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INTRODUCTION

Ceratocapnos heterocarpa Durieu is a climbing terophyte which grows in calcareous rocky soils on north- and northeast-steeper slopes, with low rates of solar radiation, frequently under a dense canopy. It is considered a thermophilous and nitrophilous or sub-nitrophilous species. Its distribution is scattered throughout the south of the Iberian Peninsula and the north of Africa. Moreover, it has been recorded in Fuerteventura (Canary Islands) by Scholz et al. (2006). At national level, it is catalogued as endangered (EN B1ab(ii,iii)) (Moreno 2008).

The association *Parietario mauritanicae-Ceratocapnetum heterocarphae* Martínez Parras 1982 was described for the first time to the Baetic and Murcian-Almeriense biogeographical provinces, which is akin to *Torilidi nodosae-Parietarium mauritanicae* Rivas-Martínez 1977, the latter having its optimum range of distribution in the Lusitan-Extremadurean subprovince and being the target species of this work the distinguishing factor of both associations (Martínez Parras 1982). Moreover, two subassociations of *Parietario mauritanicae-Ceratocapnetum heterocarphae* Martínez Parras 1982 were described: *ceratocapnetosum heterocarphae* (typical) and *succowietosum balearicae* (being *Succowia balearica* (L.) Medicus the differential species). Subsequent findings of this species in a different biogeographical region, such as Lusitan-Extremadurean subprovince, may be interesting from a phytosociological point of view.

The main aims of this work are: (i) To record a new locality for *C. heterocarpa* in Spain; (ii) to characterise the vegetal community of the new record and establish comparisons with other inventories in the Lusitan-Extremadurean subprovince; and (iii) to discuss its similarities/differences with respect to the original association described by Martínez Parras (1982): *Parietario mauritanicae-Ceratocapnetum heterocarphae*.

RESULTS

A new locality of the endangered species *C. heterocarpa* has been found, specifically:

SPAIN. Córdoba: Arroyo de Rabanales [30SUH4702], 7 April 2013, Javier López Tirado (COFC 61195); idem 15 April 2013 (COFC 61196).

This record extends the whole distribution of *C. heterocarpa* in the Iberian Peninsula (Fig. 1), being the first record for the province of Córdoba. It was found in a small stream, near the riverbank, in rocky soils from calcareous substrate of metamorphic limestone according to the lithological map of Andalusia (1:400.000 scale), in northeast and east faces under a canopy of wild olives (*Olea europaea* L. subsp. *europaea* var. *sylvestris* (Mill.) Lehr), being the most frequent species in the area. Table 1 shows the phytosociological inventories carried out at the following sites: (1-2) Córdoba. Córdoba: Arroyo de Rabanales; (3-4) Huelva. Sanlúcar de Guadiana: Rivera Grande. Inventory number 1 was about 15 meters away from the second one, whereas inventories 3 and 4 were separated by fewer than 10 meters. All the inventories were made in the Lusitan-Extremadurean subprovince.

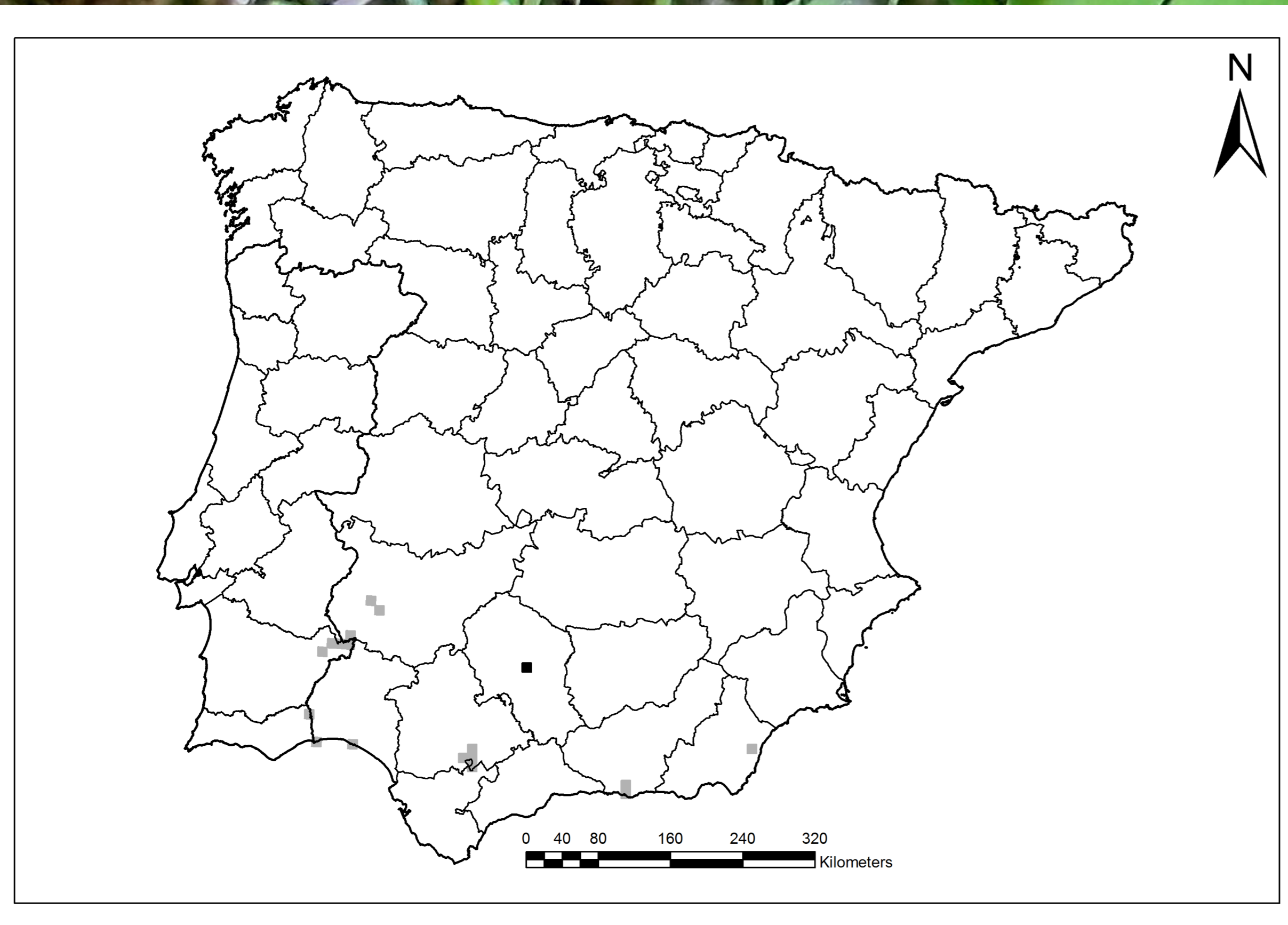


Figure 1. Current distribution of *C. heterocarpa* (10 x 10 km grid) in the Iberian Peninsula. Light gray grids show the known populations whereas the black one shows the new record.

DISCUSSION

The studied localities in the present work (provinces of Córdoba and Huelva) fit with *Parietario mauritanicae-Ceratocapnetum heterocarphae* Martínez Parras 1982, a fact that is supported by Ladero et al. (1995) in the province of Badajoz. According to the ecological variables, such as climatic and geological conditions, the phytosociological inventories have been sampled in northwest-, northeast- and eastern facing slopes, on humus-rich soils and covered by a dense canopy; it also occurs in high slopes at the bottom of valleys in the thermomediterranean bioclimatic belt. The habitat of the new locality can be noticed in figure 2. Most of the sampled species are sciophilous and nitrophilous pterophytes. All the inventories have been carried out in *Sierra Morena*, in Precambrian and Paleozoic materials in the main, being its nature basically acid (Núñez Granados et al. 2003), although specifically these inventories have been made in basophilic outcrops that are infrequent in this range. Thus, the geological substrate meets the environmental requirement for *C. heterocarpa*. The species composition of shrubs and trees are also very similar, with species from *Asparagus albi-Rhamnion oleoidis* Goday ex Rivas-Martínez 1975 alliance, *Pistacia lentisci-Rhamnetalia alaterni* Rivas-Martínez 1975 order and *Quercetea ilicis* Br.-Bl. ex A. and O. Bolós 1950 class.

On the other hand, the presence of *Theligonum cynocrambe* L. in the inventories from the province of Córdoba, lead us to propose it as differential species for subass. *ceratocapnetosum heterocarphae*. The fact that it was not recorded in the inventories carried out in the Sierra de Esparteros (Seville) by Martínez Parras (1982) can be due to an incidental fact, because actually this species is well distributed in that area (Peinado et al. 1986; Silvestre 1987). Moreover, *T. cynocrambe* is absent in the coastal areas of Granada and Almería provinces (Blanca et al. 2009), locations in which subass. *succowietosum balearicae* was described by Martínez Parras (1982). In the inventories carried out in the province of Huelva, *T. cynocrambe* is absent; it is a rare species in this province, not being recorded yet in *Andévalo*, *Sierra de Huelva* and the *Espacio Natural de Doñana* (Valdés et al. 2007; Valdés et al. 2008) but it is present in the *Condado de Huelva* (Benedi & Silvestre 1997; Sánchez Gullón & Rubio García 1999). Anyway, the absence of *Succowia balearica* in the Lusitan-Extremadurean subprovince, lead us to include it in subass. *ceratocapnetosum heterocarphae* as well.

MATERIAL AND METHODS

C. heterocarpa was found in spring 2013 when a field work on the study of the local flora was undertaken in the municipal area of Córdoba (province of Córdoba, south of Spain). The same place was visited again, and more specimens were located several meters apart from the first record. Two phytosociological inventories were carried out in the province of Córdoba, and two more in the province of Huelva in order to characterise the association in which this species was present.

The taxa were identified using Flora Europaea (Tutin et al. 1964), Flora Ibérica (Castroviejo 1986), Flora Vasculosa de Andalucía Occidental (Valdés et al. 1987) and Flora Vasculosa de Andalucía Oriental (Blanca et al. 2009). A voucher sample of *C. heterocarpa* is located in the herbarium of the Faculty of Sciences of the University of Córdoba (COFC).

Inventory number	1	2	3	4
Elevation (m a.s.l.)	222	220	23	23
Area (m ²)	1	1	1	1
Aspect (°)	60	90	330	340
Slope (%)	45	35	60	60
Cover (%)	100	100	100	95
Species number	17	22	15	15
Characteristic species from association and alliance level				
<i>Ceratocapnos heterocarpa</i> Durieu	4	3	3	3
<i>Parietaria mauritanica</i> Durieu	-	-	+	-
<i>Theligonum cynocrambe</i> L.	1	3	-	-
Characteristic species from order and class level				
<i>Rhagadiolus edulis</i> Gaertner	+	+	-	-
<i>Geranium purpureum</i> Vill.	+	+	-	+
<i>Geranium rotundifolium</i> L.	+	-	-	-
Companion species				
<i>Arisarum simorhinum</i> Durieu	+	1	-	-
<i>Ceterach officinarum</i> Willd.	+	+	-	+
<i>Cistus albidus</i> L.	(+)	(+)	-	-
<i>Euphorbia pterococca</i> Brot.	-	-	+	+
<i>Galium verrucosum</i> Hudson	-	+	-	+
<i>Melica minuta</i> L.	(+)	1	-	-
<i>Mercurialis annua</i> L.	-	-	+	+
<i>Olea europaea</i> var. <i>sylvestris</i> (Mill.) Lehr	5	1	-	-
<i>Phlomis purpurea</i> L.	1	-	(+)	-
<i>Selaginella denticulata</i> (L.) Spring	+	1	-	-
<i>Sonchus oleraceus</i> L.	-	1	-	+
<i>Trifolium campestre</i> Schreb.	-	-	+	1
<i>Umbilicus rupestris</i> (Salisb.) Dandy	-	-	+	1

Besides: Inventory 1.- *Asparagus albus* L. 1, *Euphorbia peplus* L. r, *Fumaria reuteri* Boiss. +, *Rhamnus lycioides* L. subsp. *oleoides* (L.) Maire 2, *Tamus communis* L. 1; inventory 2.- *Anogramma leptophyllum* (L.) Link +, *Arum italicum* Mill. (+), *Brachypodium sylvaticum* (Huds.) Beauv. 1, *Campanula erinus* L. +, *Erodium cicutarium* (L.) L'Hér +, *Micromeria graeca* (L.) Rchb. subsp. *graeca* (+), *Pistacia lentiscus* L. (+), *Scandix pecten-veneris* L. +, *Sedum mucizonia* (Ortega) Raym.-Hamet +, *Trifolium stellatum* L. +; inventory 3.- *Arrhenatherum album* (Vahl) Clayton +, *Ceratonja siliqua* L. (+), *Dactylis glomerata* L. +, *Delphinium pentagynum* Lam. 2, *Lavandula viridis* L'Hér (+), *Phagnalon saxatile* (L.) Cass. +, *Rumex induratus* Boiss. and Reut. 1, *Smyrniolus olusatrum* L. 2, *Urospermum picroides* (L.) Schmidt r; inventory 4.- *Avena barbata* Link 1, *Cynosurus echinatus* L. +, *Euphorbia exigua* L. subsp. *exigua* +, *Polypodium cambricum* L. (+), *Trachynia distachya* (L.) Link 2, *Urginea maritima* (L.) Baker +.

Table 1. Phytosociological inventories of *C. heterocarpa*.

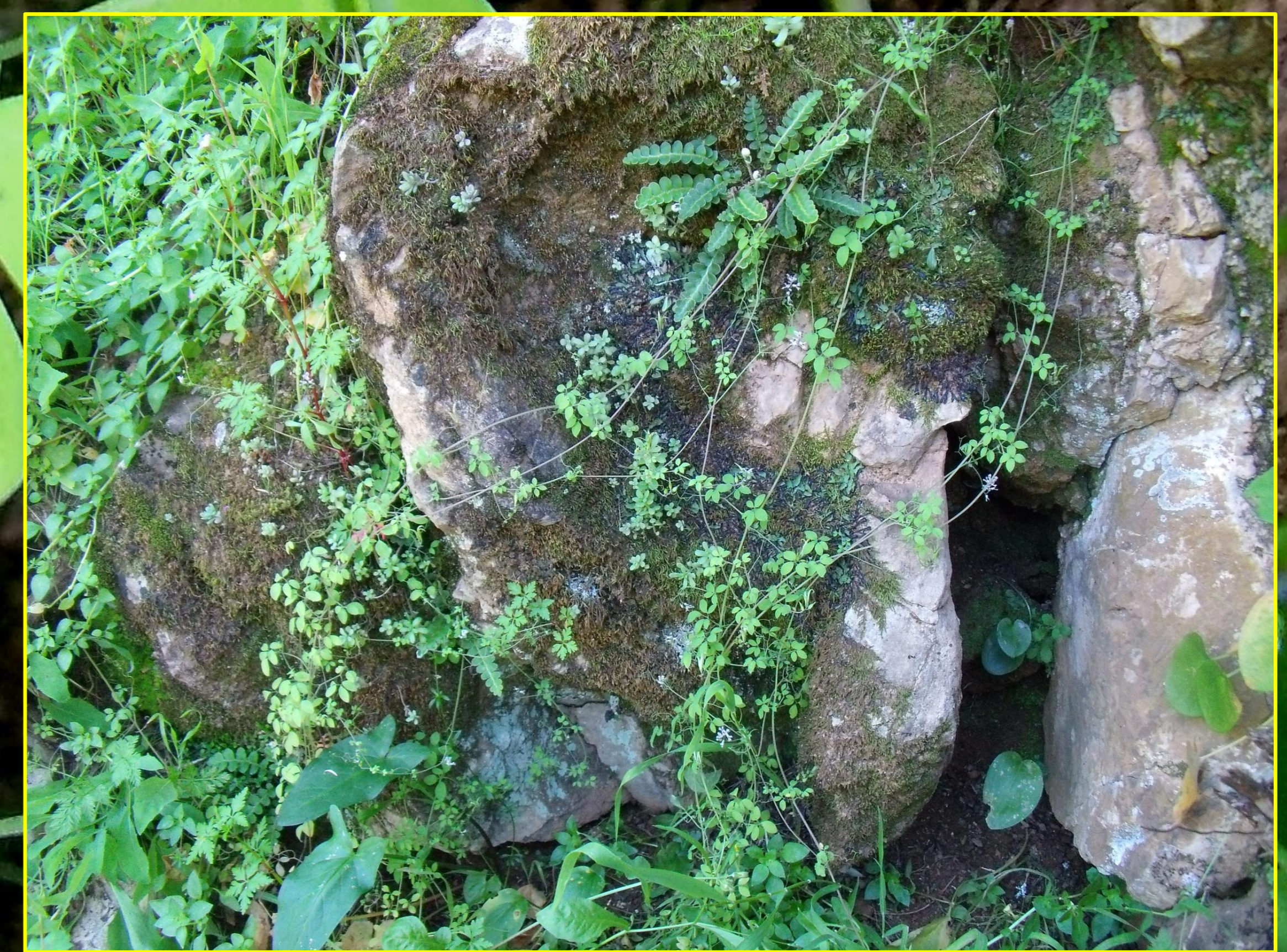


Figure 2. Habitat of *Ceratocapnos heterocarpa* in the new locality.