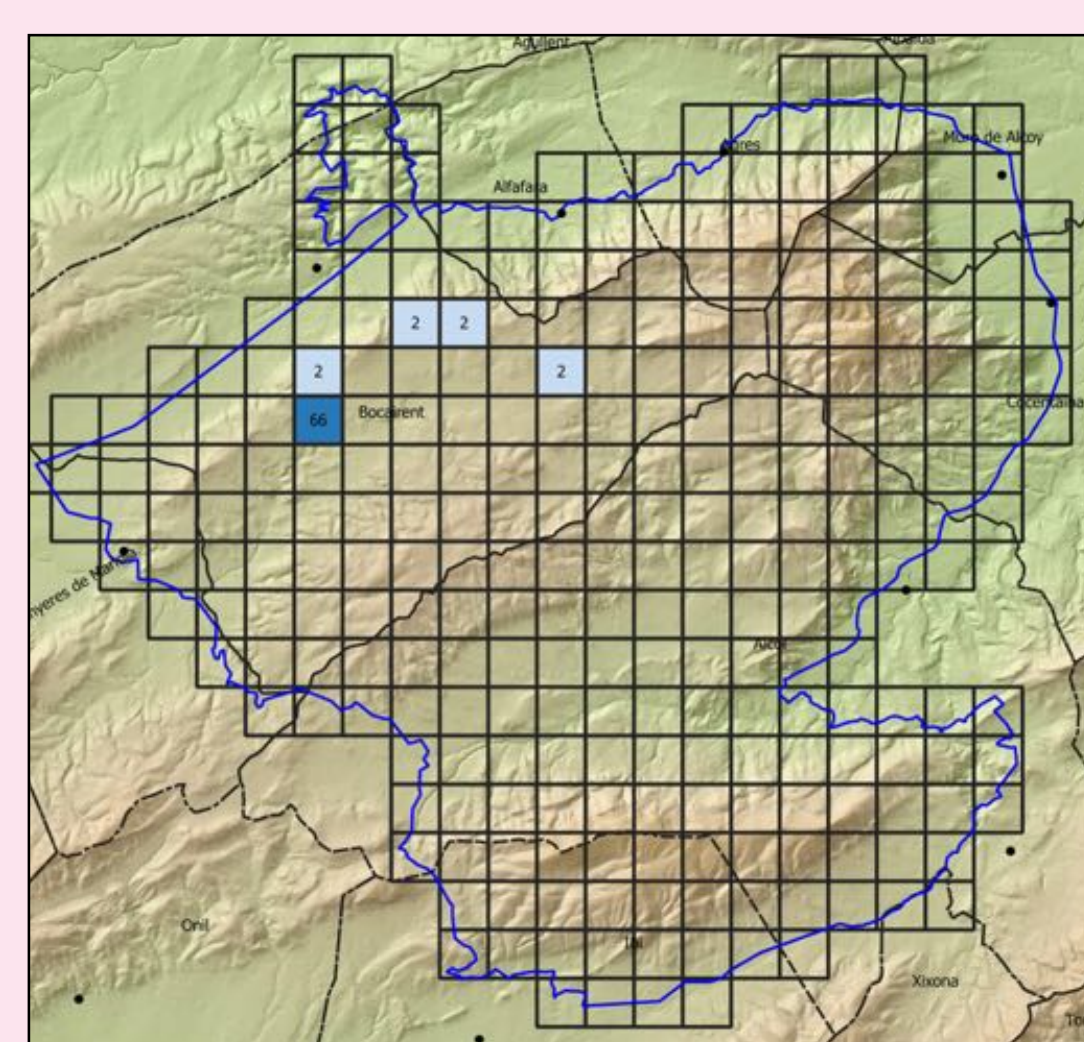
The presence of all of them and the areas of greatest value for conservation due to the higher density of threatened species are analyzed. There are 3 areas with a greater number of protected species and with the most plant diversity: a) Montcabrer, the highest area of the SCI, with some high mountain species present, b) the fresh meadows between Pla d'Aparici and Pla dels Assencis, where numerous rare orchids appear in the area of the SCI and in the Valencian Community as a whole and c) the shady slope of Font Roja, where there are a large number of rare forest species, both trees and orchids.



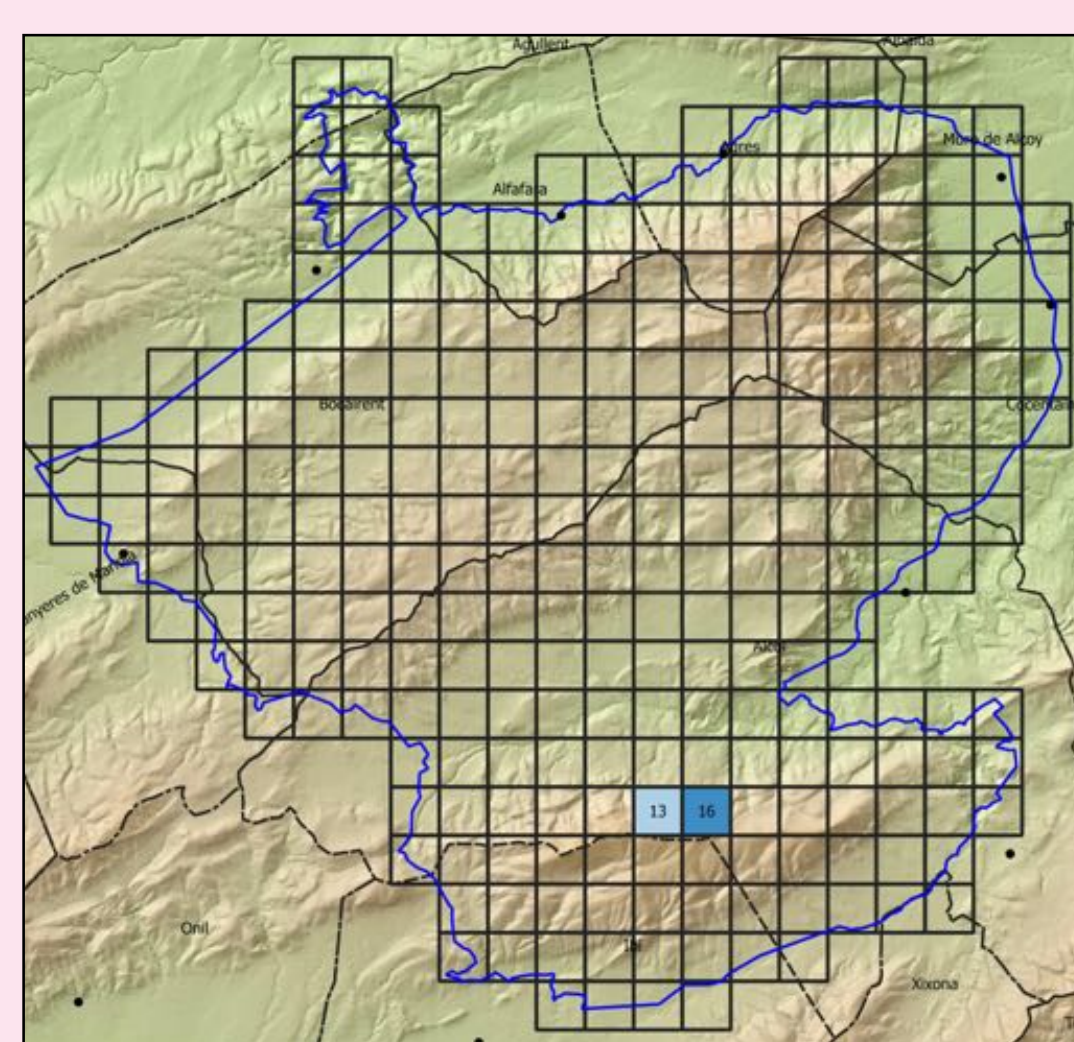
Map 3. Grid cells 1km² with observed number species



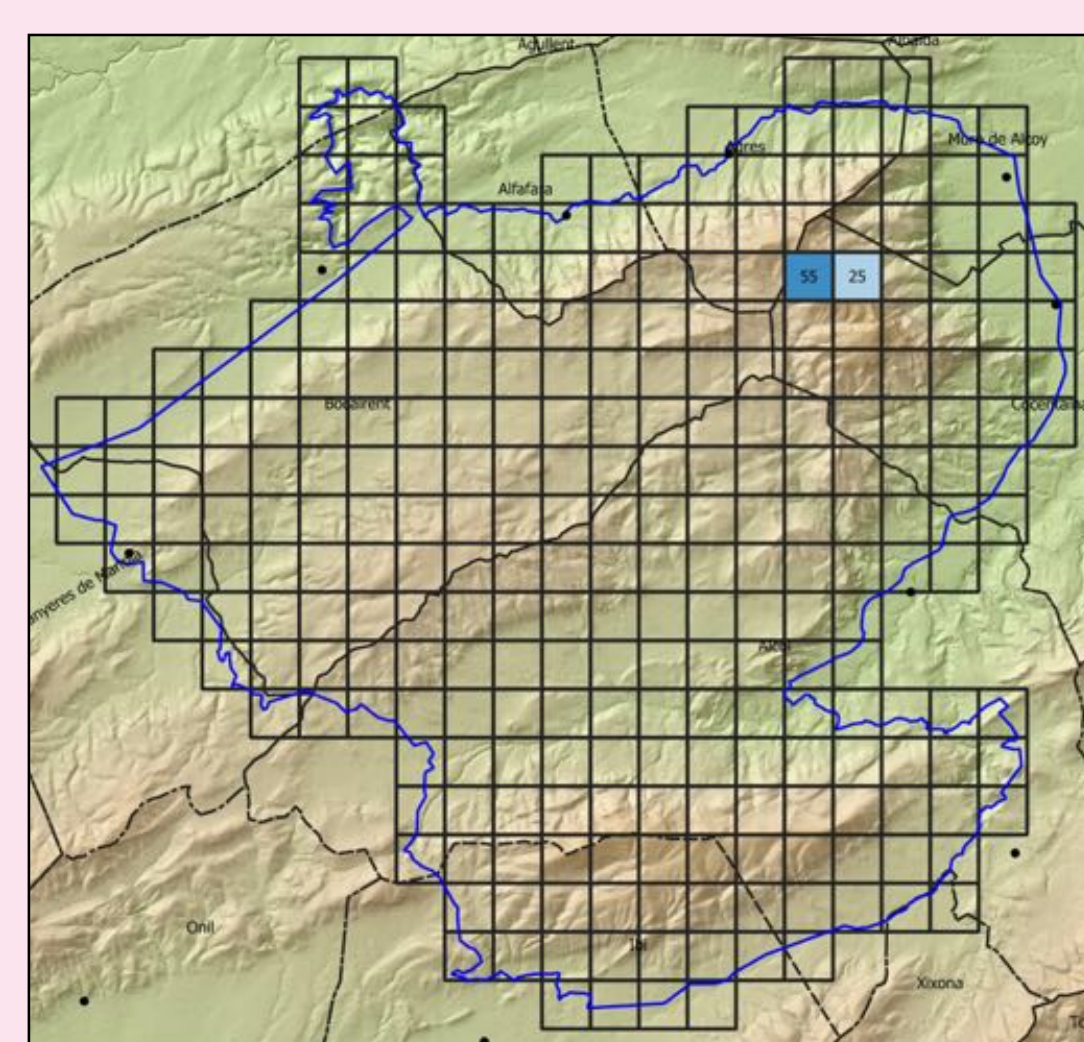
Map 4. Grid cells 1km² with observed number protected species



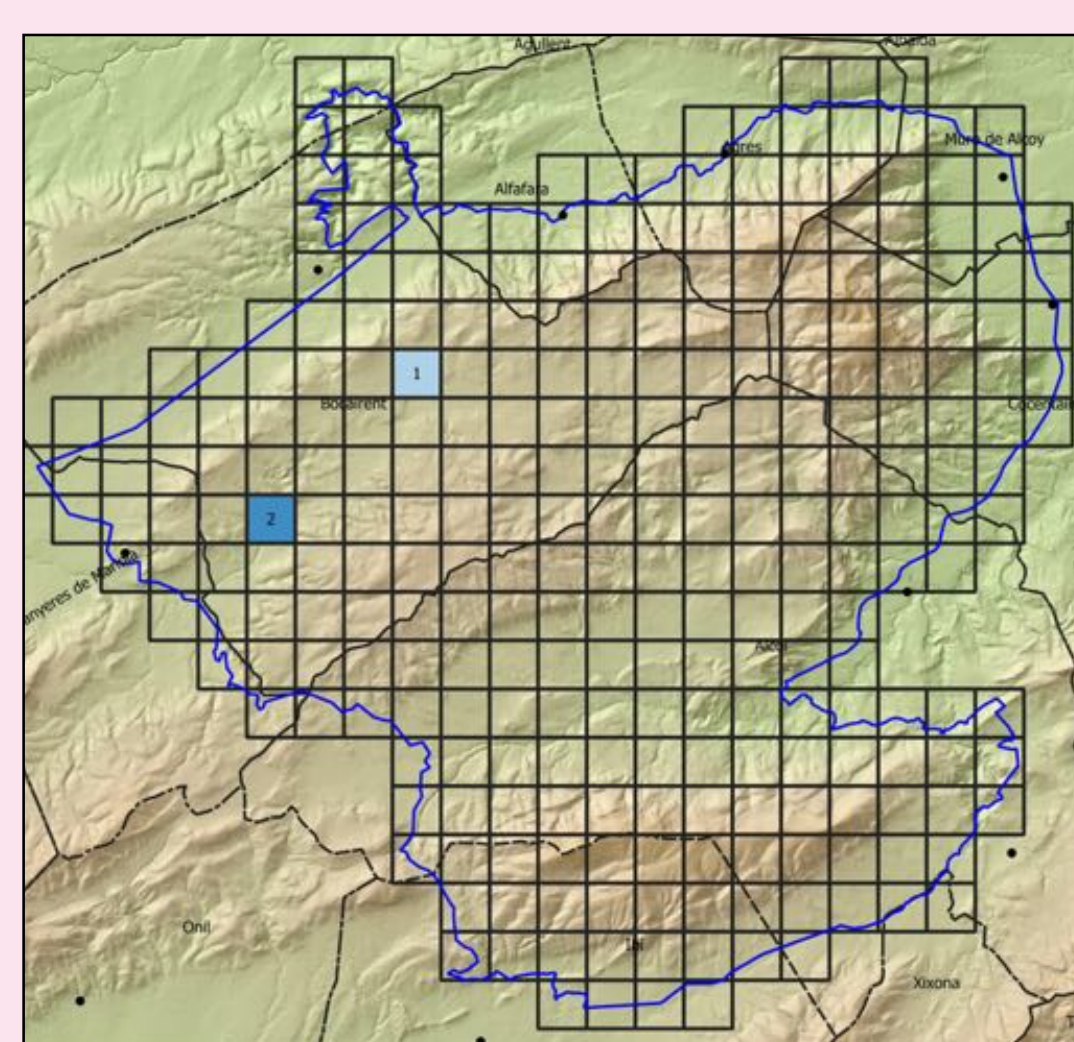
Map 5. Number of individuals of *Anacamptis papilionacea* subsp. *grandiflora*



Map 6. Number of individuals of *Festuca patula*



Map 7. Number of individuals of *Euphorbia nevadensis* subsp. *nevadensis*



Map 8. Number of individuals of *Himantoglossum hircinum*



REFERENCES

Anonymous (2009) Decreto 70/2009, de 22 de mayo, del Consell, por el que se crea y regula el Catálogo Valenciano de Especies de Flora Amenazadas y se regulan medidas adicionales de conservación. DOCV 6021 (26.05.2009): 20143-20162.

Anonymous (2013) Orden 6/2013, de 25 de marzo, de la Conselleria de Infraestructuras, Territorio y Medio Ambiente, por la que se modifican los listados valencianos de especies protegidas de flora y fauna. DOCV 6996 (04.04.2013) 8682-8690.

Anonymous (2022) Orden 2/2022, de 16 de febrero, de la Conselleria de Agricultura, Desarrollo Rural, Emergencia Climática y Transición Ecológica, por la que se actualizan los listados valencianos de especies protegidas de flora y fauna. DOCV 9285 (24.02.2022) 12677-12687.

Serra, L. & Soler, J.X. (2011). Flora del parc natural de la Font Roja. Alcoi. CAM.

Serra, L., Oltra Benavent, J.E., Conca, A., Soler, J.X. & Nebot, J. R. (2012). Catálogo de la flora del Parque Natural de la Sierra de Mariola (Alicante-Valencia). Flora Montiberica 51: 97-125.

Serra, L., Oltra Benavent, J.E. & Soler, J.X. (2019) Addicions i correccions a la flora del Parc Natural de la Serra de Mariola (Est de la península Ibérica). Butl. Inst. Cat. Hist. Nat. 83: 177-194