BIOFORM AND CHOROLOGY (PHYTOGEOGRAPHY)

3rd Vegetation Ecology Lab - 2024

Based on their external form and growth type, plants are classified into different **bioforms** or (else called) **growth forms**.

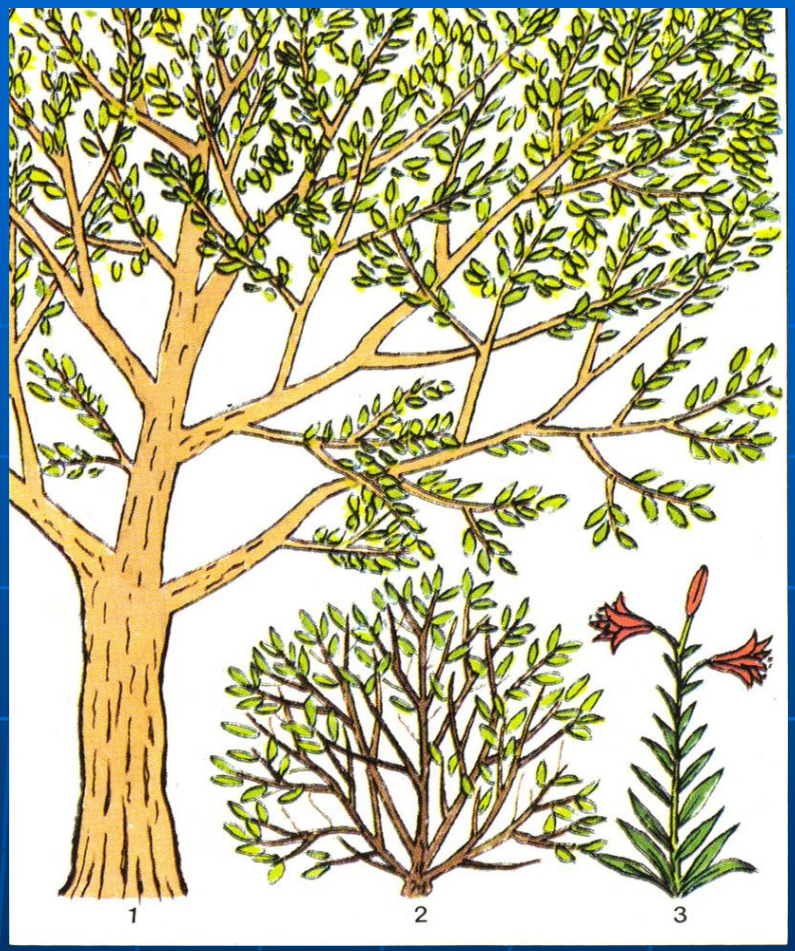
The harmonization and adaptation of plants to the ecological conditions of the environment is expressed by their **bioforms.**

Growth form:

It refers to the general appearance and structure of a plant, and includes characteristics such as:

- its position in relation to the vegetation layer,
- the way of branching,
- the time and duration that leaves remain on the plant.

By studying ecosystems with similar ecological conditions, significant similarities are found in terms of the dominant growth forms, which shows the close connection of prevailing ecological factors and growth forms (eg phrygana, maquis, etc.).



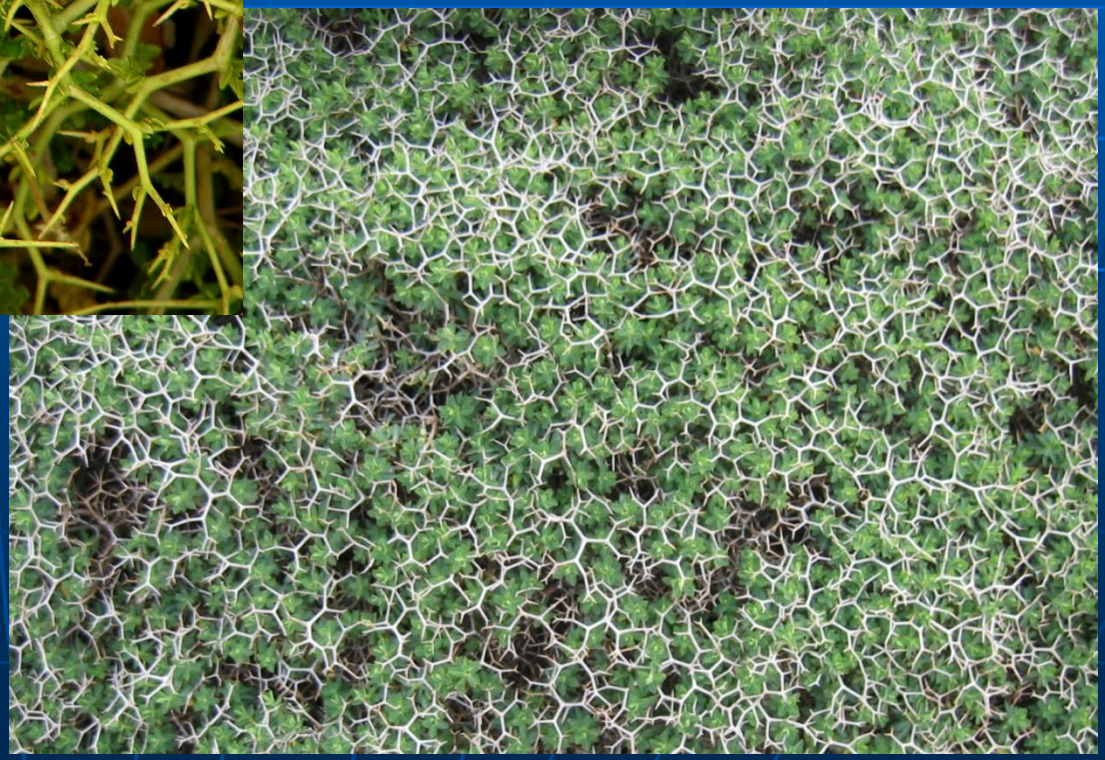
Biological form or Bioform:

plants that belong to the same bioform are plants or group of plants which, regardless of the family that they belong, have the same requirements towards the environment and the same features and strategies of adaptation to similar environmental conditions.

Therefore, they show great similarity in terms of their external form and internal structure.

Notice the resemblance among plants of arid (desert) areas
a) a member of the Cactaceae family (N.America), b**)** *Euphorbia* sp. (succulent) in S. Africa

Euphorbia acanthothamnos και *Sarcopoterium spinosum, although they belong to very different families, they have the same external spiny and stratified vegetative form (bioform).*



Bioforms (Raunkiaer)

- Raunkiaer (1904) based on a single ecological factor, i.e. **the way plants go through the most unfavorable time of the year for them** (ie winter), which determines the position and mainly the height of the meristems baring the renewal buds in relation to the soil surface, distinguished vegetative forms in the following 5 fundamental groups:

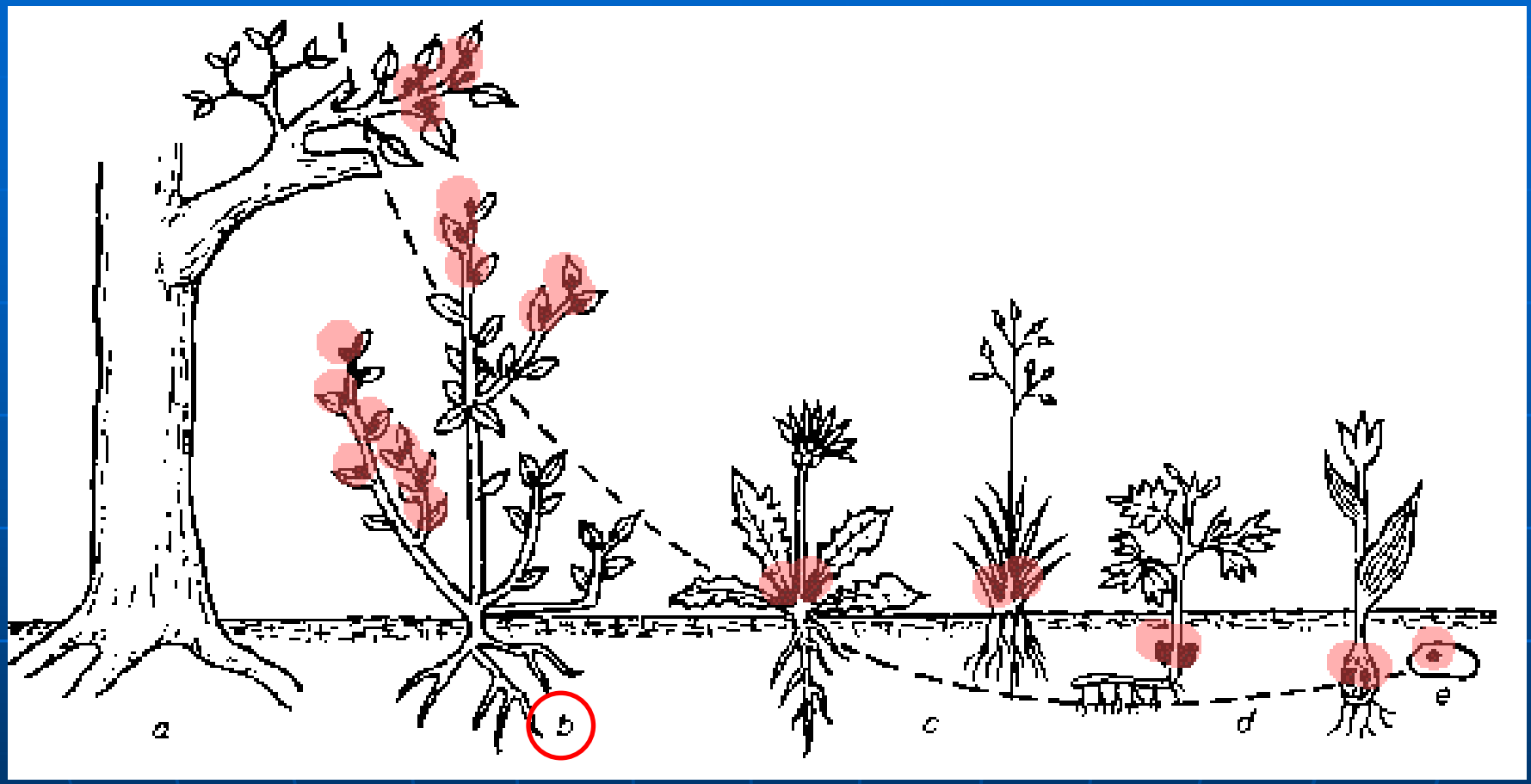
Phanerophytes (Ph): Trees, shrubs and climbing plants

- renewal buds at least 50cm above ground
- having permanent shoots, they develop branches that bear at their ends, at a considerable distance from the ground, renewal buds (to pass the unfavorable season of the year). Two groups:

i) **Megaphanerophytes** (trees) and

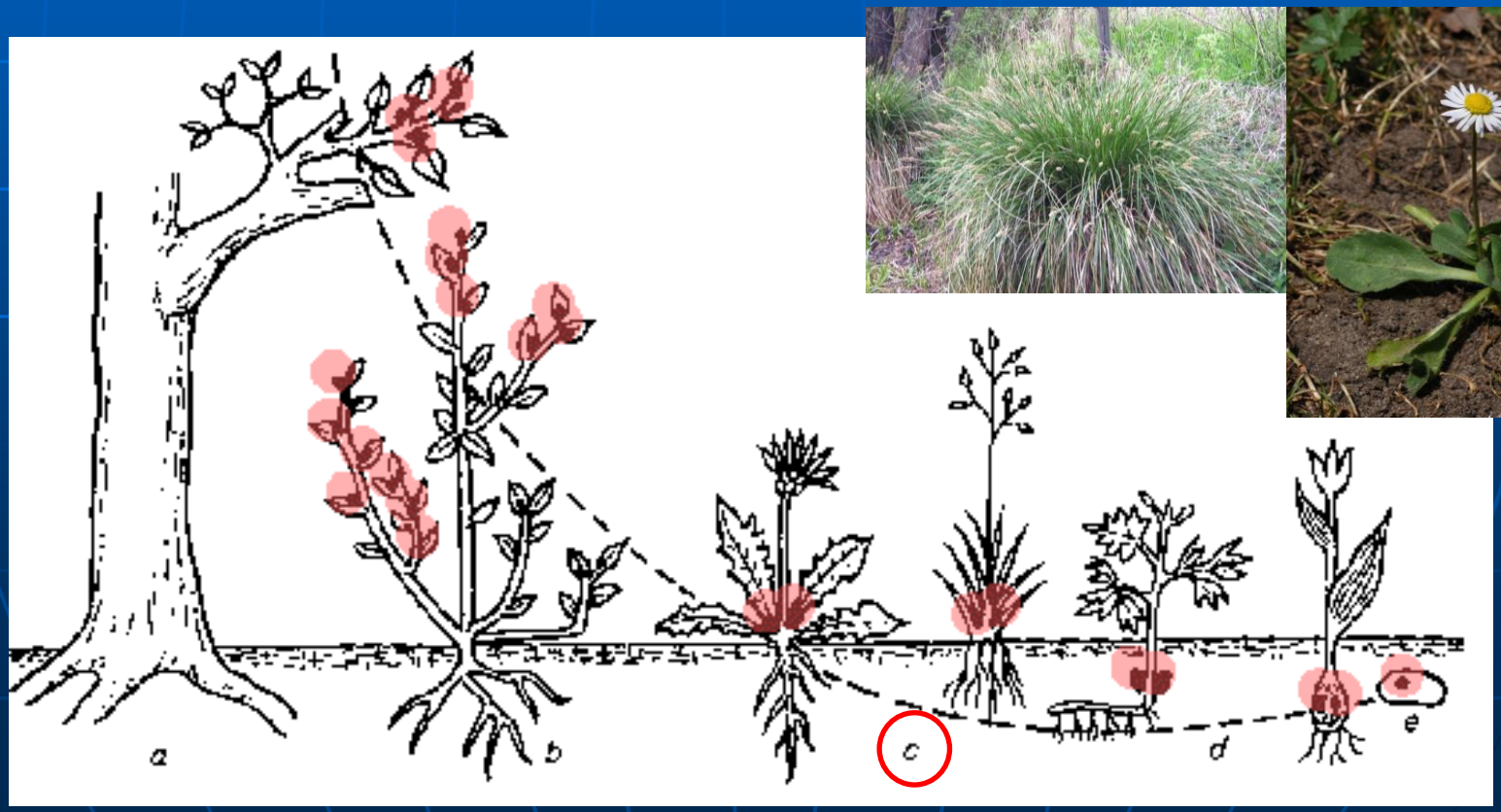
ii) **Nanophanerophytes** (shrubs) (a).

- **Chamephytes (Ch)**: low plants, wintering buds **close to the soil surface** (up to 25cm)..
- They include low shrubs and perennial herbs (ie. *Calluna vulgaris, Phlomis fruticosa, Thymbra capitata, Fumana thymifolia, Salicornia fruticosa, Lotus creticus, Juncus maritimus, Juncus acutus).*



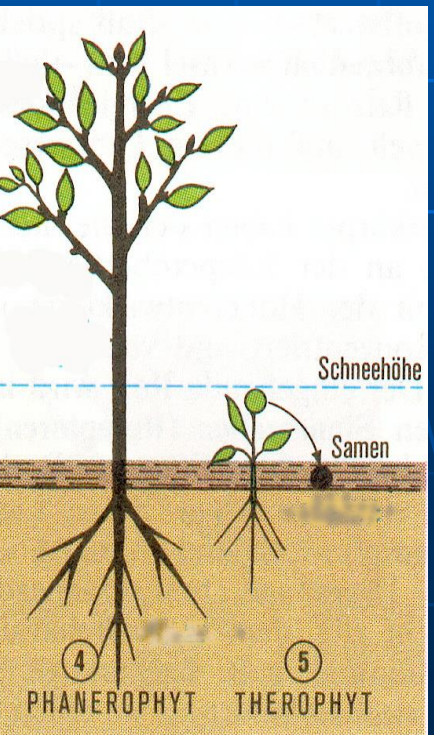
b) Chamephytes (Ch)

- **Hemicryptophytes (H)**: Their above-ground shoots die in the winter, while the overwintering buds are kept alive near the soil surface where are protected by being covered by dry leaves debris. *(Festuca* sp., *Carex* sp., *Primula* sp., *Fragaria vesca, Plantago* sp., *Viola* sp., *Bellis perennis, Taraxacum officinale Campanula* sp., *Geranium* sp., *Vicia* sp., *Lathyrus* sp., *Hedera helix)*



Cryptophytes or Geophytes (C ή G): TTheir above-ground parts die and renewal buds pass through the unfavorable season of the year in **underground vegetative organs**, either deeper in the ground (geophytes) or in the water (hydrophytes, halophytes). Often the groups of Geophytes and Hydrophytes appear as two separate forms (G & Hyd). (ie. *Phragmites australis, Cyclamen* sp., *Corydalis* sp., *Orchis* sp., *Anacamptis* sp., *Convolvulus* sp., *Ornithogalum* sp., *Muscari* sp.)

Therophytes or annual plants (Th): They have a short growing period and they dry before their unfavorable time of the year (summer) before of which they have made sure to leave treir seeds in the ground. When the unfavorable period is short and mild it is possible for the herbaceous plants to survive the summer. They are distinguished into **summer annuals** that bloom in spring and die in late summer, and **winter annuals** that bloom in fall, live in winter, bloom in spring and die in summer.



Aerophytes: these plants ensure the necessary for their survival moisture from wind and rain, usually growing on other plants, but not in a parasitic way ie. *Tillandsia landbeckii*

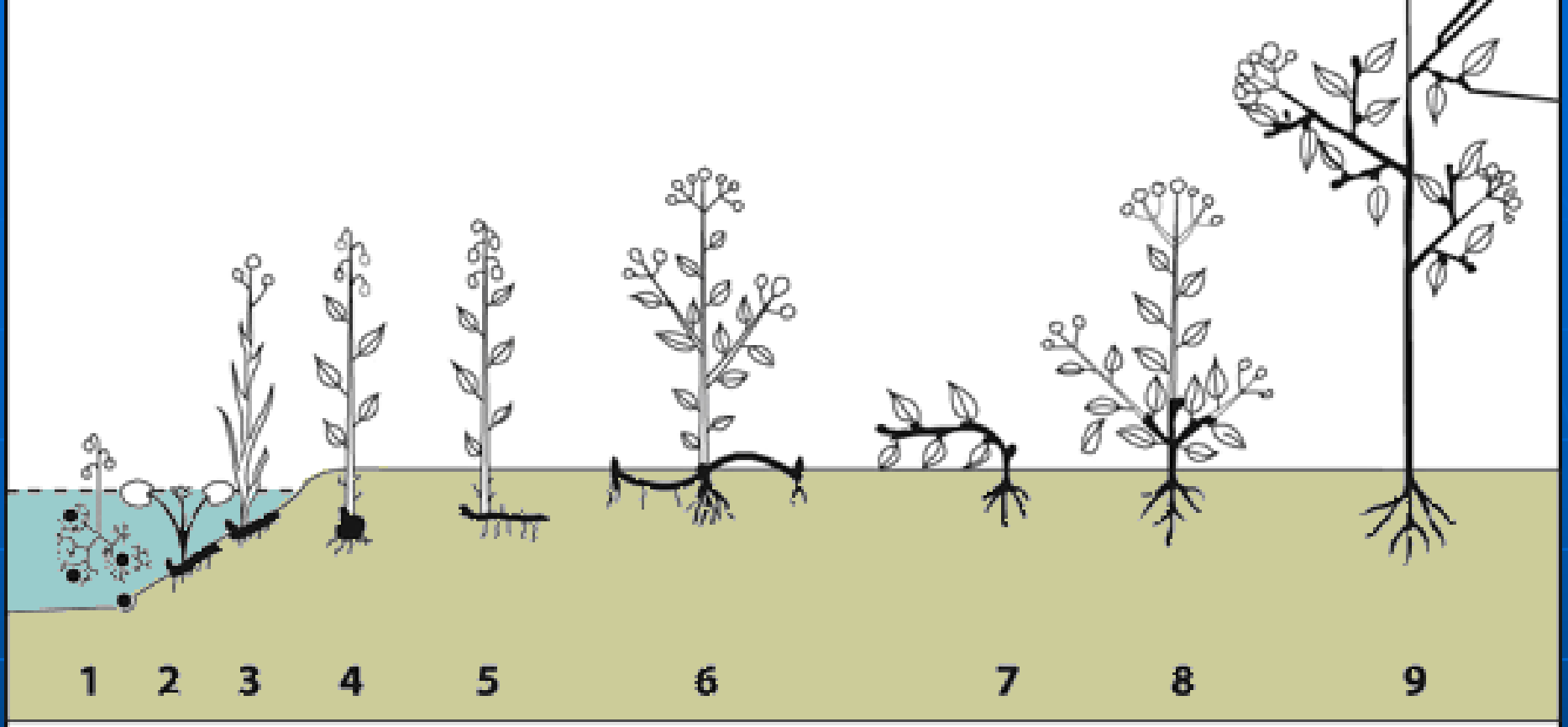


Diagram of the most important life forms based on the classification by Raunkiaer (1934)

1 + 2	Hydrophytes	*(Hydr.)*	water plants
3	Helophytes	*(Helo.)*	winter buds under water flowering plants above water
4 + 5	Crytophytes or geophytes	*(Geof.)*	winter buds below ground
6	Hemicryptophytes	*(Hemi.)*	winter buds above or just below ground
7 + 8	Chamaephytes	*(Cham.)*	winter buds up to 50 cm above ground
9	Phanerophytes	*(Phan.)*	winter buds at least 50 cm above ground (i.e. trees, shrubs and lianes)

	Bioform	Symbol	Subcategory	Symbol
1	Phanerophytes	Ph	Megaphanerophyte Mesophanerophyte Microphanerophyte Nanophanerophyte	MP NP
2	Chamaephytes	Ch	frutose suffruticose velut Στρωματοειδή ποώδη reptant succulent Graminae	Ch frut Ch sufrr Ch vel Ch pulv Ch rept Ch succ Ch grm
3	Hemicryptophytes	H	caespitose rosulate scaposus scandent reptant	H caesp H ros H scap H scand H rept
4	Geophytes or Cryptophytes (Hydrophytes)	G - Hyd	rhizomatose bulbose Ριζοφθαλμοειδή Υδρόφυτα Ελόφυτα	G rhiz G bulb G rad Hyd / Irad Hel
5	Therophytes	T or Th	caespitose rosulate reptant	T caesp T ros T rept

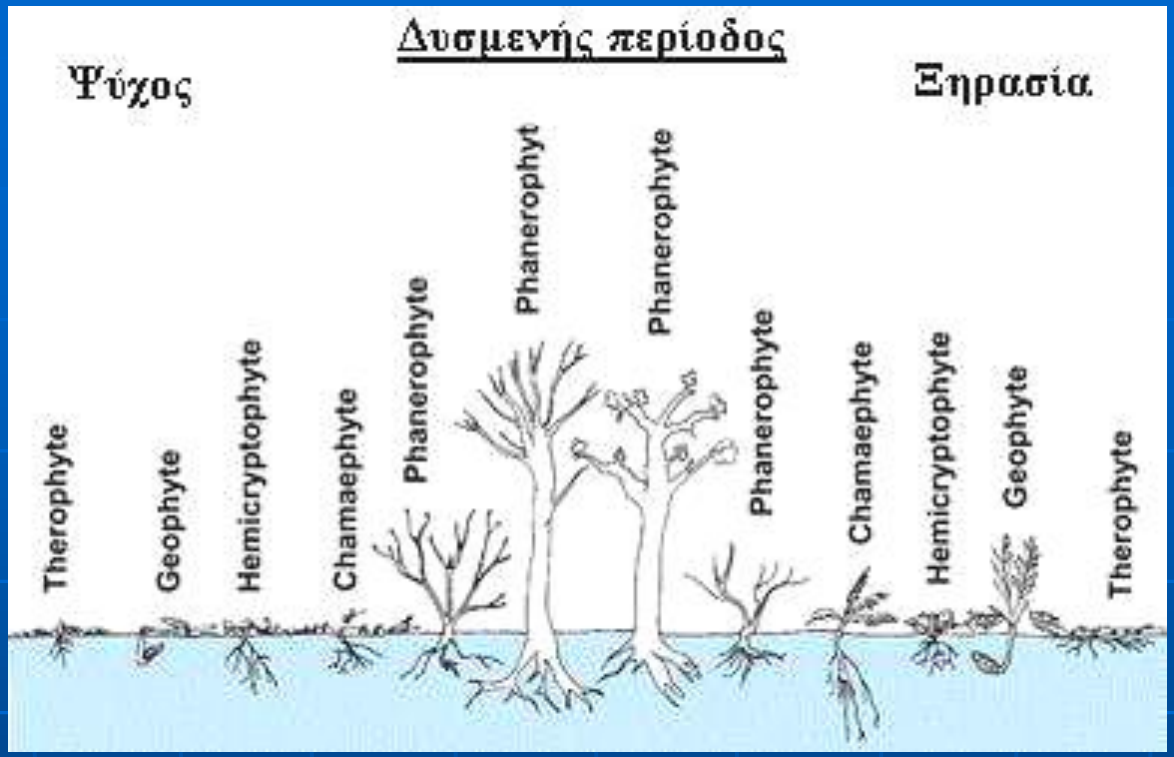
Biological spectrum

The percentage of ‘participation’ of the various bioforms in the total number of flora species of an area constitutes the biospectrum or biological spectrum of the area.

Depending on the climatic conditions of an area, certain bioforms may dominate and in this way the biospectrum reflects the climate type of this area.

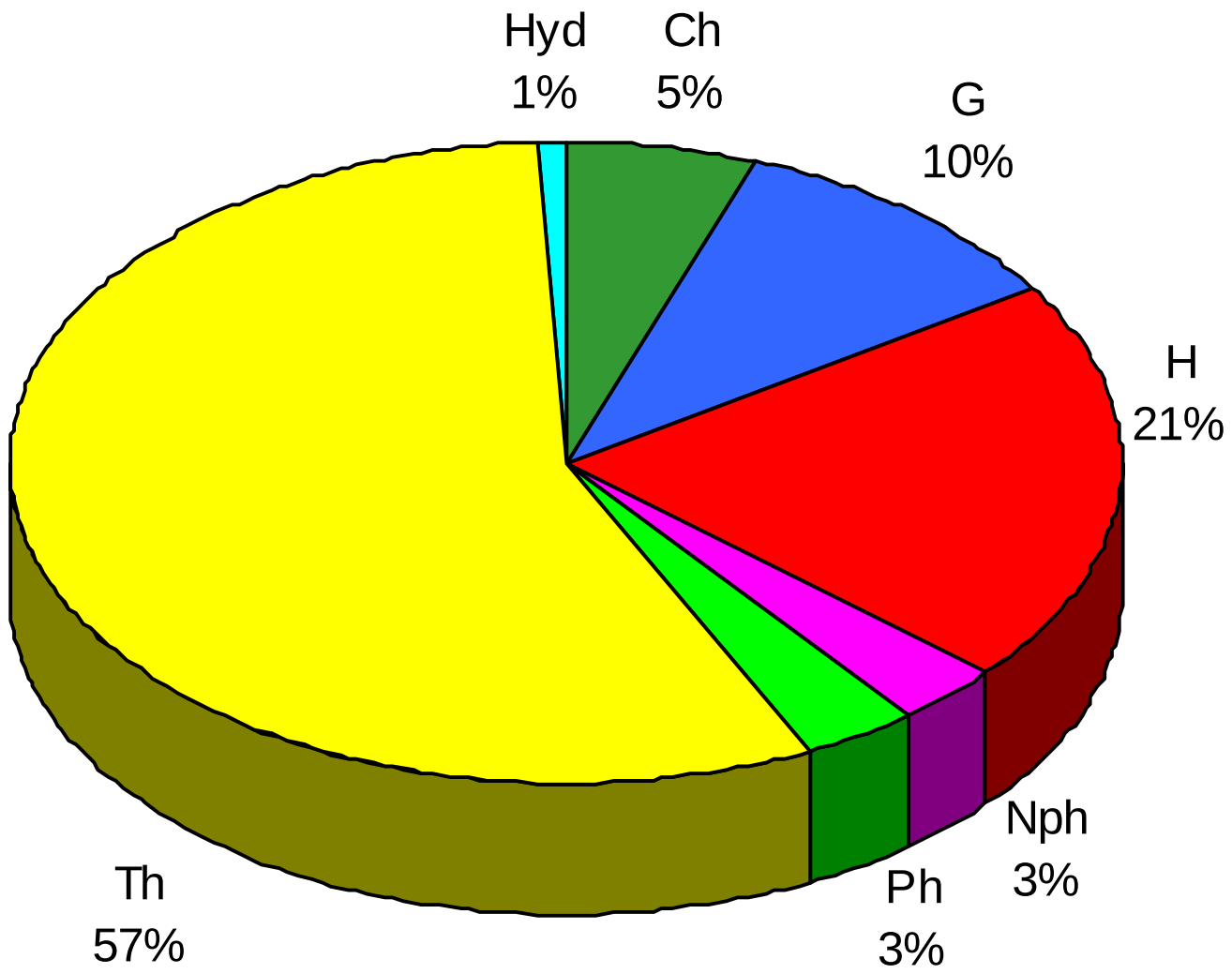
The Ecological meaning of a biological spectrum

- In the para-Mediterranean countries and in desert regions where prolonged summer drought prevails, a high percentage of Therophytes prevails.
- In tropical regions with a uniformly warm and humid climate, Phanerophytes prevai.
- In temperate zone Hemicryptophytes prevail.
- In the cold polar regions and high mountains areas Hemicryptophytes followed by the Chamaephytes prevail (note: the more unfavorable the ecological conditions of a region, the greater the participation of the Chamaephytes).

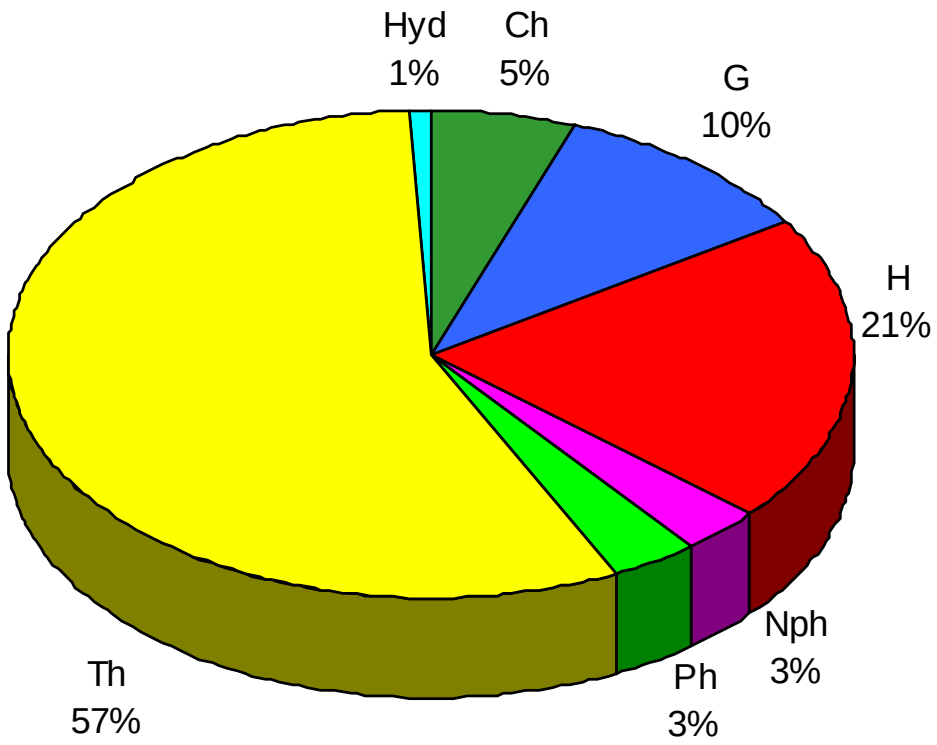


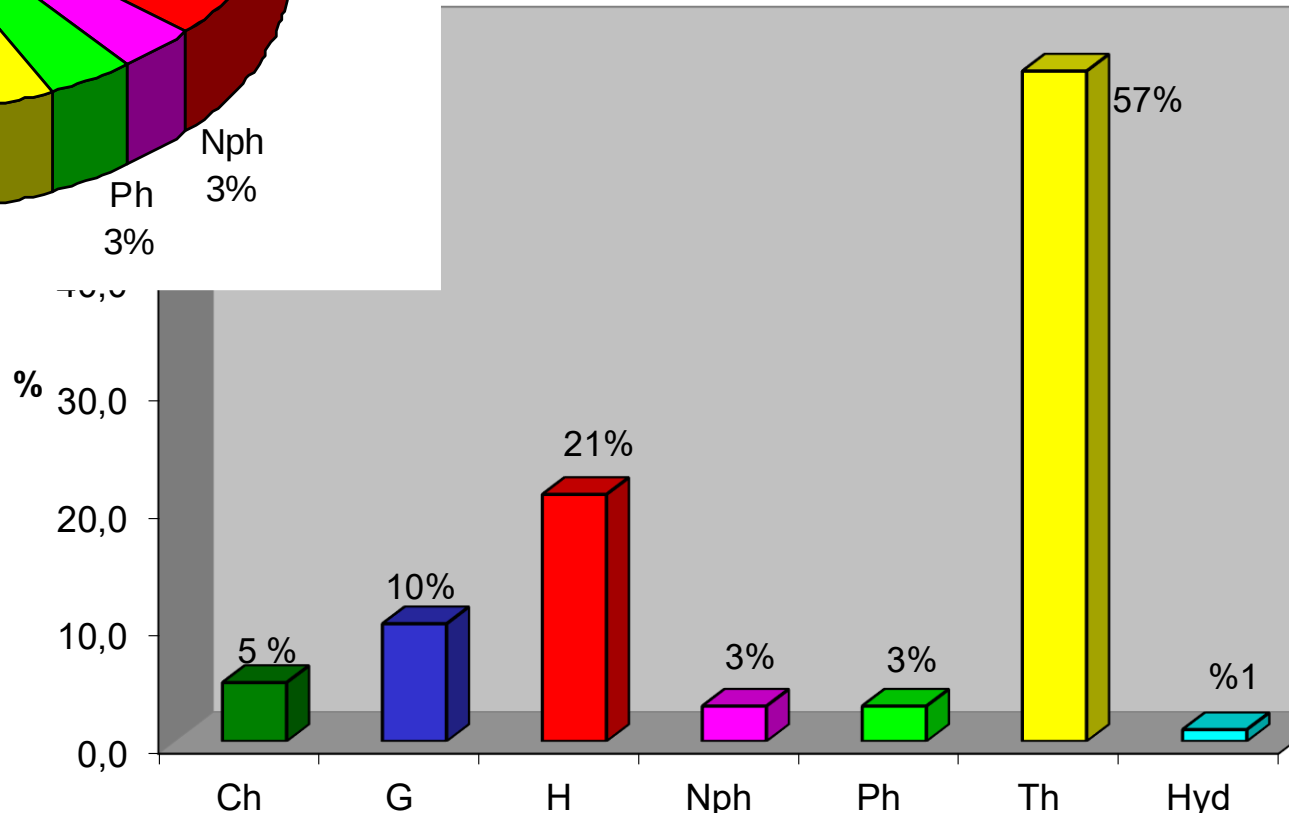
- RAUNKIAER's biospectrum expresses the **floristic diversity** of the biological types within a considered vegetation type.
- The interesting point for an ecologist is the qualitative significance of the biospectrum as the presence or absence of certain categories of biological types (bioforms) is an important characteristic for the vegetation that is being studied.

Example of a biological spectrum



Life-form spectrum





Floristic bioforms of Greek islands and mountains (and one lake)

Βιομορφές	mount Μενοίκιο ΚΑΡΑΓΙΑΝΑΚΙΔΟΥ	mount Βόρας ΒΟΛΙΩΤΗΣ 1979	mount Λαϊλιάς ΒΟΛΙΩΤΗΣ 1976	mount Βέρμιο ΓΚΑΝΙΑΤΣΑΣ 1939	mount Βερτίσκος ΠΑΥΛΙΔΗΣ 1982
Φανερόφυτα	9.98	9.6	12.2	14.8	11.2
Χαμαίφυτα	9.80	7.1	7.7	13.8	5.2
Ημικρυπτόφυτα	54.26	56.6	54.3	33.0	41.5
Γεώφυτα	6.17	11.0	12.0	15.8	10.3
Θερόφυτα	19.78	14.2	13.2	20.8	20.0

Βιομορφές	mount Χολομωντας ΒΟΛΙΩΤΗΣ 1967	lake η Πρέσπα ΠΑΥΛΙΔΗΣ 1985	Isl. ; Παξοί ΓΕΩΡΓΙΑΔΗΣ et al. 1986	Isl. ; Σκιάθος ΕΚΟΝΟΜΙΔΟΥ 1969	Isl. ; Κύθηρα ΓΙΑΝΝΙΤΣΑΡΟΣ 1969
Φανερόφυτα	15.0	9.53	12.18	8.3	7.61
Χαμαίφυτα	7.7	5.20	7.59	7.1	10.93
Ημικρυπτόφυτα	31.4	47.96	21.38	25.0	17.15
Γεώφυτα	15.3	7.61	11.50	12.3	11.48
Θερόφυτα	26.3	23.70	47.35	44.6	52.00

Βιοφάσματα ελλαδικού χώρου και κλιματικών ζωνών βλαστήσεως

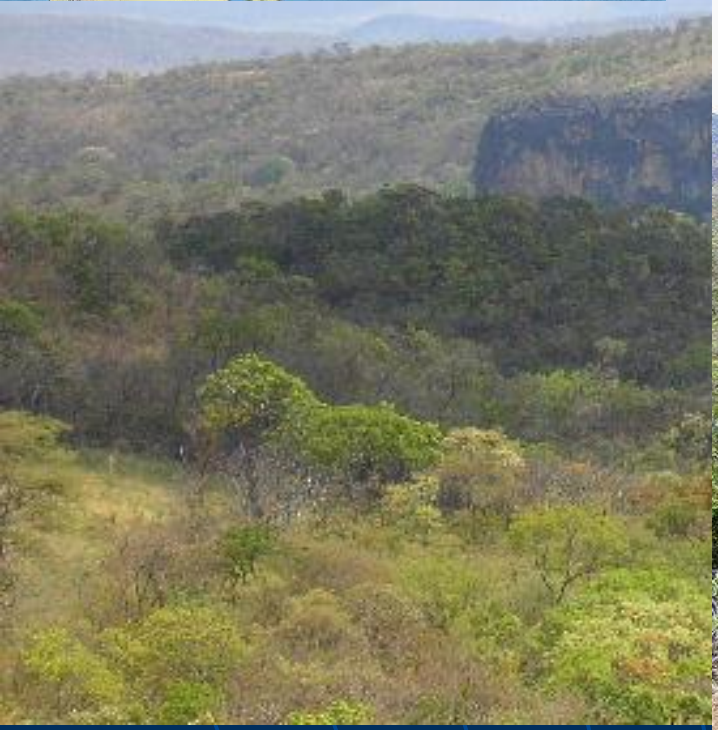
Ερευνηθείσες περιοχές	Th	H	G	Ch	Ph	HH	EA	Ερευνητής
1. Ελλαδικός χώρος								
α. Νησιά								
Σύρα	51,41	22,42	12,77	7,79	5,45	0,16	–	Σαρλής (1994)
Νήσοι νότιου Ευβοϊκού	48,73	23,17	11,81	10,31	5,98	–	–	Σαρλής (1981)
Εύβοια	35,30	42,80	8,40	9,70	3,80	–	–	Φοίτος (1960)
Κρήτη	38,30	27,10	10,20	13,30	9,00	2,10	–	Turrill (1929)
Σκιάθος	44,60	25,00	12,30	7,10	8,30	1,80	0,90	Οικονομίδου (1969)
Σκόπελος	47,40	18,50	12,60	10,10	8,90	1,30	1,20	Οικονομίδου (1973)
Σάμος	33,00	32,00	11,00	13,00	9,00	2,00	–	Raunkiaer (1934)
Σάμος	41,50	23,70	15,30	10,00	8,70	0,80	–	Χριστοδουλάκης (1986)
Νίσυρος	54,54	16,83	9,53	9,31	9,98	–	–	Παπάτσου (1975)
Αγκίστρι	53,94	19,24	8,83	10,09	7,88	–	–	Στεφανάκη (1982)
Κύθηρα	52,00	17,15	11,48	10,93	7,61	0,83	–	Γιαννίτσαρος (1969)
Ψαρά	65,80	16,30	8,50	7,90	1,50	–	–	Greuter (1976)
Παξοί	47,35	21,38	11,50	7,59	12,18	–	–	Georgiadis *et al.* (1986)
β. Χερσόνησοι								
Κασσάνδρας	49,46	25,97	8,55	6,69	8,86	0,47	–	Λαυρεντιάδης (1961)
Σιθωνίας	41,73	30,07	8,98	7,90	9,34	1,89	0,09	Παυλίδης (1976)
γ. Ορεινές περιοχές								
Αιγάλεω	40,41	24,38	11,96	10,84	12,41	–	–	Σαρλής (1980)
Χολομώντας	26,30	31,40	15,30	11,80	15,00	–	0,20	Βολιώτης (1967)
Ορβηλος (Λαϊλιάς)	13,20	54,30	12,00	7,70	12,20	0,40	0,20	Βολιώτης (1977)
Βέρμιο	20,80	33,00	15,80	13,80	14,80	1,40	0,40	Γκανιάτσας (1955)
Δρυμός Πρεσπών	23,70	47,96	7,61	5,20	9,53	6,00	–	Παυλίδης (1985)
Βόρρας	14,20	56,60	11,00	7,10	9,60	1,30	–	Βολιώτης (1979)
Βερτίσκος	30,00	41,50	10,30	5,20	11,20	1,70	0,10	Παυλίδης (1982)
2. Κλιματικές ζώνες βλαστήσεως								
Τροπική : Σεϋχέλες	16,00	12,00	5,00	6,00	61,00	–	–	Raunkiaer *et al.* (1934)
Ερήμων : Κυρηναϊκή	50,00	19,00	8,00	14,00	9,00	–	–	Raunkiaer *et al.* (1934)
Παραμεσόγειος : Ιταλία	42,00	29,00	11,00	6,00	12,00	–	–	Raunkiaer *et al.* (1934)
Παραμεσόγειος : Παλαιστίνη	51,00	23,00	13,00	7,00	5,50	–	–	Raunkiaer *et al.* (1934)
Εύκρατος : Στουτγάρδη	17,00	54,00	17,00	3,00	9,00	–	–	Raunkiaer *et al.* (1934)
Αρκτική : Σπιτσβέργη	2,00	60,00	15,00	22,00	1,00	–	–	Raunkiaer *et al.* (1934)

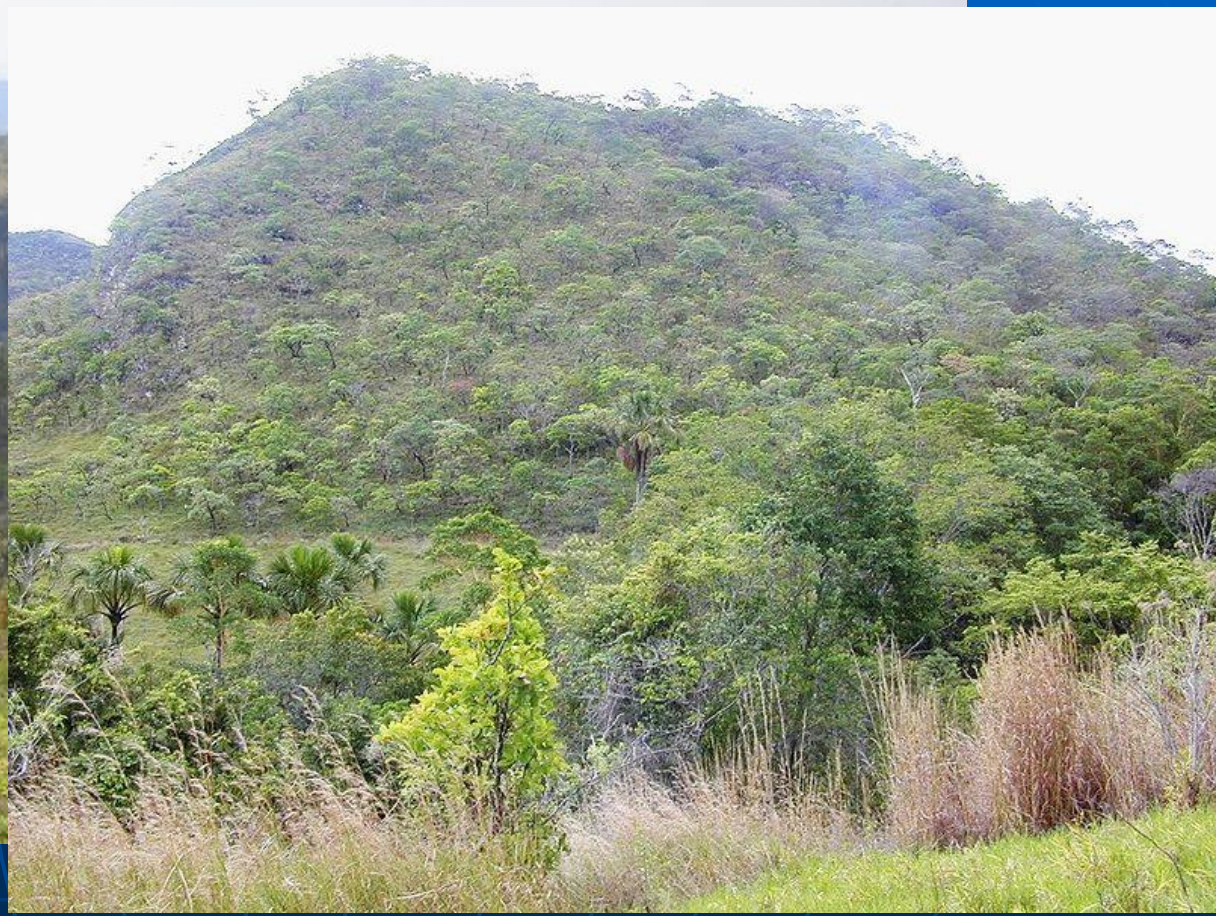
Vegetative spectrum of Patras' flora

Vegetative forms	Number of taxa	%
Θερόφυτα (Th)	433	53
Θ. βλαστοειδή (Thscap)	398	48,7
Θ. θυσανοειδή (Thcaesp)	8	1
Θ. έρποντα (Thrept)	19	2,3
Θ. ροδακοειδή (Thros)	1	0,1
Θ. παρασιτικά (Thpar)	7	0,9
Ημικρυπτόφυτα (H)	173	21,1
Η. βλαστοειδή (Hscap)	85	10,4
Η. θυσανοειδή (Hcaesp)	26	3,2
Η. έρποντα (Hrept)	5	0,6
Η. ροδακοειδή (Hros)	15	1,8
Η. διετή (Hbienn)	40	4,9
Η. αναρριχώμενα (Hscand)	2	0,2
Γεώφυτα (G)	99	12,1
Γ. βολβώδη (Gbulb)	45	5,5
Γ. ριζωματώδη (Grhiz)	53	6,5
Γ. με ριζικούς οφθαλμούς (Grad)	1	0,1
Χαμαίφυτα (Ch)	31	3,8
Χ. ημιθαμνώδη (Chsuffr)	18	2,2
Χ. θαμνώδη (Chfrut)	8	1
Χ. έρποντα (Chrept)	3	0,4
Χ. σαρκώδη (Chsucc)	2	0,2
Νανο-φανερόφυτα (Nph)	19	2,3
Φανερόφυτα (Ph)	59	7,2
Φ. δενδρώδη (Phscap)	22	2,7
Φ. θαμνώδη (Phcaesp)	25	3,1
Φ. αναρριχώμενα (Phlian)	11	1,3
Φ. σαρκώδη (Phsucc)	1	0,1
Υδρόφυτα (Hyd)	4	0,5
Υ. ριζωμένα (Hydrad)	4	0,5
Σύνολο	818	100

The high proportion of therophytes is attributed to the long dry season and to a lesser extent to the "city" factor where a warmer and drier microclimate than the countryside exists

Life-forms	Life-form spectra		
	Floristic	Frequency	Vegetation
Ph	66.37	65.70	35.46
Ch	11.50	10.08	23.85
H	18.58	19.19	34.61
Cr	1.77	0.39	0.07
H + Cr	20.35	19.58	34.68
Th	1.77	4.65	6.00





Cerrado (Brazil, Paraguay, Bolivia), subhumid tropical climate

Chorology

1) Trying to interprete the distribution range of a species is a historical problem (geology, paleogeography, paleontology, and paleoclimatology data are required)

2) Effect of ecological conditions and competition

3) Interpreting the distribution of a species is also a genetic problem

Chorological analysis– Chorological spectrum

The distribution area of a plant taxon, i.e. the geographical limits within which it occurs, is the result of the combination of several factors, such as:

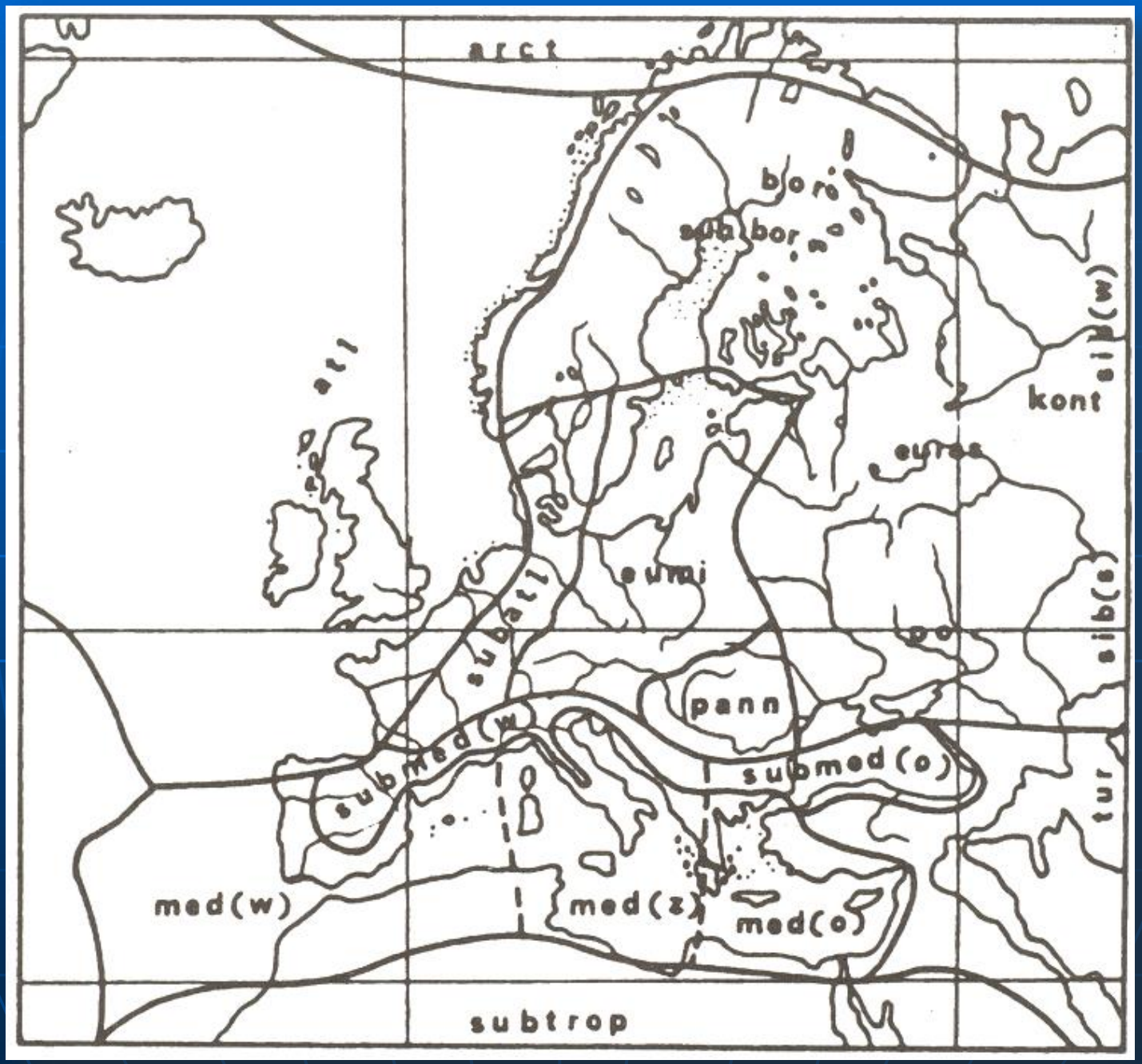
- the genome of each species and its ability to thrive,
- the ecological conditions that prevail,
- climate and soil

Also, human activity affects significantly the distribution pattern of plants, increasing or reducing their limits.

- To facilitate the study of the distribution of higher plants, the concept of **chorological unit** was introduced.
- Each chorological unit includes some *broad areas of the Globe* in which each taxon may be found.

This grouping is quite rough, therefore conclusions extracted by it are not so clear as well.

Chorology of Europe



Cosmop., Subcosmop.: Taxa with a transcontinental distribution without significant gaps and without a specific center of geographic origin. The sub-cosmopolitans appear in almost all zones of the world, but with significant gaps.

Tropical, Subtropical: The main distribution area is the subtropical, tropical and warm zones.

Temperate: Taxa, spreading in the climatically temperate regions of Europe, Asia and N. Africa.

Circumboreal: Northern taxa distributed in the cold and temperate zone of Europe, Asia and N. Africa.

Eurasiatic: Taxa with an intercontinental distribution, including large areas of Europe and Asia without being concentrated in the Mediterranean area. Here taxa with a geographical distribution in the Caucasus and the region around the Black Sea (Europ.Pont.) have also been included.

European: Taxa, which have the European area as a center of distribution, outside the Mediterranean region.

Main Chorological groups

Balkan: Taxa of the Balkan peninsula countries

Greek endemic: **Taxa occuring exclusively in Greece**

Mediterranean: Taxa spreading to the borders of the Mediterranean basin (Med.). St.Med, narrow-Mediterranean taxa with a geographical distribution limited to the Mediterranean coasts. Eu.Med., wide (spread)-Mediterranean species that also spread towards the mainland. Other species are restricted to the southern part of the Mediterranean basin (S. Med.) and others to the east (E. Med.).

Med.-Atl., Med.-Turan, Eu.Med. etc: some 'bilocal' taxa, one area of distribution of is the Mediterranean and the other is adjacent to the Mediterranean area (e.g. Medit. - Turan.).

Adventive, Cultivated: foreign plants which ended up in Greece either by accident or because they 'escaped' from cultivation (semi-native). Most of these are crop weeds, growing on roadsides, settlements and generally in habitats affected by humans.

Chorological unit	Chorological elements
Cosmopolitan	Cosmop.
Subcosmppolitan	Subcosmop., Subcosmop.-Subtropic.
Tropical – Subtropical	Paleosubtrop., Saharo-Sind.
Temperate	Temp., Palaeotemp.
Circumboreal	Circumbor.
Eurasiatic	Eurasiat., Europ-Caucas., Eurosiber., Eurasiat.-Temp., Eurasiat.-Circumbor.
European	Europ.,SE-Europ.
Balkan	Balkan
Greek endemic	Greek endemic
Steno-Mediterranean	St.-Med., S-Med., NEMed., N-St.Med., N.Med.
Eurimediterranean	Eu-Med., Med.
Eastmediterranean	E-Med., E-St.Med.
Mediterranean – Outside of the Mediterranean region	Med.-Atl., Eu.Med.-Atl., Med.-Makarones, Med.-Makarones & Messico, Med.-Turan, Eu-Med.-Turan, N.Med.-Turan, E.Med.-Turan, Eu.Med.-Subpont., Eu.Med. & Sudafr., Med.-Subatl.
Adventive /Cultivated	Adv., Cult.

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Geospatial Conservation Assessment Tool

Perform rapid geospatial analysis of species in a simple and powerful way.

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Simplified process, usable tool

1. Create a report from scratch or upload your previous work.
2. Manage your species data sources and work directly on the map.
3. Download or print your report and start sharing it.

Harnessing multiple data sources

GeoCAT synchronizes with GBIF and Flickr to display raw occurrence data.

Performs extent of occurrence (EOO) and area of occupancy (AOO) analysis.

Red List assessment compliant

Endorsed by Kew Gardens, ViBRANT and IUCN, GeoCAT supports the Red Listing process to help identify and conserve threatened species.

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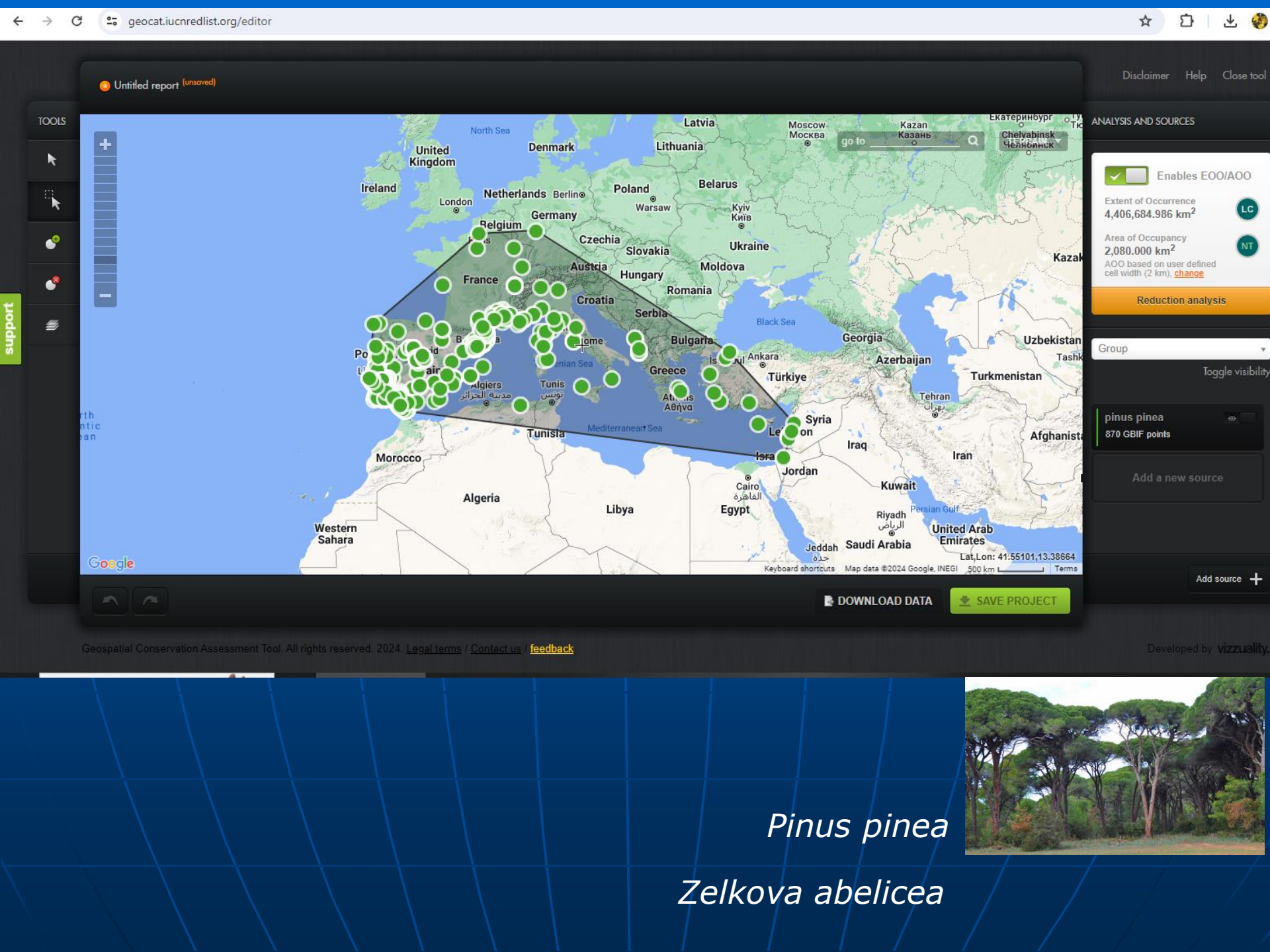
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Enables EOO/AOO
Extent of Occurrence
4,406,684.986 km²
LC
Area of Occupancy
2,080.000 km²
NT
AOO based on user defined cell width (2 km), change
Reduction analysis
Group
Toggle visibility
pinus pinea
870 GBIF points
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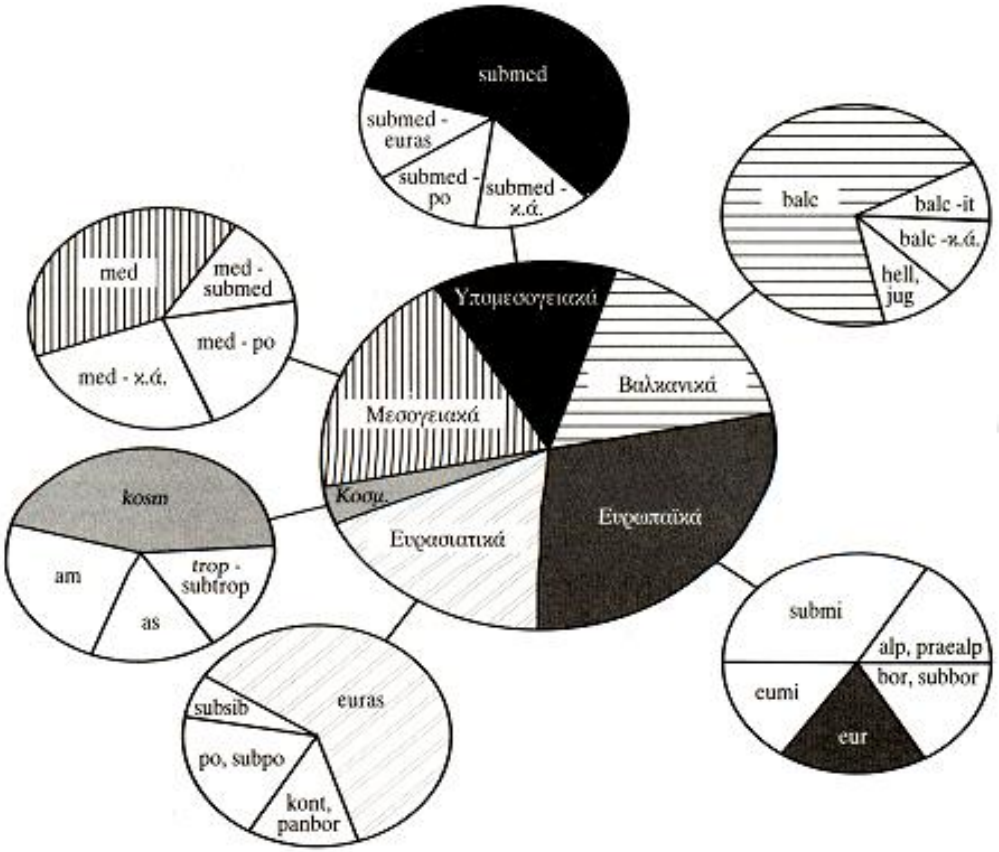
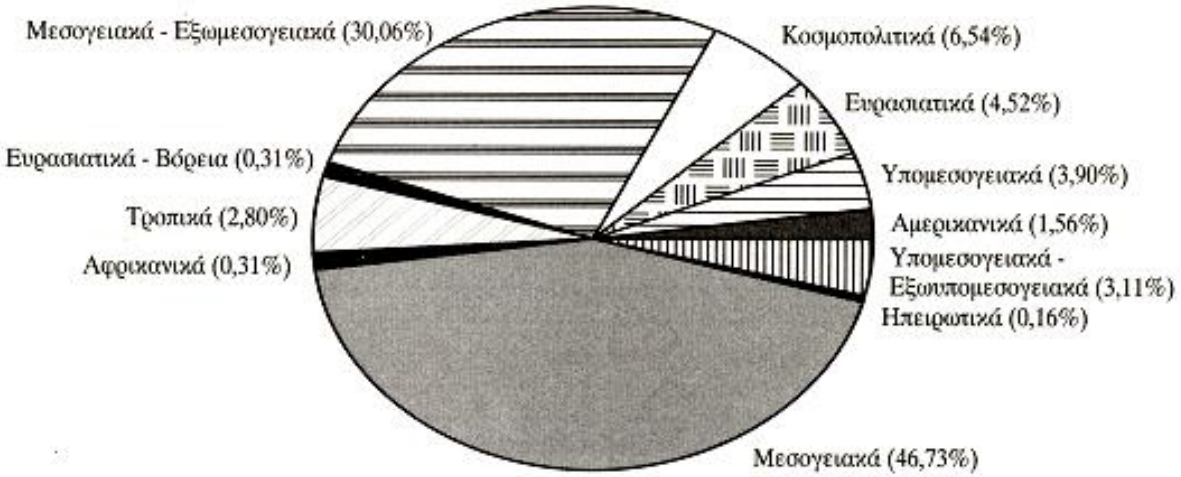
Pinus pinea
Zelkova abelicea

Categories of chorological elements of a random Mediterranean area

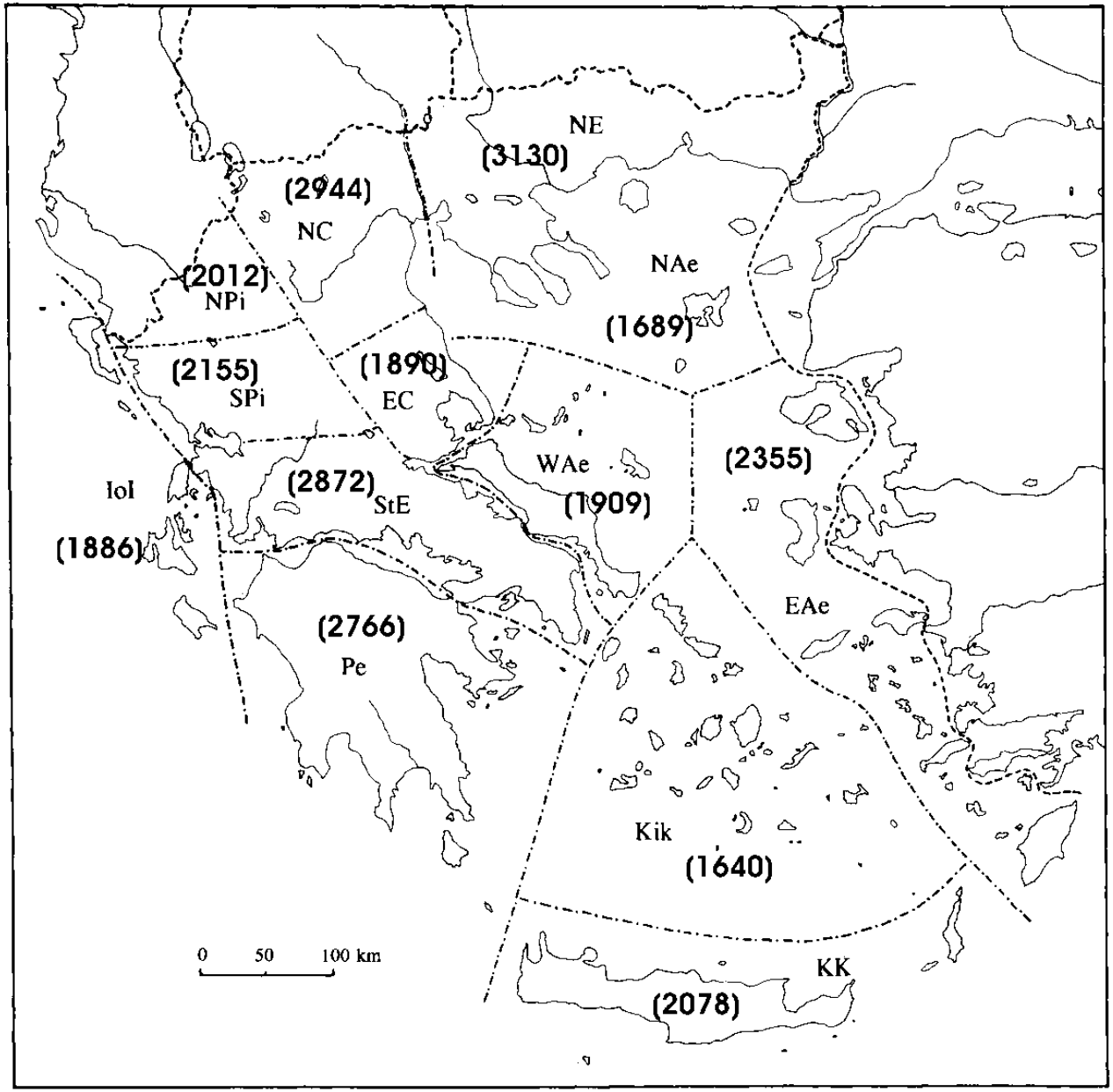
Χωρολογικά στοιχεία κατά κατηγορία	Taxa	Ποσοστό %	Κατηγορίες	
			Taxa	%
ΜΕΣΟΓΕΙΑΚΑ:				
med	185	28,82		
omded	86	13,40		
hell	10	1,55		
aeg	17	2,65		
wmed	2	0,31	300	46,73
ΜΕΣΟΓΕΙΑΚΑ-ΕΞΩΜΕΣΟΓΕΙΑΚΑ:				
med-atl	26	4,05		
med-subatl	1	0,15		
med-euras	7	1,09		
med-kont	30	4,67		
med europkont	3	0,48		
med-submed	90	14,01		
med-submed-atl	2	0,31		
med submed-subatl	7	1,09		
med-submed-euras	2	0,31		
med-submed-kont	4	0,62		
med-submed-europkont	1	0,16		
omed-osubmed	20	3,12	193	30,06
ΥΠΟΜΕΣΟΓΕΙΑΚΑ:				
submed	24	3,74		
osubmed	1	0,16	25	3,90
ΥΠΟΜΕΣΟΓΕΙΑΚΑ-ΕΞΩΥΠΟΜΕΣΟΓΕΙΑΚΑ:				
submed-euras	3	0,48		
submed-subatl	10	1,56		
submed-eurossubocean	2	0,31		
submed-euraskont	1	0,15		
submed-kont	1	0,15		
ossubmed-europkont	2	0,31		
osubmed-euras	1	0,15	20	3,11
ΕΥΡΑΣΙΑΤΙΚΑ:				
euras	24	3,74		
subatl	2	0,31		
eurassubocean	1	0,16		
as	2	0,31	29	4,52
ΕΥΡΑΣΙΑΤΙΚΑ-ΒΟΡΕΙΑ:				
euras-no	2	0,31	2	0,31
ΗΠΕΙΡΩΤΙΚΑ:				
kont	1	0,16	1	0,16
ΤΡΟΠΙΚΑ:				
paleotrop	2	0,31		
paleosubtrop	12	1,86		
subtrop	3	0,48		
pantrop	1	0,15	18	2,80
ΚΟΣΜΟΠΟΛΙΤΙΚΑ:				
kosm	20	3,12		
subkosm	22	3,42	42	6,54
ΑΜΕΡΙΚΑΝΙΚΑ:				
nam	5	0,78		
sam	5	0,78	10	1,56
ΑΦΡΙΚΑΝΙΚΑ:				
safr	2	0,31	2	0,31
Σύνολο	642	100,00	642	100,00

Χωρολογικά στοιχεία κατά κατηγορία	Taxa	Ποσοστό %	Κατηγορίες	
			Taxa	%
Μεσογειακά: med	50	7,1		
med (o)	49	6,9		
med (z, w) eumed	12	1,7	111	15,7
Μεσογειακά - Εξωμεσογειακά:				
med-submed	17	2,4		
med-atl, pont, subatl	23	3,3		
med- et als	24	3,4	64	9,1
Ενδοβαλκανικά:				
balc	55	7,7		
hell, aeg	16	2,3	71	10,0
Υπομεσογειακά:				
submed	62	8,8		
submed (o,z,n)	21	3,0		
submed-subatl	10	1,4		
submed - et als	13	1,8	106	15,0
Ευρωπαϊκά-Μεσοευρωπαϊκά:				
eumi	28	3,9		
submi	47	6,7		
eur	34	4,8		
Διαφόρων περιοχών	26	3,7	135	19,1
Ευρασιατικά-Ηπειρωτικά:				
euras	91	12,9		
subpont	21	3,0		
kont	16	2,2		
Διαφόρων περιοχών	31	4,4	159	22,5
Βόρεια: bor	7	1,0		
subbor	10	1,4		
panbor, scanden	4	0,6	21	3,0
Κοσμοπολιτικά:				
kosm	14	2,0		
kosm (s.s.)	9	1,2	23	3,2
Αμερικανικά-Τροπικά:				
am, am (n, w, s)	11	1,5		
trop, subtrop	6	0,9	17	2,4
Σύνολο	707	100,0	707	100,0


submed
submed - euras
submed - po
submed - κ.ά.
balc
balc -it
balc -κ.ά.
hell, jug
med
med - submed
med - po
med - κ.ά.
Υπομεσογειακά
Βαλκανικά
Μεσογειακά
Κοσμ.
Ευρασιατικά
Ευρωπαϊκά
kosm
am
trop - subtrop
as
submi
alp, praealp
bor, subbor
eumi
eur
euras
subsib
po, subpo
kont, panbor


Μεσογειακά - Εξωμεσογειακά (30,06%)
Κοσμοπολιτικά (6,54%)
Ευρασιατικά (4,52%)
Ευρασιατικά - Βόρεια (0,31%)
Υπομεσογειακά (3,90%)
Τροπικά (2,80%)
Αμερικανικά (1,56%)
Αφρικανικά (0,31%)
Υπομεσογειακά - Εξωυπομεσογειακά (3,11%)
Ηπειρωτικά (0,16%)
Μεσογειακά (46,73%)

Phytogeographical regions of Greece

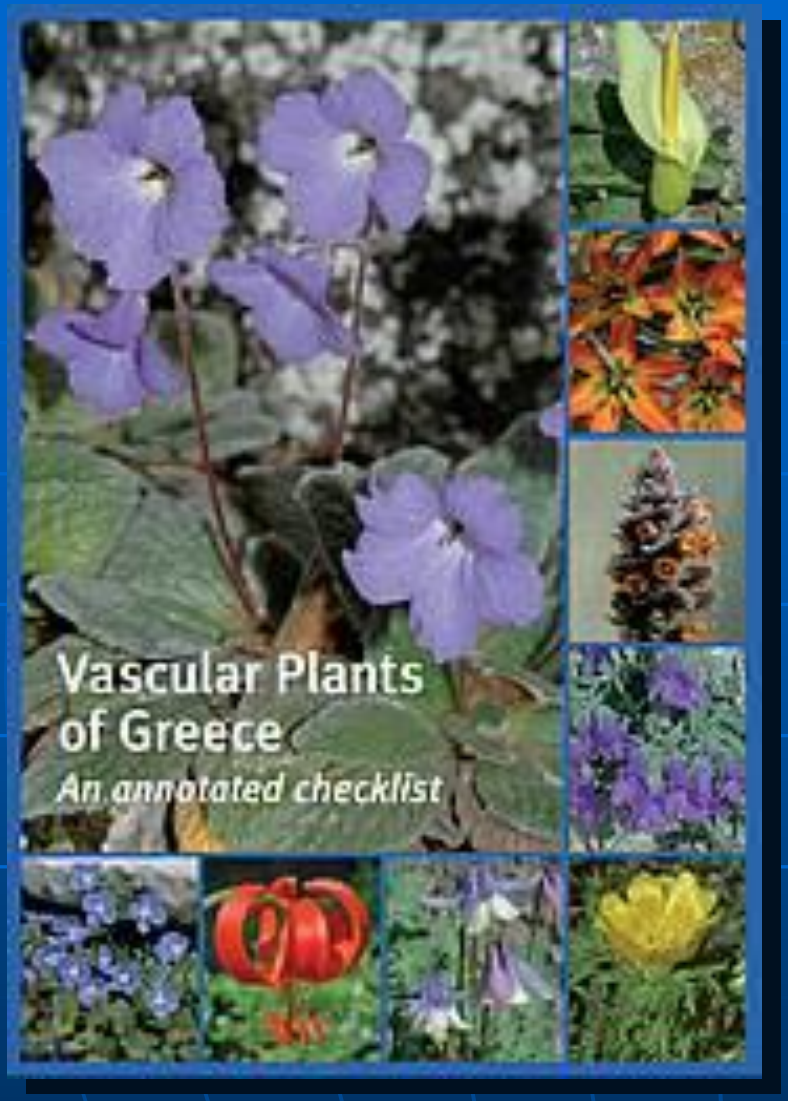


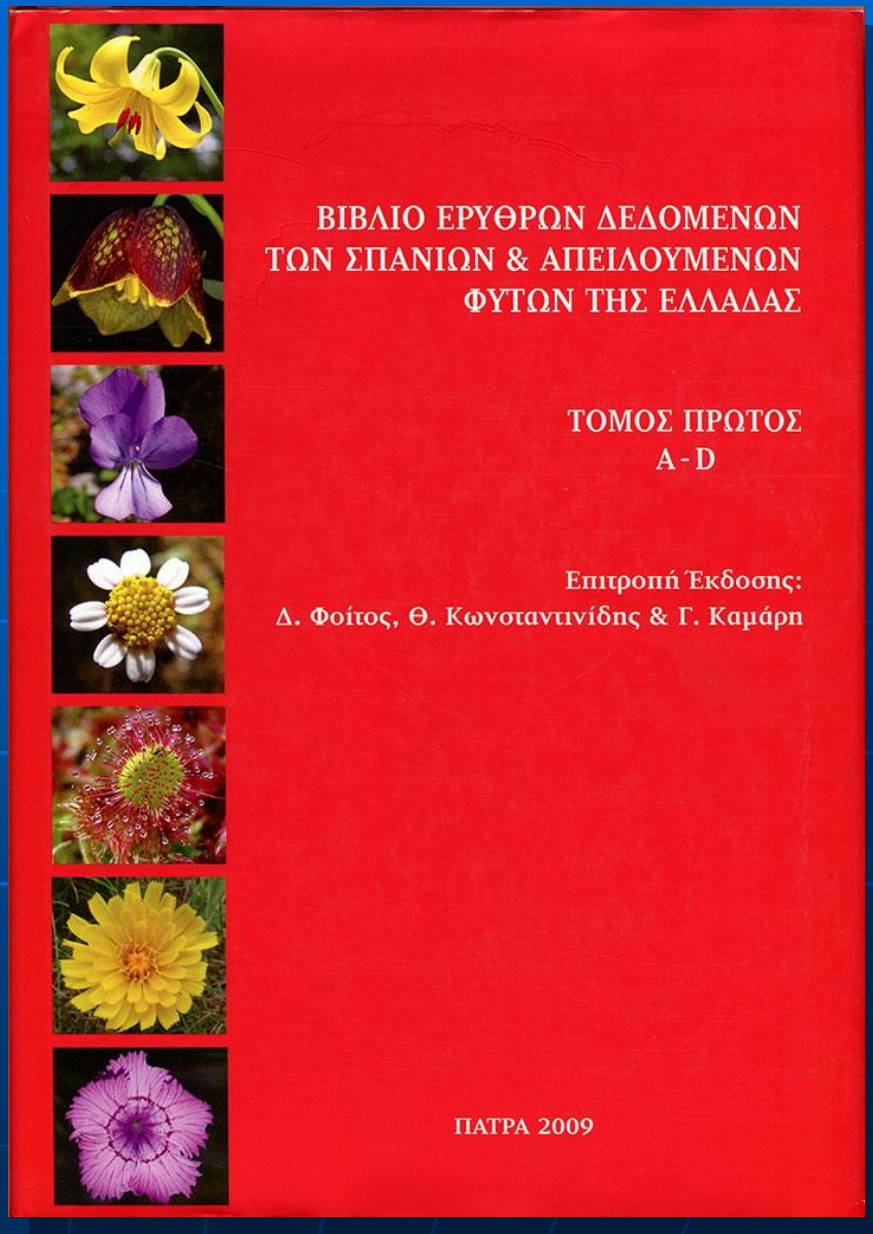
ENDEMISM

- The first biological study of the phenomenon of endemism, although without the use of the term, is attributed to Darwin and his observations of species at oceanic islands and the study of their affinities with those of the American continent.
- The concept of endemism is linked to the concept of area occupied by a systematic unit (species, genus, etc.) and cannot be defined in an absolute way (relative concept).
- A systematic unit (ie. a taxon) may be characterized as endemic, if its geographical distribution is less than the average area of distribution of the corresponding hierarchical classification levels.

- In November 2023, the vascular flora of Greece comprises of **6846 taxa** (5959 species and 2013 subspecies)
- Belonging to 1093 genera and 184 families
- 1350 taxa endemic in Greece (19.5% of total flora)

https://portal.cybertaxonomy.org/flora-greece/content





Τα Chorological data play an important role in the creation of 'Red Books' (at country level) and in more local ones for the assessment of plant diversity.

http://www.iucn.org/about/union/secretariat/offices/europe/?14186/

Chorological elements site A

Create the simple (numerical participation of species in each category) and the complex (percentage of species in each category) biospectrum and geographical spectrum of the flora of Research area A

Χωρολογικά στοιχεία κατά κατηγορία	Taxa	Ποσοστό %
ΜΕΣΟΓΕΙΑΚΑ:		
med	185	28,82
omded	86	13,40
hell	10	1,55
aeg	17	2,65
wmed	2	0,31
ΜΕΣΟΓΕΙΑΚΑ-ΕΞΩΜΕΣΟΓΕΙΑΚΑ:		
med-atl	26	4,05
med-subatl	1	0,15
med-euras	7	1,09
med-kont	30	4,67
med europkont	3	0,48
med-submed	90	14,01
med-submed-atl	2	0,31
med submed-subatl	7	1,09
med-submed-euras	2	0,31
med-submed-kont	4	0,62
med-submed-europkont	1	0,16
omed-osubmed	20	3,12
ΥΠΟΜΕΣΟΓΕΙΑΚΑ:		
submed	24	3,74
osubmed	1	0,16
ΥΠΟΜΕΣΟΓΕΙΑΚΑ-ΕΞΩΥΠΟΜΕΣΟΓΕΙΑΚΑ:		
submed-euras	3	0,48
submed-subatl	10	1,56
submed-eurossubocean	2	0,31
submed-euraskont	1	0,15
submed-kont	1	0,15
ossubmed-europkont	2	0,31
osubmed-euras	1	0,15
ΕΥΡΑΣΙΑΤΙΚΑ:		
euras	24	3,74
subatl	2	0,31
eurassubocean	1	0,16
as	2	0,31
ΕΥΡΑΣΙΑΤΙΚΑ-ΒΟΡΕΙΑ:		
euras-no	2	0,31
ΗΠΕΙΡΩΤΙΚΑ:		
kont	1	0,16
ΤΡΟΠΙΚΑ:		
paleotrop	2	0,31
paleosubtrop	12	1,86
subtrop	3	0,48
pantrop	1	0,15
ΚΟΣΜΟΠΟΛΙΤΙΚΑ:		
kosm	20	3,12
subkosm	22	3,42
ΑΜΕΡΙΚΑΝΙΚΑ:		
nam	5	0,78
sam	5	0,78
ΑΦΡΙΚΑΝΙΚΑ:		
safr	2	0,31
Σύνολο	642	100,00

Site B Bioforms

Χωρολογικά στοιχεία κατά κατηγορία	Taxa	Ποσοστό %
Μεσογειακά: med	50	7,1
med (o)	49	6,9
med (z, w) eumed	12	1,7
Μεσογειακά - Εξωμεσογειακά:		
med-submed	17	2,4
med-atl, pont, subatl	23	3,3
med- et als	24	3,4
Ενδοβαλκανικά:		
balc	55	7,7
hell, aeg	16	2,3
Υπομεσογειακά:		
submed	62	8,8
submed (o,z,n)	21	3,0
submed-subatl	10	1,4
submed - et als	13	1,8
Ευρωπαϊκά-Μεσοευρωπαϊκά:		
eumi	28	3,9
submi	47	6,7
eur	34	4,8
Διαφόρων περιοχών	26	3,7
Ευρασιατικά-Ηπειρωτικά:		
euras	91	12,9
subpont	21	3,0
kont	16	2,2
Διαφόρων περιοχών	31	4,4
Βόρεια: bor	7	1,0
subbor	10	1,4
panbor, scanden	4	0,6
Κοσμοπολιτικά:		
kosm	14	2,0
kosm (s.s.)	9	1,2
Αμερικανικά-Τροπικά:		
am, am (n, w, s)	11	1,5
trop, subtrop	6	0,9
Σύνολο	707	100,0

Lab report: Create the simple (numerical participation of species in each category) and the complex (percentage of species in each category) biospectrum and geographical spectrum of the flora of the Campus area (field data from 2nd exercise).

Further reading:

- On Raunkier's life-form system: https://www.britishecologicalsociety.org/100papers/100_Ecological_Papers/100_Influential_Papers_026.pdf