



Mediterranean Plant Conservation Unit of MAICH

Peculiarities in Seed Germination of Cretan plants - implications for significant impacts of Climate Change.

"WORKSHOP: Climate Change Impacts on Mediterranean Plant Diversity"

25-28 September 2006
Chania, Crete, Greece



ACTIVITIES OF MAICH CONSERVING THE STUDY AND CONSERVATION OF PLANT SPECIES

1. LOCAL HERBARIUM OF THE FLORA OF CRETE



ESTIMATIONS ON THE TOTAL No OF TAXA AND THE PERCENTAGE OF ENDEMIC TAXA IN CRETE

TOTAL No OF TAXA IN CRETE	No OF ENDEMIC TAXA IN CRETE	PERCENTAGE OF ENDEMIC TAXA	REFERENCES
1800	172	10,4%	Jahn & Schönfelder (1995)
1820	180	9,9%	Montmollin & Iatrou (1995)

Today: 186 taxa endemic in Crete (185 for the SB)
(according to several recent publications)

Threat categories according to the Red Data Book of Greece (1995)

Endemic	Not threatened	133	186	67
	Threatened	53		
Non- endemic	Threatened	14		
TOTAL		200 (198 in SB)		

2. BOTANIC GARDEN

- endemic & threatened taxa in Crete (201 taxa)
- traditional cultivars of fruits, legumes and vegetables





3. SEED BANK OF ENDEMIC AND THREATENED PLANTS IN CRETE



PURPOSES

- enhance the *ex-situ* conservation of endemic and threatened plants of Crete (200 taxa concerning the SB) (by storing and preserving a representative range of their genetic diversity, that is threatened by various human interventions and land uses)

4. MEDUSA NETWORK- Identification, Conservation & Sustainable Use of wild plants of the Mediterranean region



5. Related research projects (on plant ecology, physiology, biochemistry, genetics, etc.) in the Dept. of Natural Products, Horticulture, and Environmental Management

SEED BANK



Germination studies

- ✓ Germination protocols
- ✓ Dormancy (after-ripening)
- ✓ Seed storage behaviour

Germination protocols

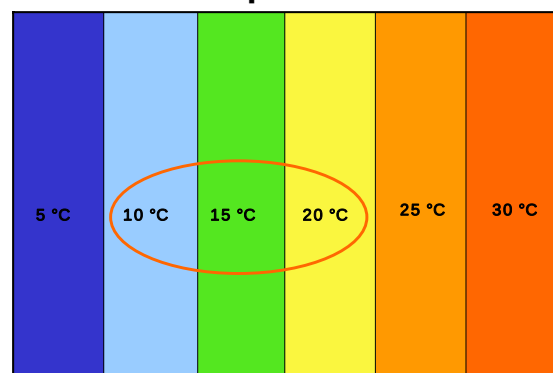
- ✓ Effect of **temperature**
- ✓ Effect of **light**

TEMPERATURE RANGE

It is possible roughly to classify **non-dormant** seeds in three categories according to the temperature range within which they can germinate

- ✓ **Cool temperatures**, thermal optimum being between about 10 -20 °C (sometimes less) – Temperate climates
- ✓ **High temperatures**, the thermal optimum being sometimes close to lethal temperatures (35-40 °C). Tropical to subtropical plants
- ✓ A very **large temperature range**

Temperature



EFFECT OF LIGHT

- ✓ **Photoperiod 12h/12h (L/D)**
- ✓ **Complete Dark (D)**

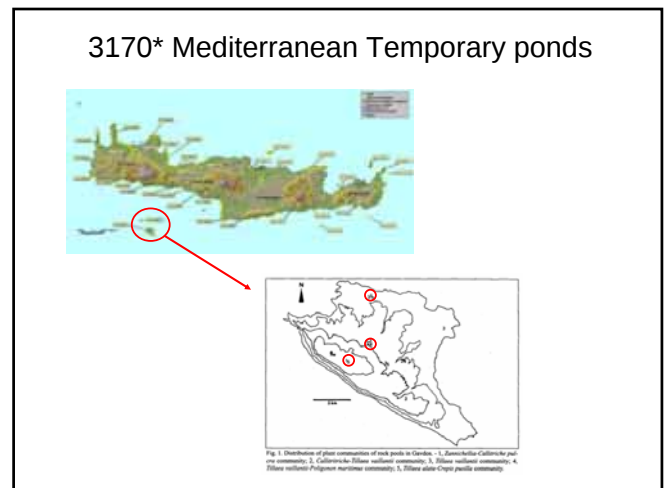
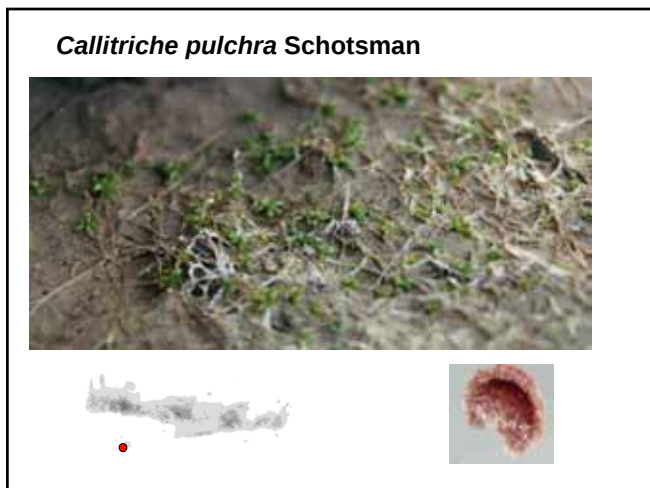
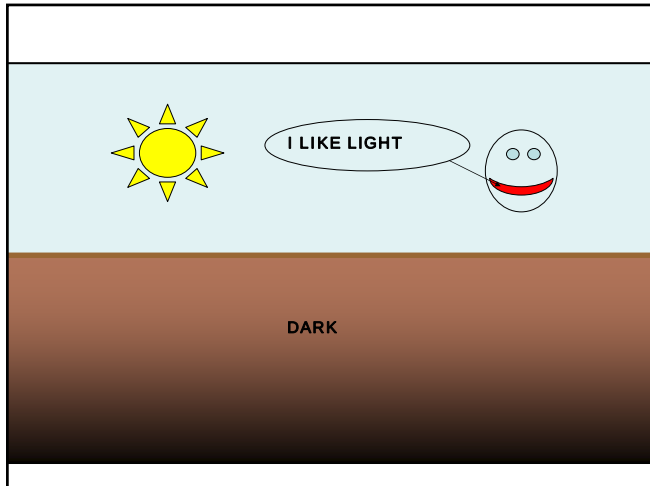
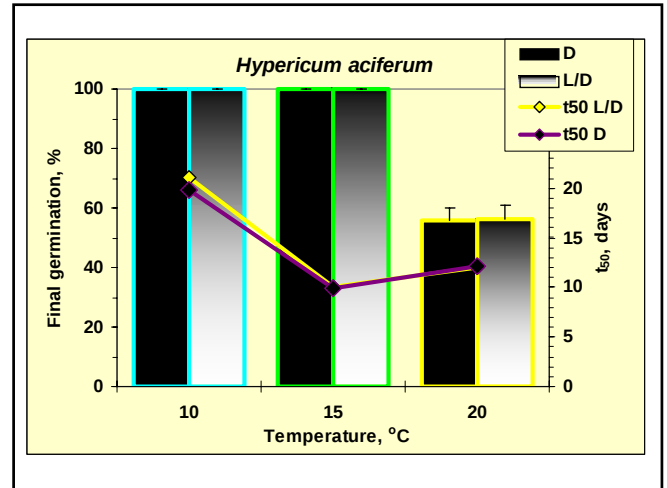
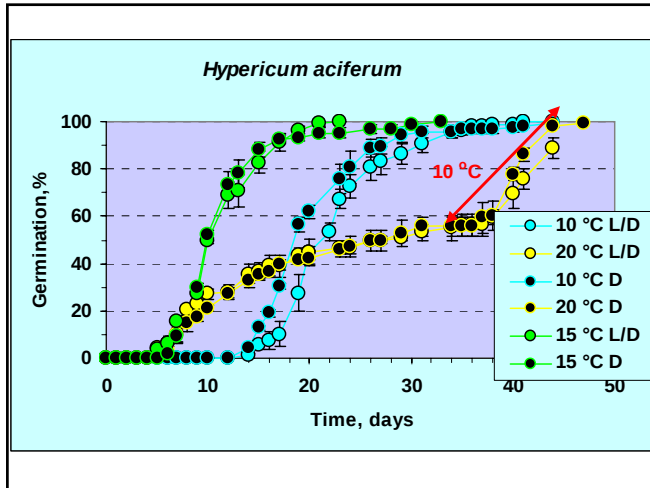
TYPES OF REACTION TO WHITE LIGHT

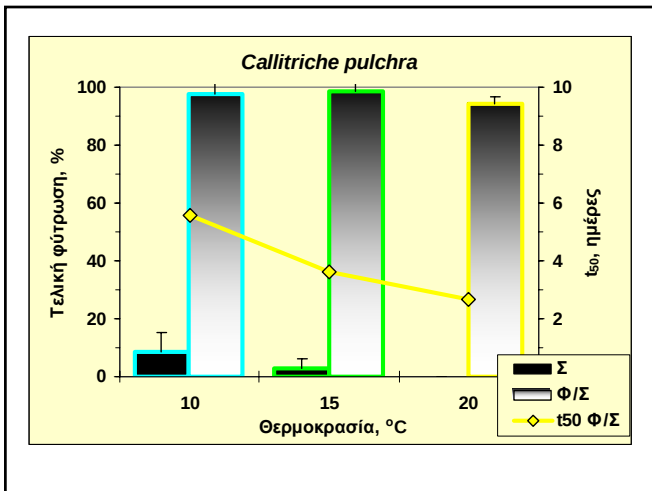
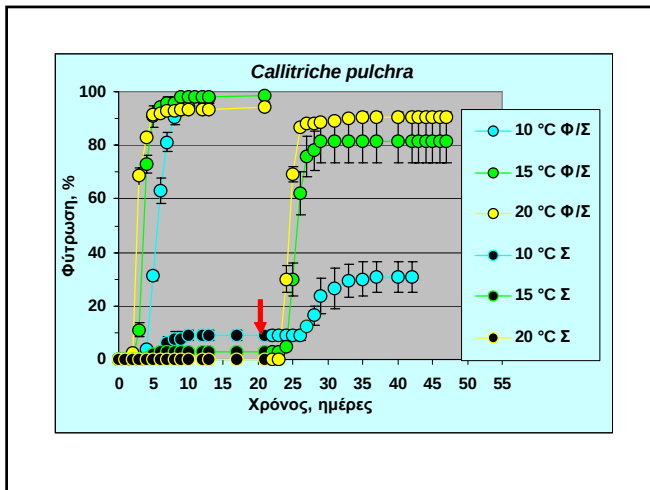
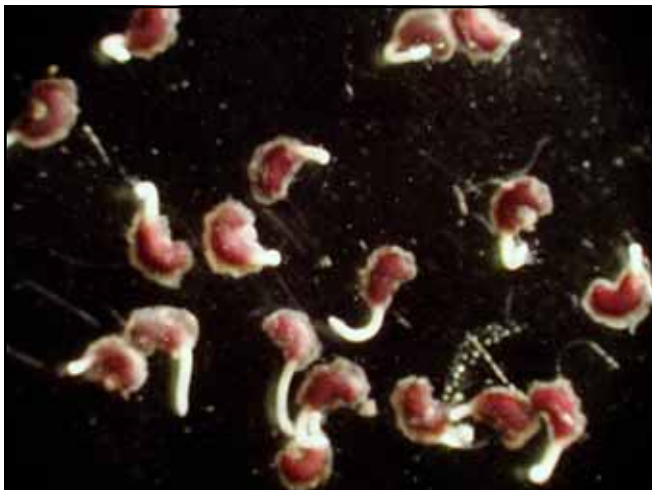
- ✓ **Inhibition** : Higher final dark germination and lower t_{50}
- ✓ **Delay** : with equal final dark and light germination but with significantly lower t_{50} in the dark
- ✓ **Indifference** : with not significantly different final germination and t_{50} between light and dark
- ✓ **Promotion** : higher final germination in the light than in the dark



Hypericum aciferum







According to Baskin & Baskin (1998) seed germination of most aquatic plants is promoted by white light. Out of 134 species studied, only in 6 (4%) light seems to inhibit germination, 67 (50%) require light to germinate, in 52 (39%) light promotes germination and 9 (7%) are light indifferent.

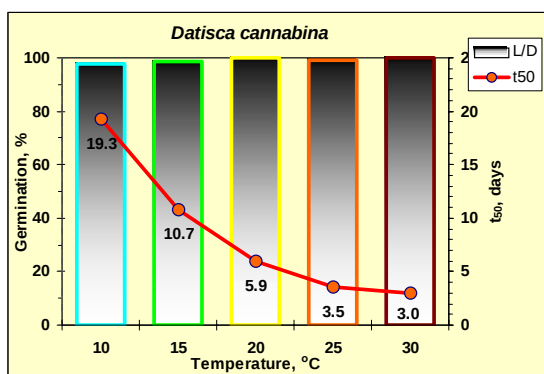
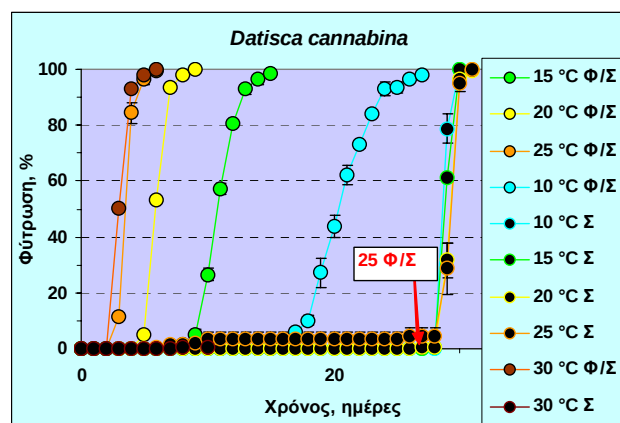
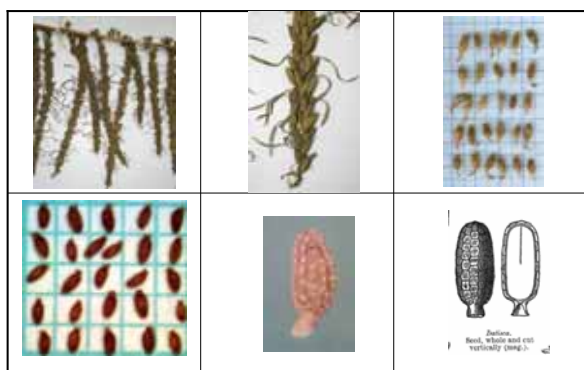
Datisca cannabina L.



Female



Male

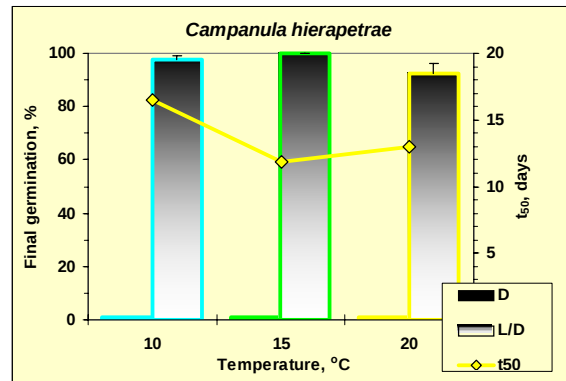
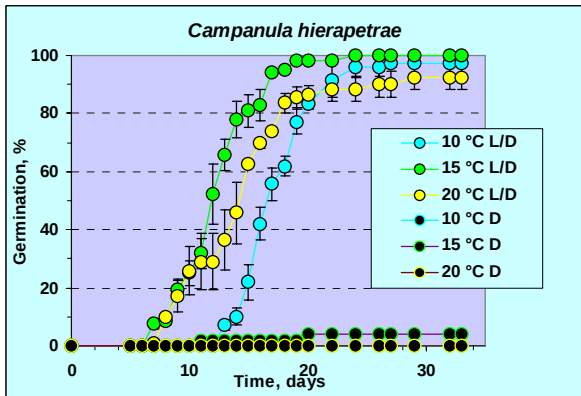


Campanula hierapetrae Rech. fil.



Alt.: 1000 – 1450 m





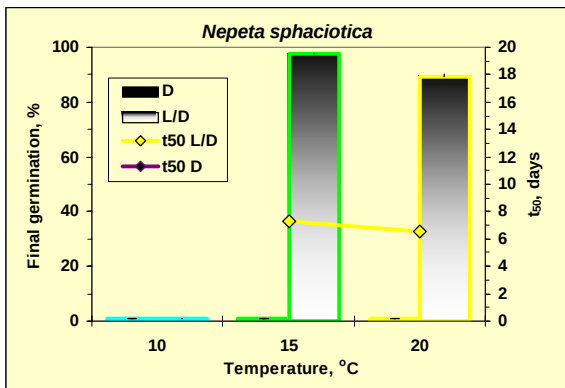
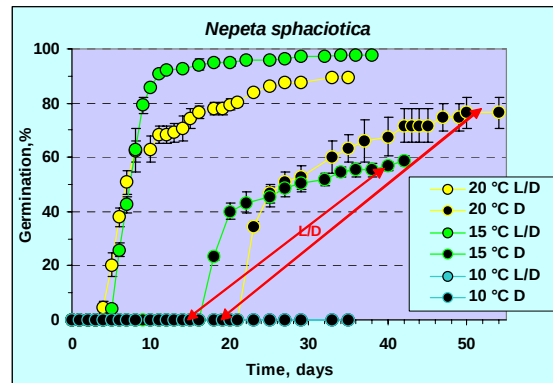
Nepeta sphaciotica P.H. Davis



- ✓ Habitat Directive II*IV
- ✓ P.D 67/81
- ✓ Bern Convention
- ✓ Endangered (E)



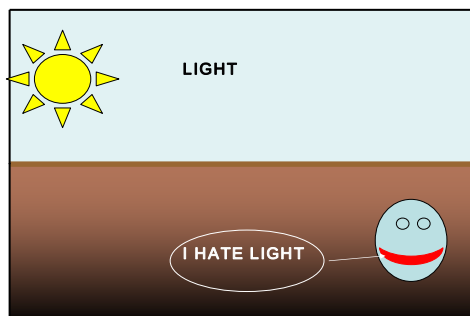
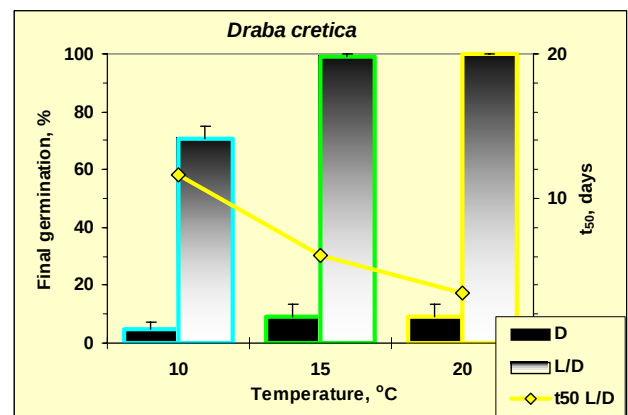
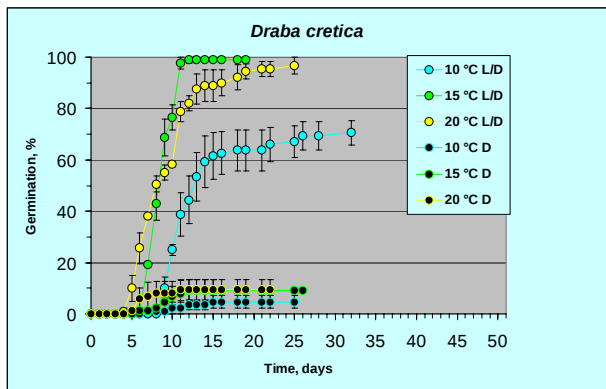
Alt. : 2200-2300 m



Draba cretica Boiss. & Heldr.

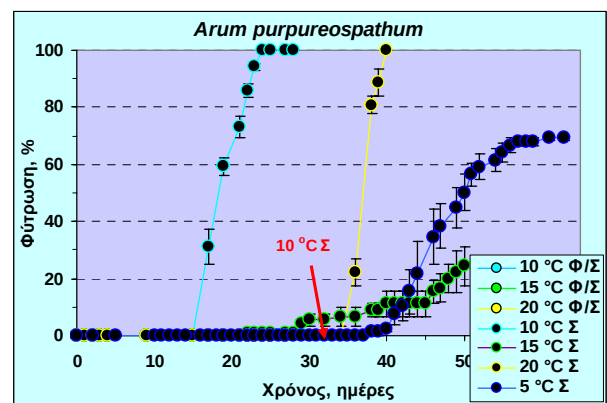


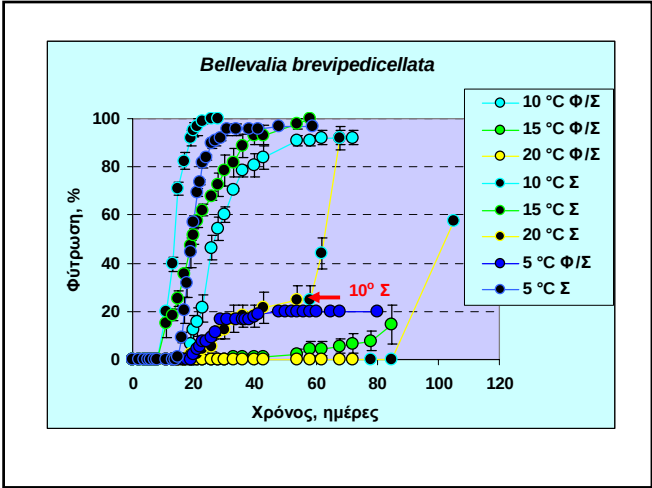
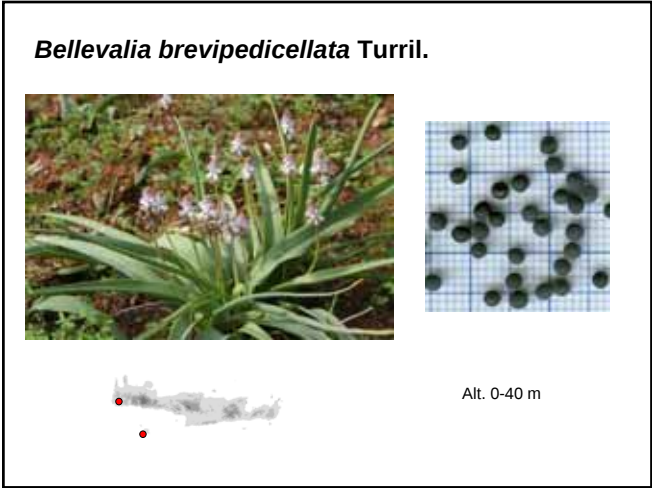
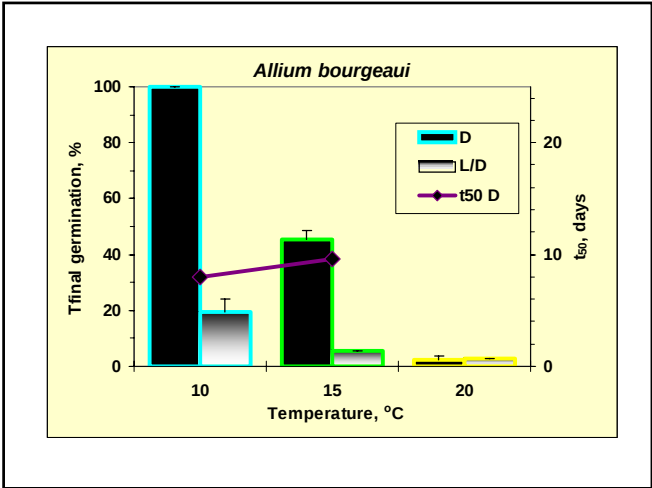
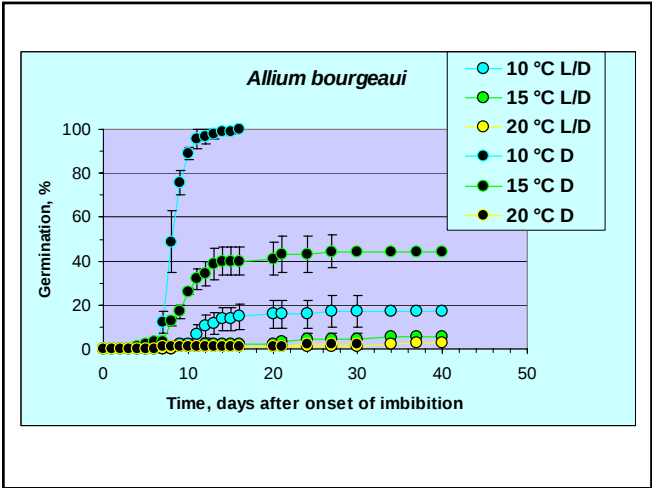
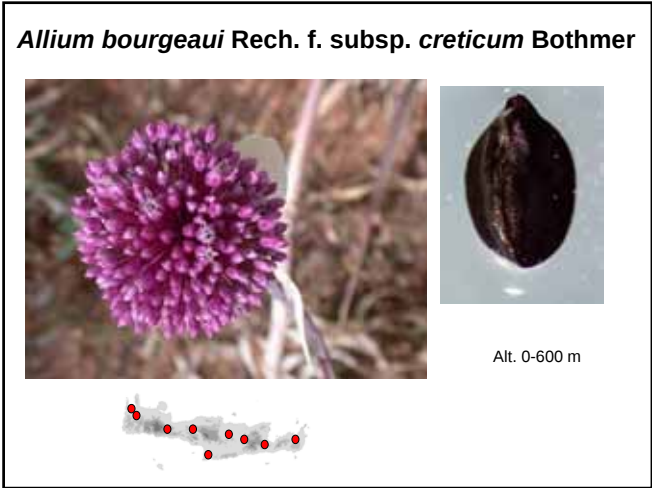
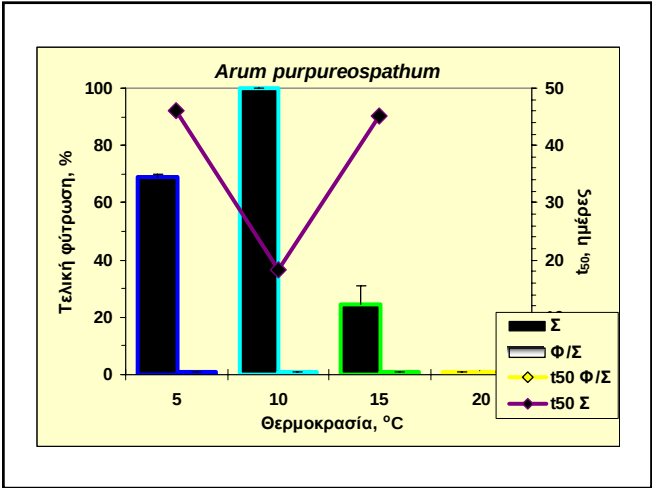
Alt. 1100-2400 m

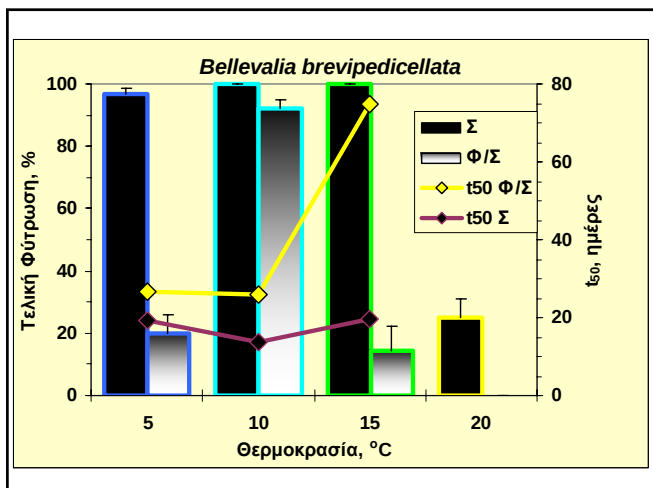


Inhibition :
Higher final germination and lower t₅₀

Arum purpureospathum P.C. Boyce



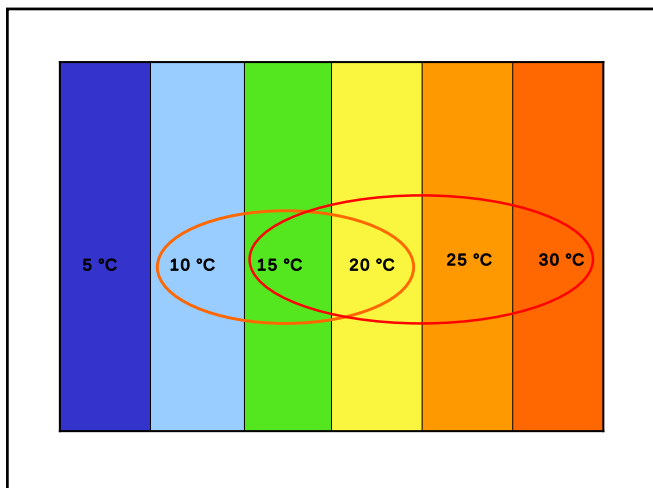




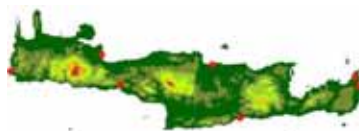
Effect of temperature

✓ High temperatures

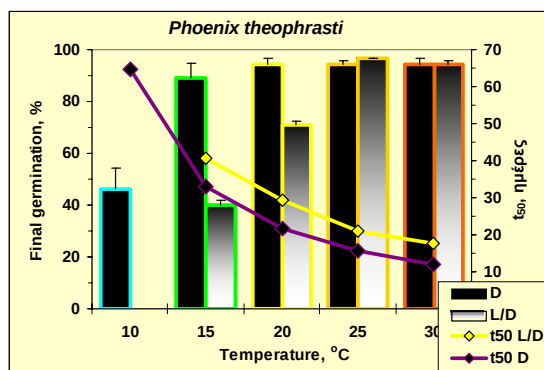
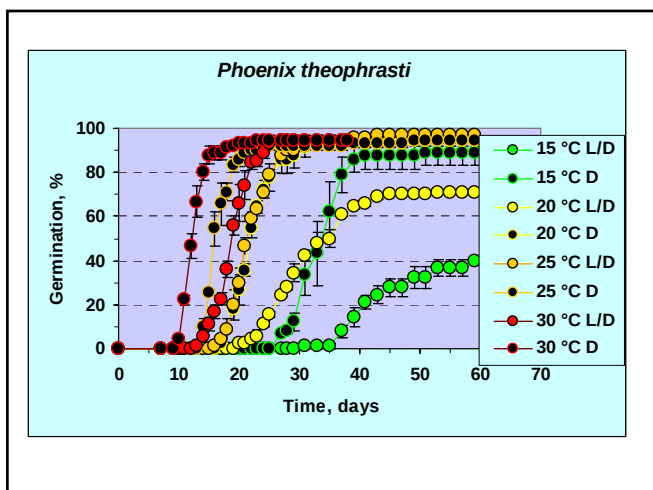
✓ Low temperatures

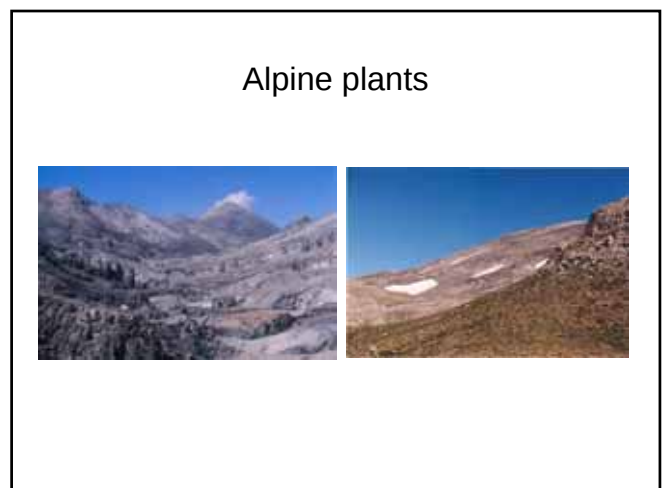
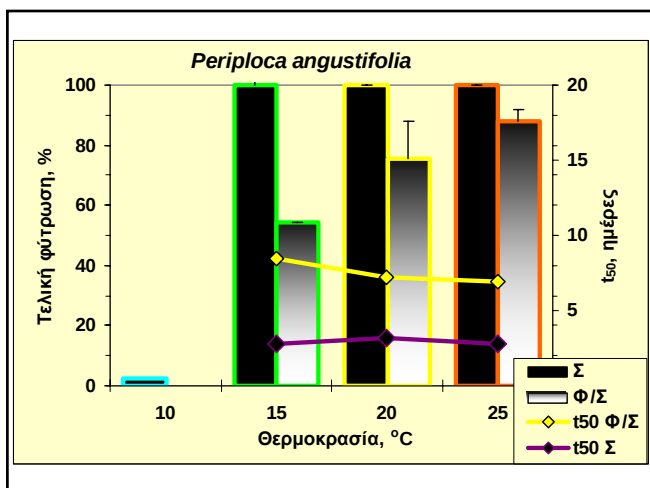
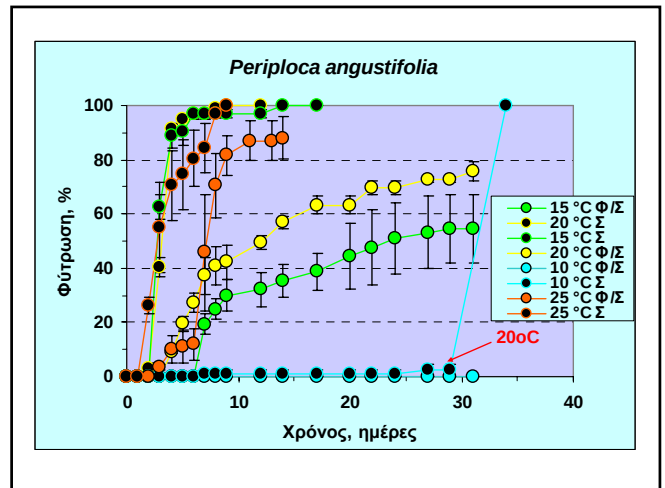
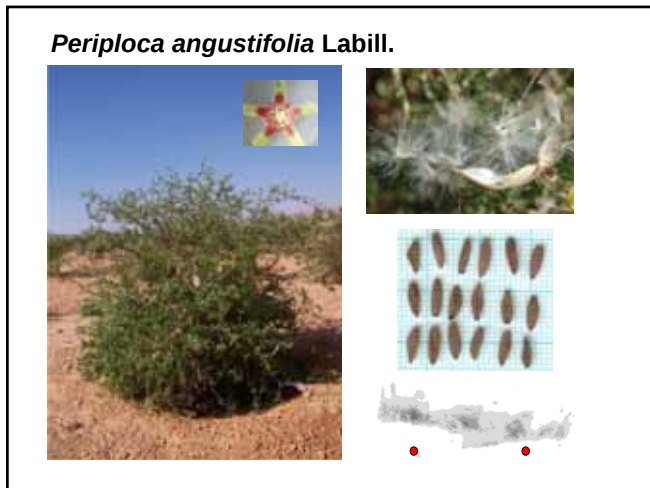
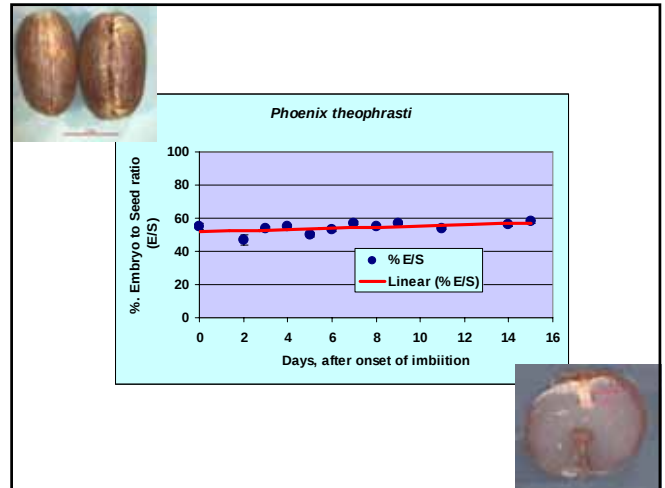
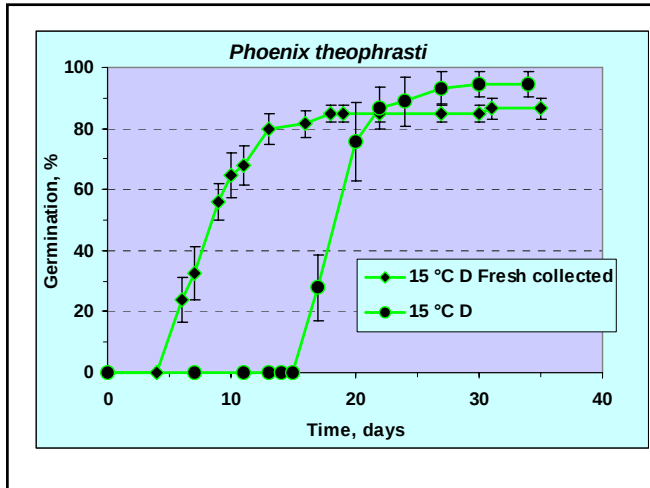


9370* Palm groves with *Phoenix*



Phoenix theophrasti
(germination)

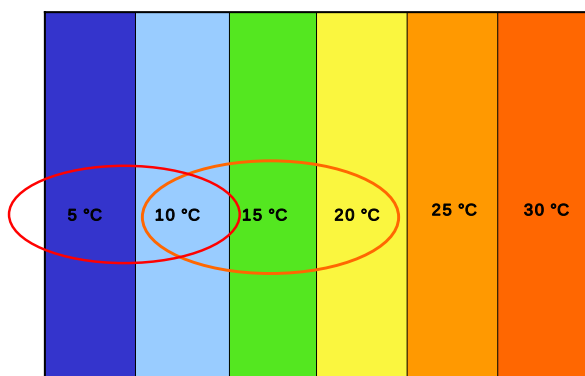
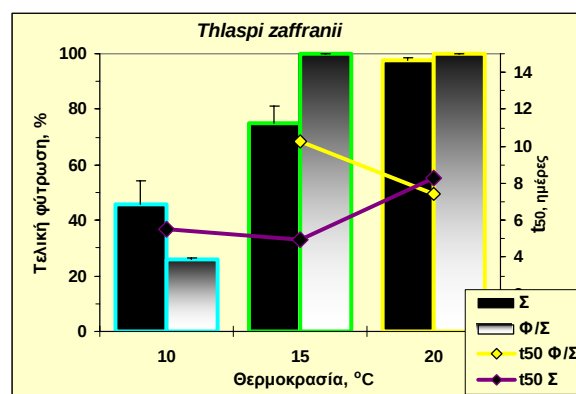
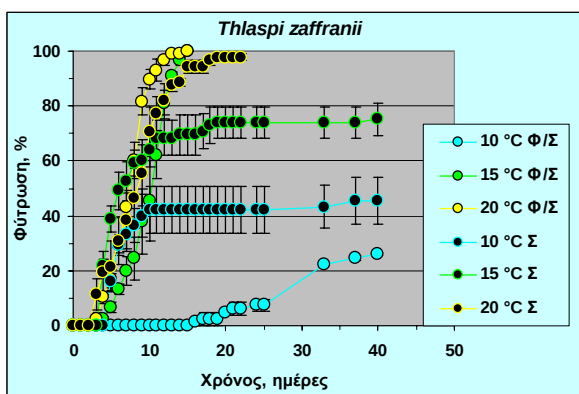
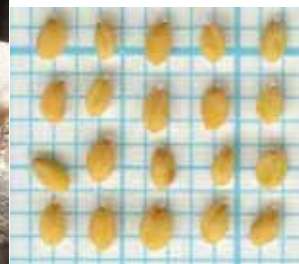




***Thlaspi zafranii* (F.K. Meyer) Greuter & Burdet**



Alt.: 1500-1700m



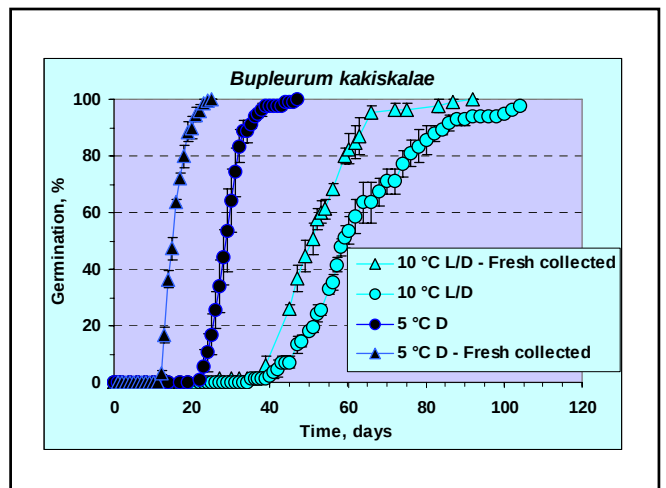
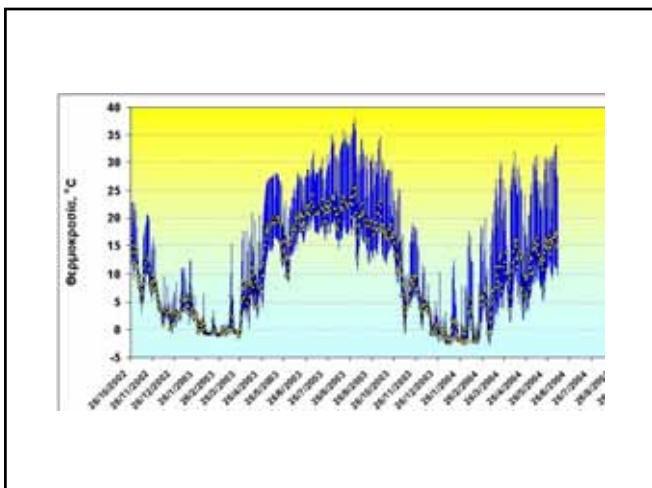
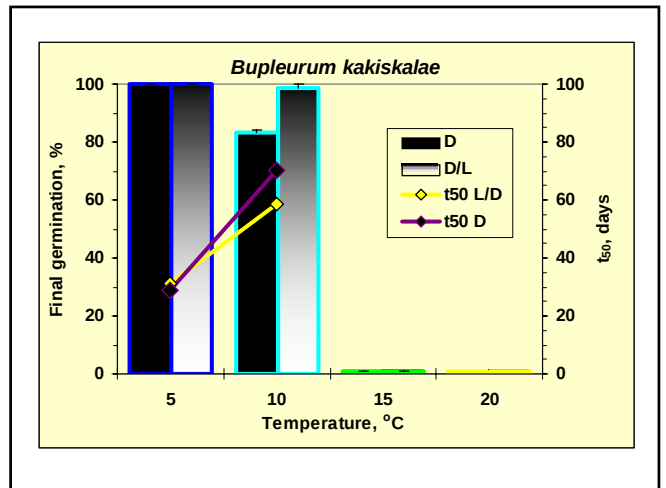
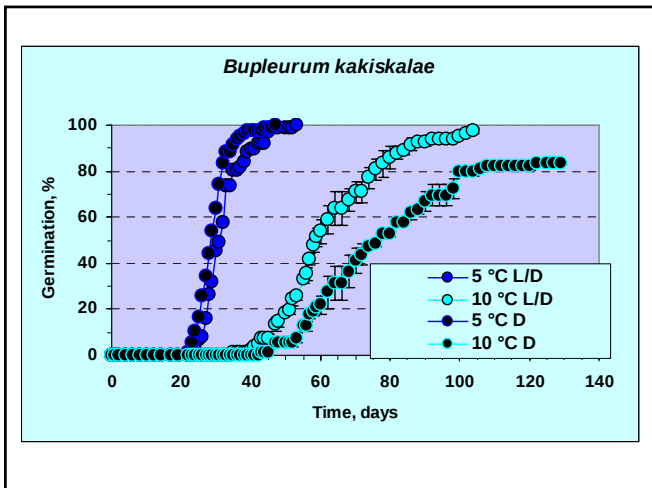
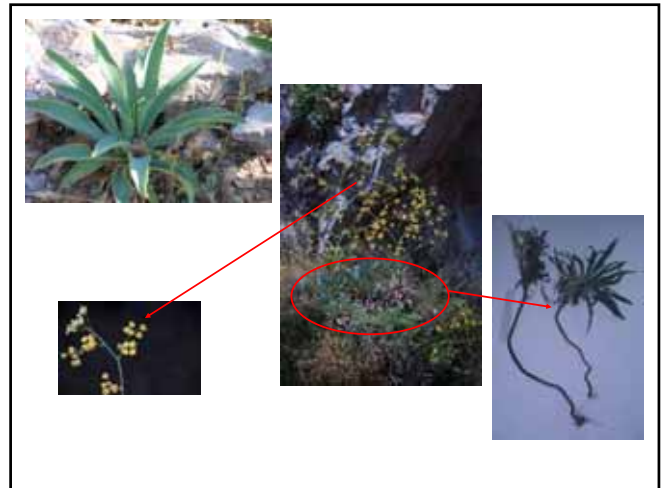
Bupleurum kakiskalae

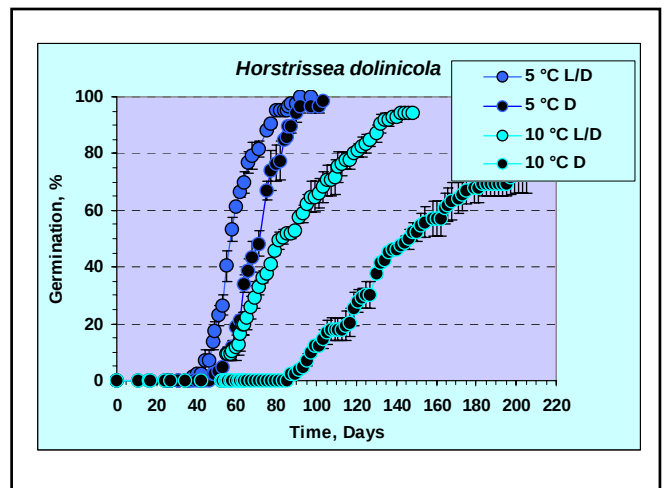
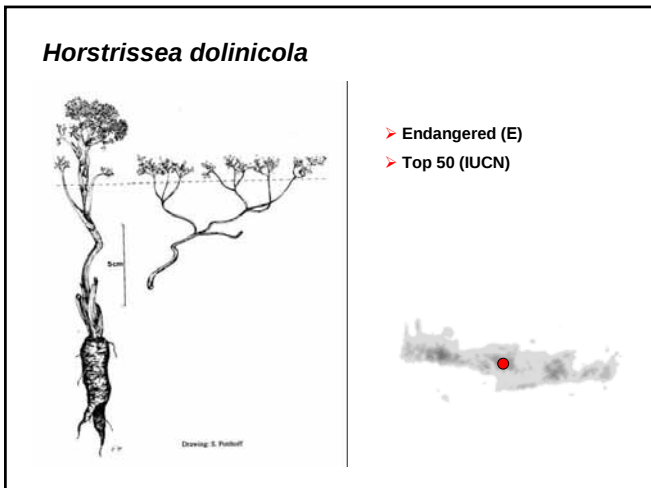
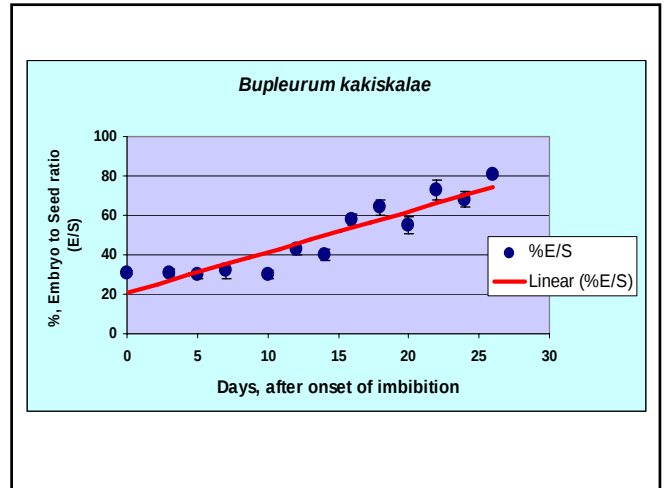
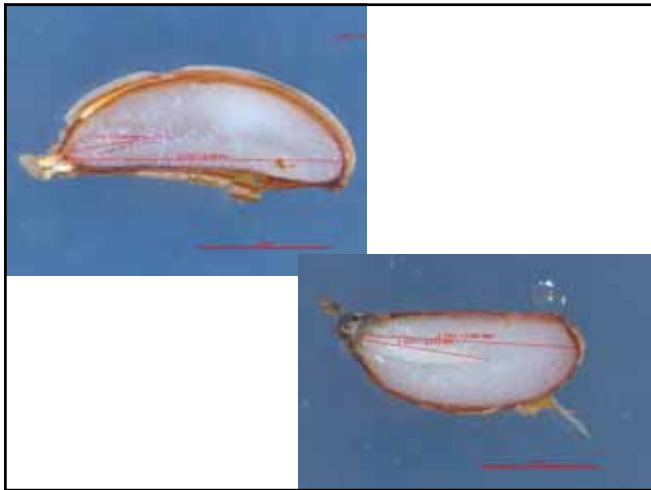


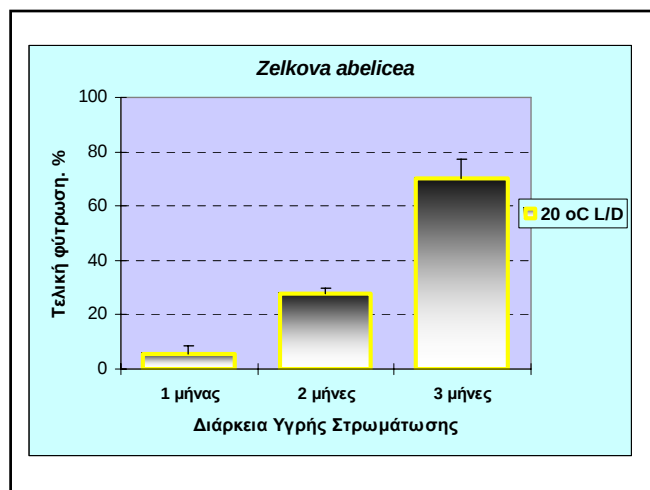
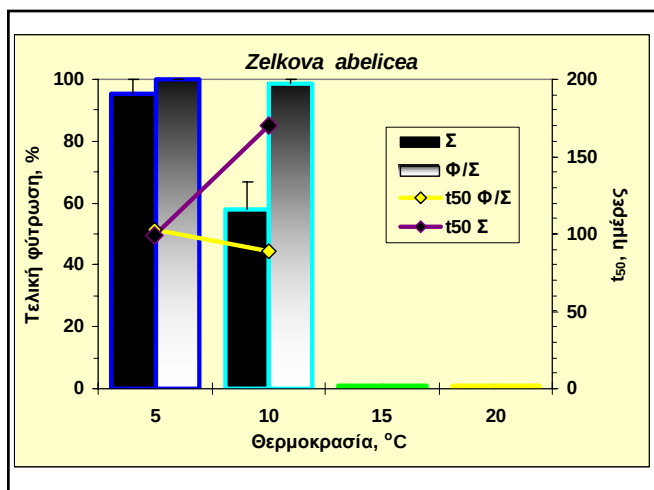
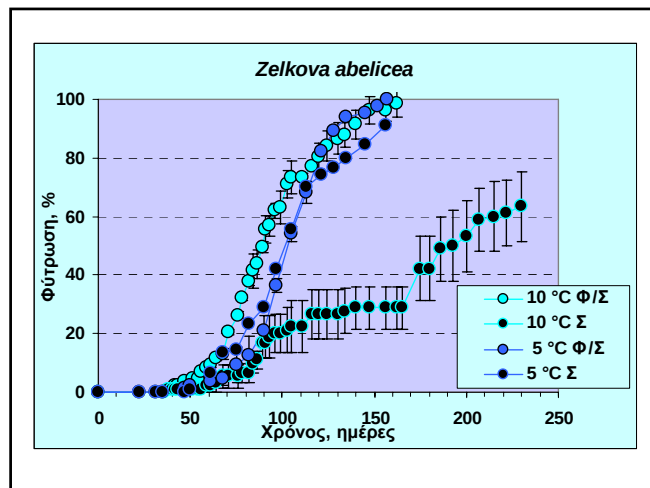
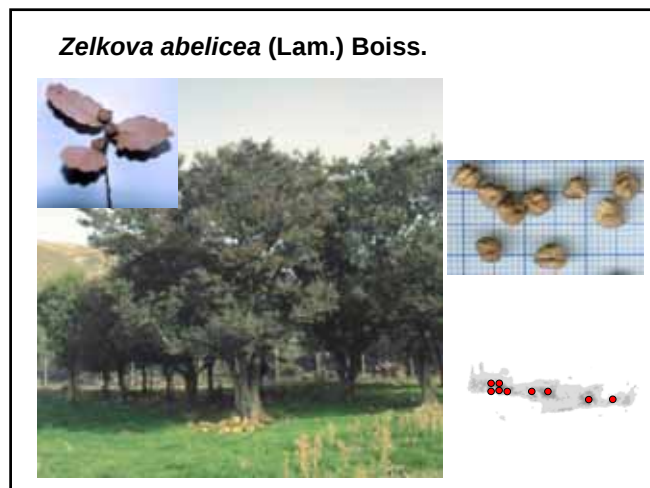
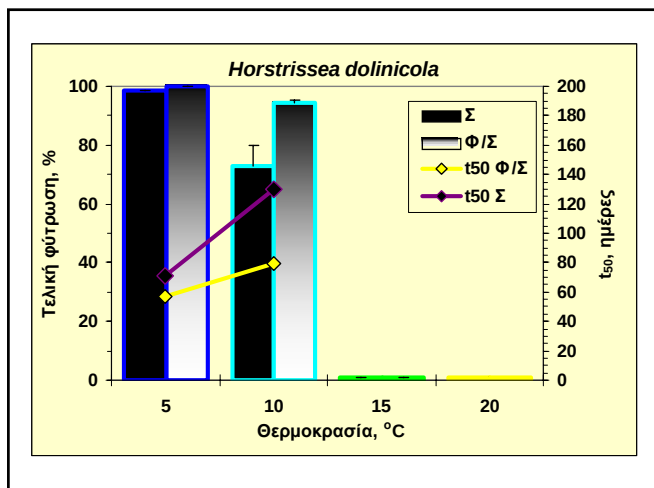
- Habitat Directive II*IV
- P.D 67/81
- Bern Convention
- Endangered (E)
- Top 50 (IUCN)

Alt. 1450-1500





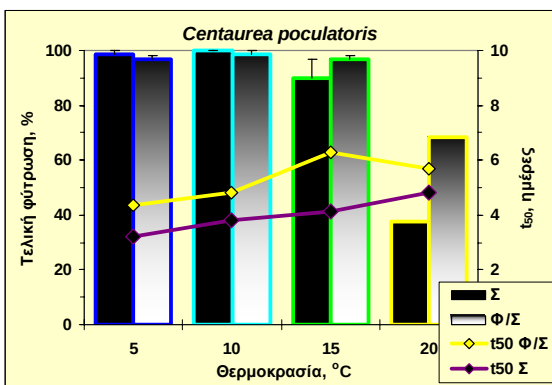
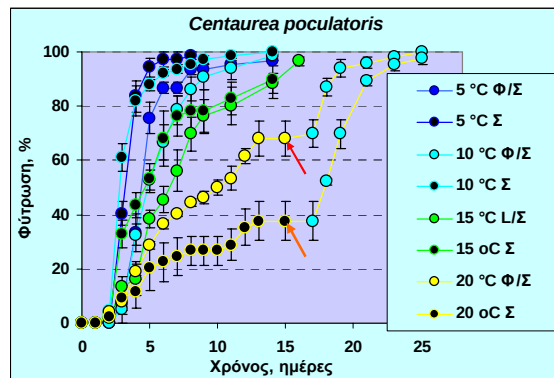




Centaurea poculatoris Greuter



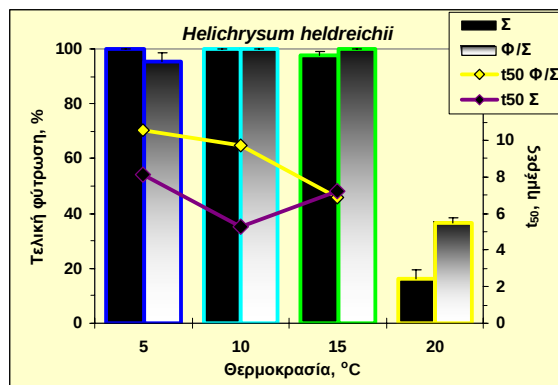
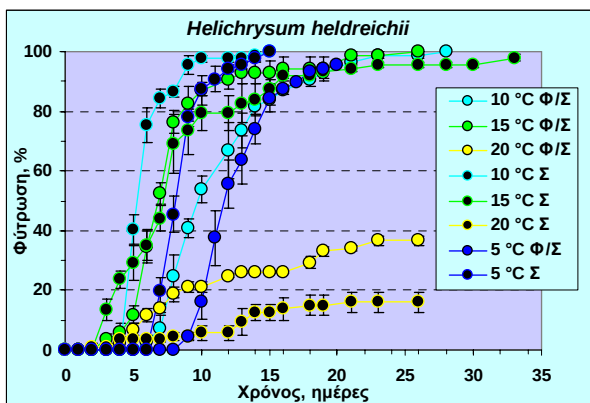
Alt.: 50-300 m



Helichrysum heldreichii Boiss.



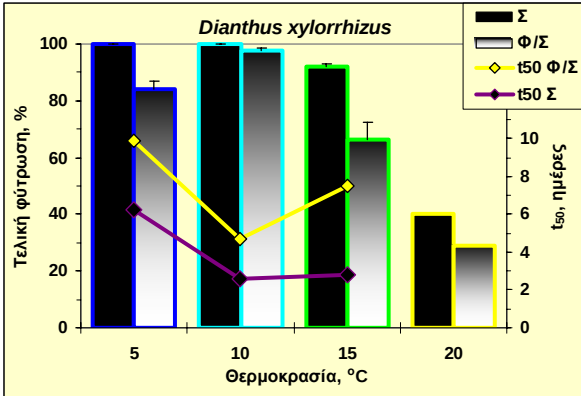
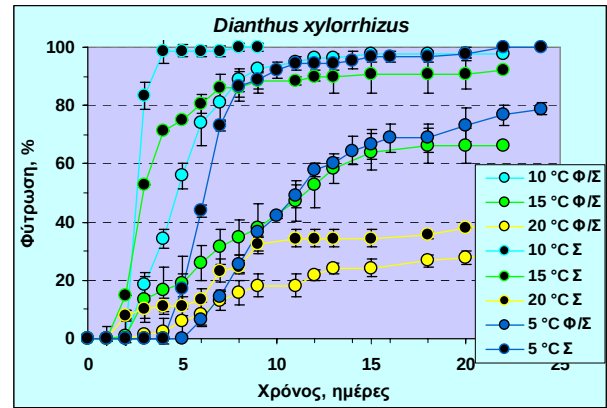
Alt.: 0-450 m



Dianthus xylorrhizus Boiss. & Heldr.



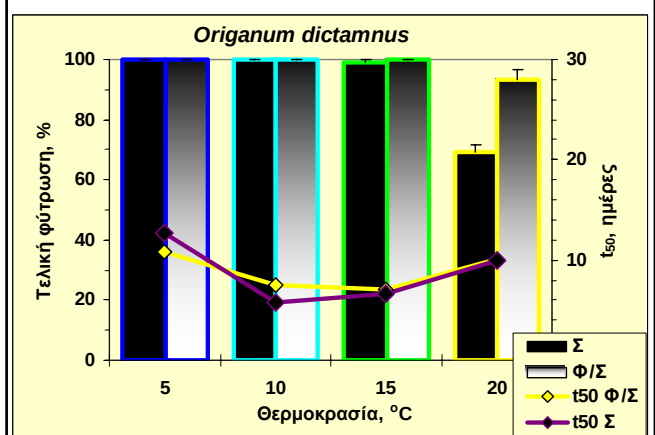
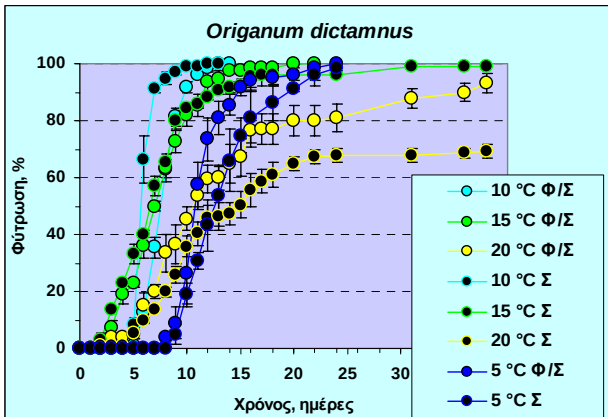
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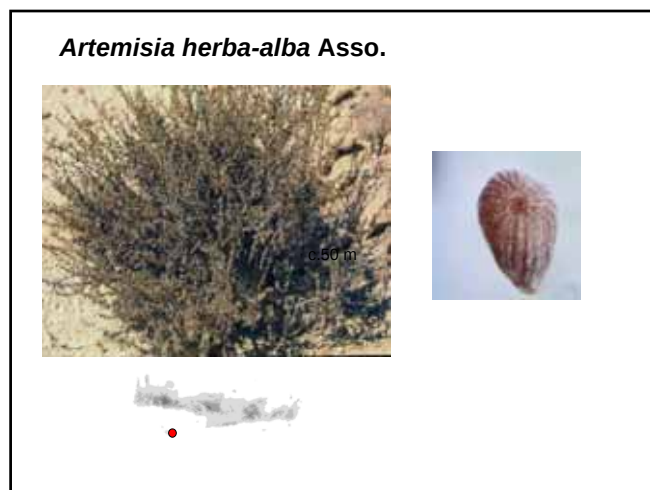
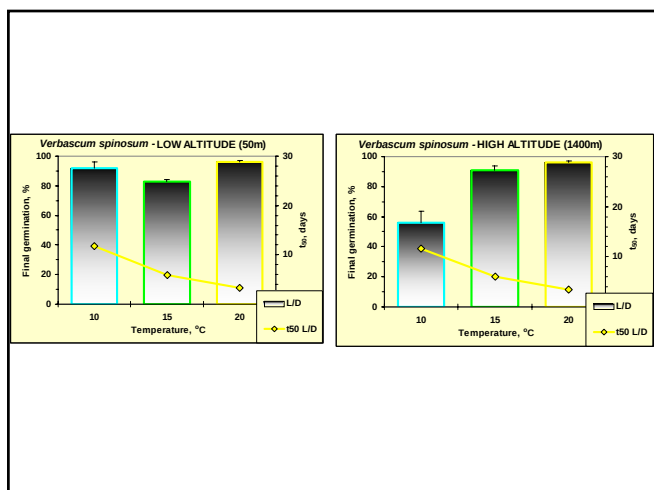
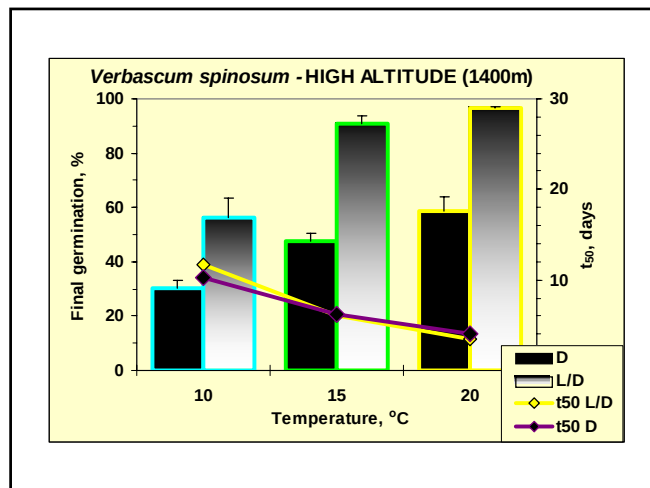
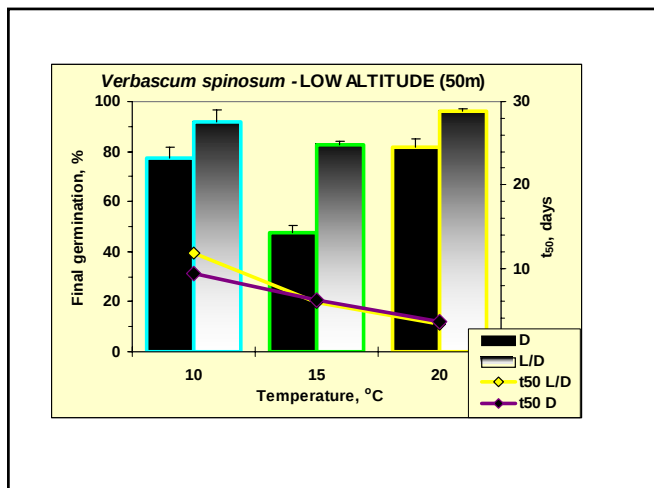
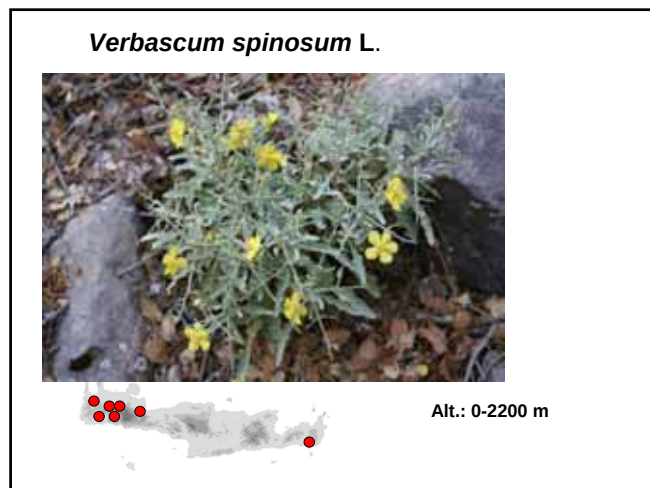
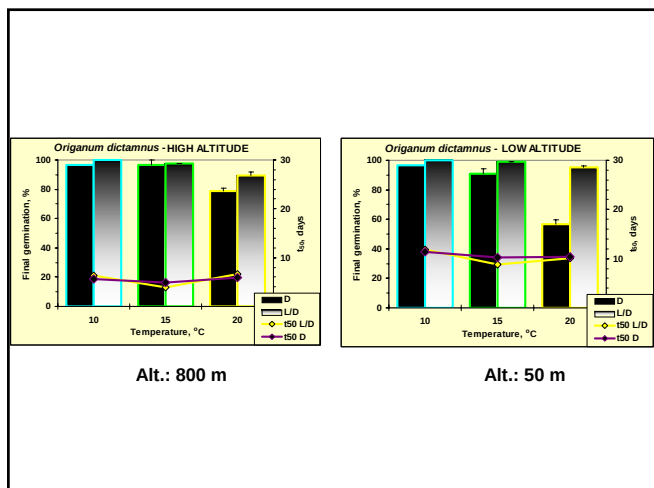


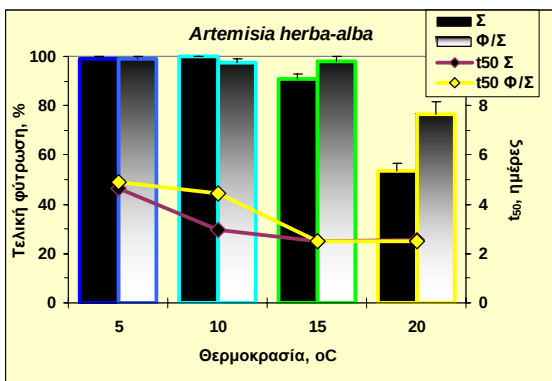
Origanum dictamnus L.



Alt.: 0-1900 m

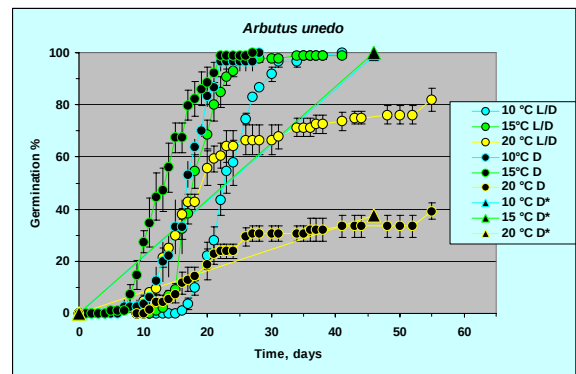






The effect of Green light

Arbutus unedo L.



Crithmum maritimum L.

