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The phytodiversity of the flora of Kriti (Greece) – a survey of the current state of knowledge

Abstract

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Based on c. 250.000 individual records the distribution of vascular plants on Crete is summed up on four cumulative grid maps with 4'×3' cells.

Introduction

The vascular flora of Crete and adjacent islets has been the object of many floristic studies during the last decades. The currently known numbers of taxa are given in Table 1.

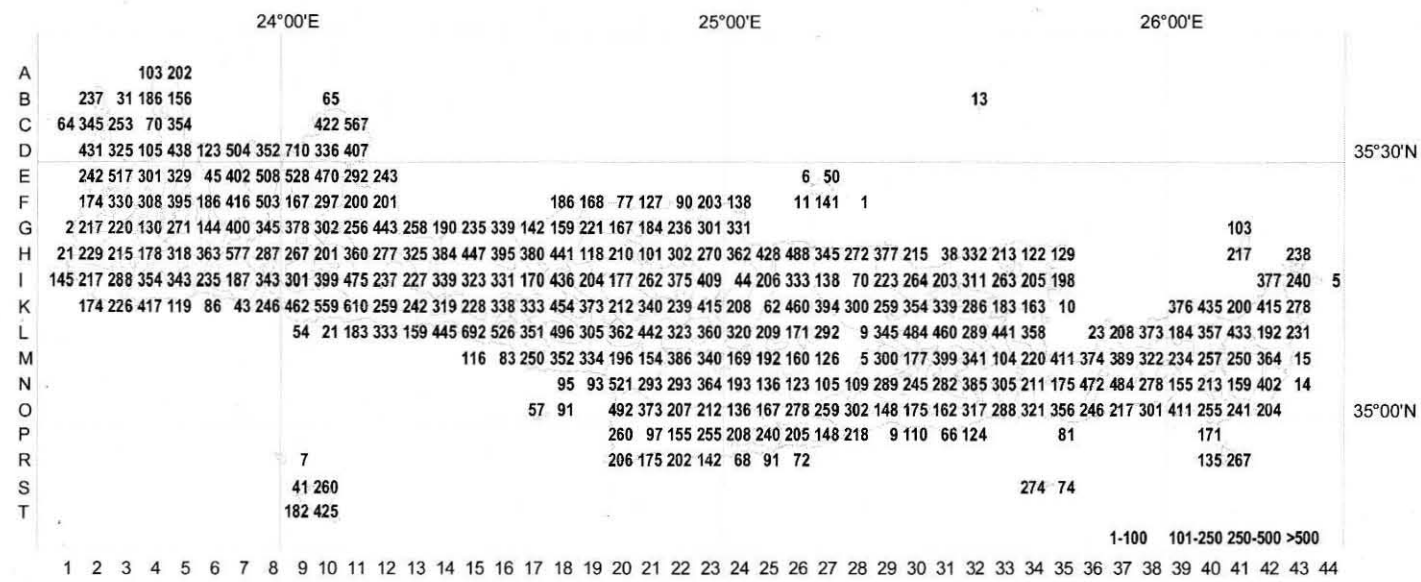
Table 1. Numbers of the Cretan vascular flora, updated from Jahn & Schönfelder (1995). D = doubtfully native, N = naturalized, P = possibly naturalized, A = casual.

	all taxa	**endemic taxa**	**endemic subsp. of non-endemic species**	**Introduced taxa**			
				D	**N**	**P**	**A**
Species	1890	165		15	80	25	35
Additional subspecies	111	9		1	2	3	1
Total	**2001**	**174**	**33**	**16**	**82**	**28**	**36**

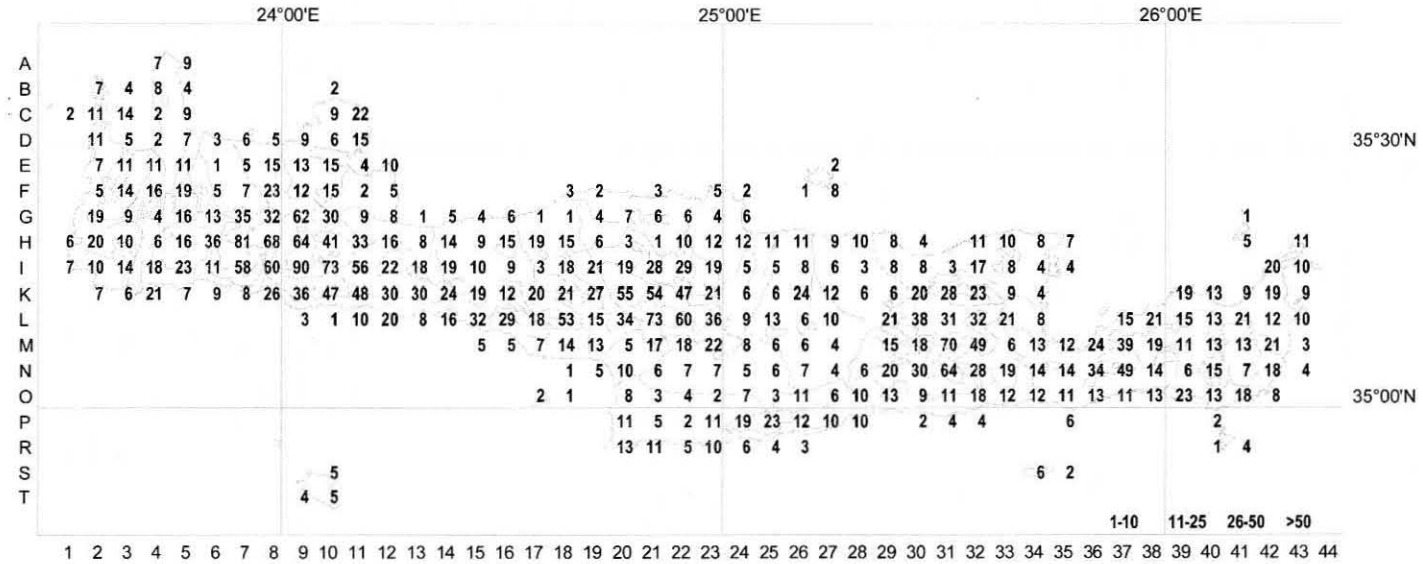
About 460.000 South Aegean records from the available floristic and phytosociological literature as well as from the author's own field work, mostly from a study of Cretan phrygana communities covering the island with 970 relevés, have been compiled in a database. This also covers the other South Aegean islands (Kithira, Andikithira, the Karpathos group, Rhodos, Tilos and Symi). A majority of the data, c. 250000 records, are from Kriti. Additional data on the distribution of vascular plants on the South Aegean islands are welcome.

Material and methods

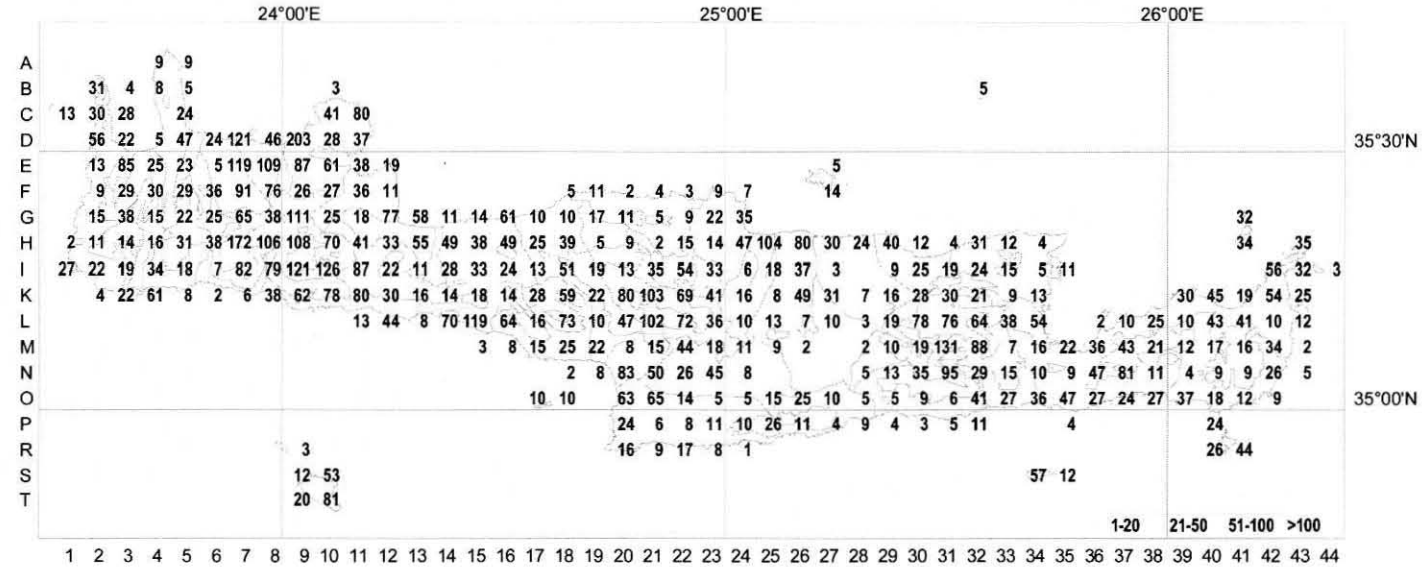
For a survey of the island's phytodiversity, Crete was subdivided by means of a grid into 343 unit areas (cells) of 4'×3' (c. 6 km × 5,5 km). The species numbers per unit area were



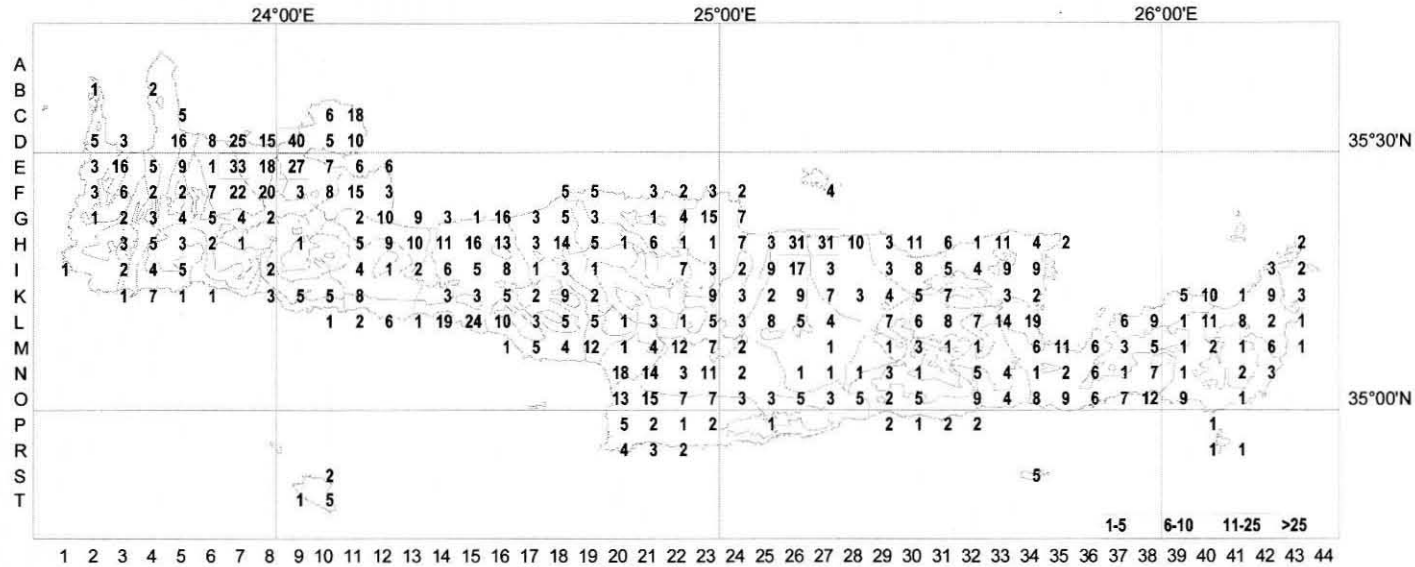
Map 1. Numbers of all species per 4'×3' grid cell (1981 taxa mapped).



Map 2. Numbers of endemic taxa per 4'×3' grid cell (203 taxa mapped).



Map 3. Numbers of species covering up to 25 grid cells only (1163 taxa mapped).



Map 4. Numbers of neophytes per 4'×3' grid cell (143 taxa mapped).

determined (Maps 1-4). Historical as well as recent records have been counted. Records with a non-precision of up to 4' have been considered only when no more precise records were available. This refers, in particular, to the dots in the 8,25 km × 8,25 km^2 grid maps in Turland & al. (1993), of which c. ¼ were included, while the rest was displaced by more precise records. The records of 20 out of 111 additional subspecies (Table 1) have been left out, because the distribution of the species as a whole is much more accurately known than that of its subspecies. The base map was produced with the aid of DMAP, the final maps with Microsoft Excel.

Comments on the maps

Units areas with more than 500 taxa (Map 1) reflect the focuses of floristic research on the island; their exploration partly dates back to the 19th or early 20th Century (Rechinger 1944). Thus, a great part of the records from Timbaki (N20 on map) date from the Austrian expedition of 1914 (Vierhapper 1914–1916). Some high numbers (Imbros gorge – K11, Omalos plain – H7) result from frequent botanical visits, and some (e.g. Plakias – L15), from intense recent fieldwork (Turland & al. 1993). In general, many imprecise records (e. g. "Kissamos" (E3), "Khania" (D9), "Kap Maleka" (C11) from Rechinger 1944) are involved.

Gaps of knowledge mainly concern the area E of Rethimno, including the Kouloukonas range and Central Crete. Both areas consist in large parts of cultivated land. Some of the species not recorded from Kriti since 1930 have their distribution centre there, e.g. *Cardopatium corymbosum* (L.) Pers., collected in Central Crete by Cousturier (fide Rechinger 1944) and recorded here for the first time since 1914 (Nomos Irakliou, Eparchia Monofatsiou, near Amourgelles, 19.6.1994, R. Jahn). Some grid cells have low species numbers due to their inaccessibility (e.g. I7) or because of the predominance of sea over land surface.

Species numbers decrease from west to east, following a gradient of aridity, and with increasing altitude. Due to the island situation, the relatively high aridity and the lack of special habitats such as large streams, species numbers do not reach the peak values known from continental (e.g. Central) Europe.

The endemic species of Crete (Map 2) increase in the mountains of Crete, above 1400 m, due to high geodiversity and ± constant long-term climatic conditions that enhance their role as refuges for relict taxa. Here, the endemic element may reach 25-31% of the total flora.

Species numbers of mountain endemics decline from west to east due to a decrease in area and altitude of the mountain massifs. They remain low on elevations of 1000-1200 m, where the natural timberline is not reached (Kouloukonas (G17–23), Asterousia (P20–27).

Numbers of lowland endemics are highest in the well isolated Sitia peninsula, the eastern part of Kriti. The endemic element is poorly represented on the satellite islets around Crete.

The most widely distributed species is *Charybdis maritima* (L.) Speta s. l. (302 unit areas) followed by *Coridothymus capitatus* (L.) Rchb. f. (296), *Sarcopoterium spinosum* (L.) Spach (294) and *Leontodon tuberosus* L. (292), all of them frequent members of Cisto-Micromerietea communities, the most widespread vegetation class on the island. The most widespread Cretan endemic is the phrygana shrublet *Asperula rigida* Sm. (233), the most

widespread neophyte *Oxalis pes-caprae* L. (190). Only 290 taxa are currently known to occur in more than 100 unit areas, among them but 9 endemics and a single neophyte.

A clear majority (1163) of the taxa mapped is currently known from 25 unit areas or less. The picture shown by Map 3 shows the combined effects of research focuses and the occurrence of exceptional habitats. The high mountains as well as the coasts and the satellite islets have high numbers of sparsely distributed taxa.

Neophytes (doubtfully native, naturalized, possibly naturalized, casual) (Map 4) are best-represented in areas strongly influenced by Man. High neophyte numbers are found in the cities of Iraklion (H25–26) and Chania (B7–F9), and to a lesser extent Rethimno (G16) and Ag. Nikolaos (L33). Large gaps can be assumed to be due to incomplete survey, whereas some thoroughly searched areas are over-represented. Species numbers decrease on the satellite islets as well as with increasing altitude. Neophytes are all but absent from thinly populated areas such as the Gramvousa and Rodopou peninsulas (A4–B5, B–C2).

The maps show that the essential characteristic of the flora of Kriti is not high species numbers, but a high rate of endemism. It should be emphasized that richness in species and endemics are important criteria for plant protection, but not the only valid ones.

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