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The alien vascular flora of Greece: Floristic analysis and chorology

Abstract

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Within the framework of the EC funded project DAISIE literature data regarding the alien flora of Greece were compiled in a database. The data collected concern taxonomy, distribution, origin, introduction pathway, status, life and growth form, flowering period, fruit type, habitat etc. Data on 326 taxa reported for Greece have been compiled in this database. Approximately 40% of these taxa are naturalized. The richest families in number of taxa, comprising approximately 30% of the total, are *Gramineae*, *Compositae* and *Leguminosae*, while *Amaranthus* is by far the richest genus consisted of 18 taxa. As far as their life form is concerned, the majority are therophytes followed by phanerophytes and hemicryptophytes. Chorological analysis showed that most of the taxa are of American origin (38%) As it was expected, most of the alien taxa grow in disturbed and man-made habitats.

Introduction

Alien plants, also known as exotic, introduced, non-native, non-indigenous, are those taxa whose presence in a given area is due to intentional or unintentional human involvement, or which have arrived there without the help of people from an area in which they are native (Pyšek & al. 2004; Pyšek & Richardson 2006). According to Webb (1985) alien species are those who reached an area as a consequence of the activities of neolithic or post-neolithic man or of his domestic animals. Pyšek & Richardson (2006) distinguished three categories of alien plants according to their 'invasion status': a) casual aliens, that are those plants which may flourish and reproduce occasionally away from cultivation, but that eventually die out because they do not form self-replacing populations, b) naturalized plants, which sustain self-replacing populations without direct human intervention and c) invasive plants, which are naturalized plants that produce reproductive offspring, often in large numbers, at considerable distances from the parent plants and thus have the potential to spread far over a large area. Yannitsaros (1982) uses the term adventive in its strict sense to define both naturalized and casual alien plant taxa, while in the wide sense spontaneous are also included.

Invasion ecology is one of the most rapidly developing branches of ecology (Williamson 1996). This is due to the significant losses of the biological diversity and

function of the ecosystems invaded as well as to their impact on the economy (Mooney & Hobbs 2000; Mack & al. 2000). The European Commission funded the project DAISIE (www.europe-aliens.org) with a view to deliver an alien invasive species inventory for Europe. The project aimed at producing a database on the alien species in Europe and the outcome is a web portal from which all interested scientists will have access to its data. The current work, mostly carried out under this project, is the first attempt to gather scattered information and provide the best possible overview of the Greek alien flora. The study of the alien vascular flora of Greece started in early 1970's (Yannitsaros 1982). It became more intense and systematic during the last two decades and many new records were added. Among the Greek regions with a sufficient knowledge of the alien flora are Attica, the island of Crete, the urban areas of Thessaloniki and Patras and some Aegean Islands (e.g. Lesbos, Chios, Kalymnos).

Material and methods

The data collected are based on an extensive survey of the existing literature and concern taxonomy, distribution, chorology, habitat, introduction pathway, as well as several life history traits of the alien plant taxa (e.g. life and growth form, fruit type, reproduction and dispersal mode etc.). A relational database has been created with fields corresponding to the above mentioned topics of information. Nomenclature is according to Tutin & al. (1968-1980, 1993). Life forms are identified according to the system proposed by Raunkiaer (1934, 1937) and modified by Ellenberg (1956) and Ellenberg & Müller-Dombois (1967). Chorology of the taxa is mainly after Pignatti (1982), Strid & Tan (1997, 2002) and Tutin & al. (1968-1980, 1993) while in many cases several additional sources were used.

Results and Discussion

The number of alien taxa (species, subspecies and hybrids) reported so far for Greece is 326. A high percentage of these (approximately 40%) are naturalized (Fig. 1). The majority of the taxa recorded belong to the families of *Gramineae* (45 taxa), *Compositae* (29 taxa), *Leguminosae* (25 taxa), *Amaranthaceae* (19 taxa), *Solanaceae* (18 taxa) and *Cruciferae* (14 taxa). *Amaranthus* is by far the richest genus consisted of 18 taxa. Therophytes (46.9%) are the majority in overall alien taxa followed by phanerophytes (19.6%), hemicryptophytes (13.4%) and geophytes (11.8%) as demonstrated in Fig. 2. The percentage of therophytes is increasing significantly within the casual alien plant taxa (54.5%). The majority of the alien plant taxa in Greece are of American origin (38%), followed by those of Asiatic (18%), Mediterranean (9%) and Tropical-Subtropical (8%) origin (Fig. 3). Notably, the majority of the alien taxa occur in disturbed or man-made habitats such as cultivations, road sides, fallow lands and waste deposits and only a limited number intrude natural habitats such as coastal habitats.

The alien flora of Greece is not yet fully studied, since several regions and habitats likely to host such species are under-investigated. However, it is expected that even if new data will be available, the trends presented above will not change significantly.

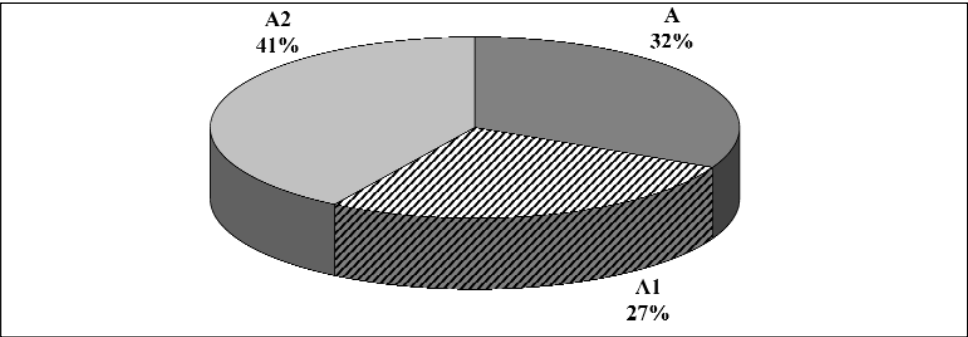


Fig. 1. Status of the alien plant taxa of Greece: Uncertain (A), Casual (A1), Naturalized (A2).

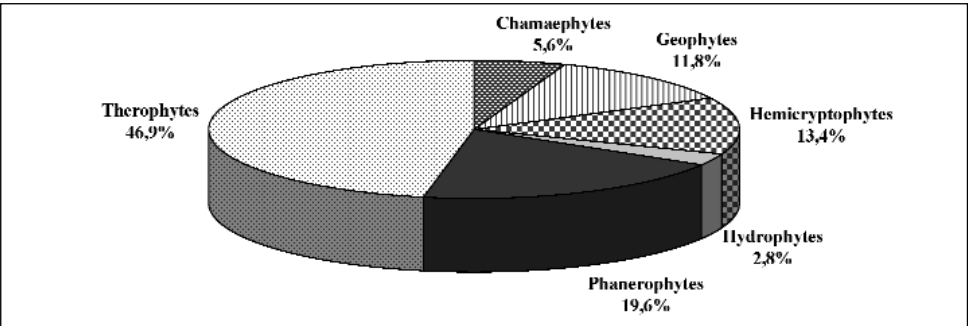


Fig. 2. Life form spectrum of the alien plant taxa of Greece.

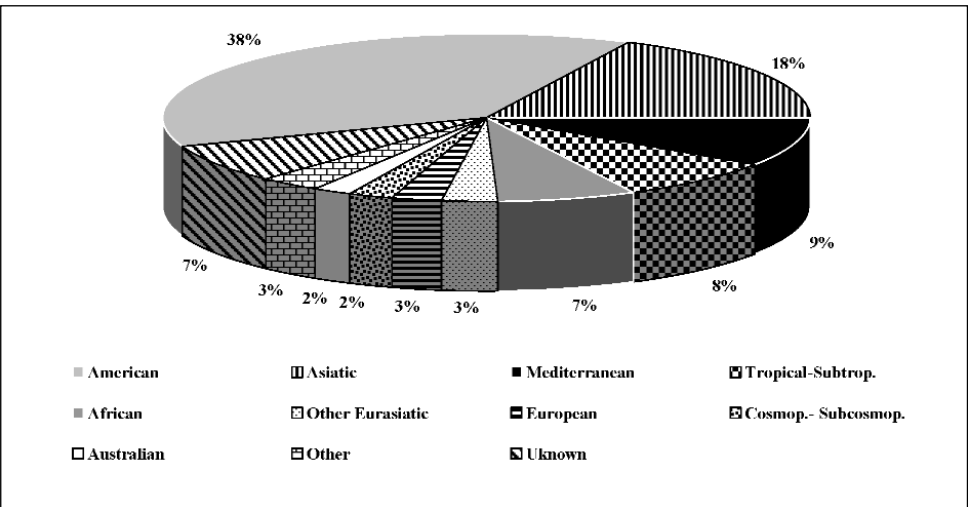


Fig. 3. Chorological spectrum of the alien plant taxa of Greece.

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