

## Some phytochemical and morphophysiological characteristics of *Euphorbia cyparissias* L. populations

Nóra Papp\*, Gy L Szabó

Department of Botany Pécs, University of Pécs, Hungary

**ABSTRACT** Perennial plants are able to adapt to different ecological habitats with their morphological and physiological characteristics. In this study some population of *Euphorbia cyparissias* L. were investigated. This stress tolerant species can adapt to its environment with morphological and reproductive marks. Differences were not detected in the presence of the investigated phytochemical compounds, only in their respective quantity, considering the extracts from stem, leaf and inflorescence.

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### KEY WORDS

*Euphorbia cyparissias* L.  
habitats  
flavonoids

*Euphorbia cyparissias* L. is spread in Hungary and in all Central Europe. It is an association-indifferent species. In this study were collected some data about the life strategy of this species. Populations at different ecological habitats were studied in Mecsek (Tettye, Kővágószőlős). Taking into consideration the differences the height above sea level and soil characteristics the possible changes in the morphology, reproduction and phytochemistry of the populations.

### Materials and Methods

The investigation was carried out at 2 habitats from March to December 2001, and from March 2002 it has been extended with additional 3 habitats.

Soil samples were investigated for nitrate, phosphorus, lime, humidity, humus content and the pH.

The morphological measurements included the length of the rhizome and the number of its branches, the number of inflorescences, the mass and length of the seeds, the length of stems and the number of the leafy branches.

Germination of seeds from the same plant was characterized under laboratory conditional (in Petri-dish on filter-paper), in the year of collection and the following years too.

Some phytochemical characteristics were investigated with thin-layer-chromatography, the most common flavonoids of the species. The flavonoid extracts were made in ethanol. The collected plants were dried at room temperature. The stems, leaves and inflorescences were ground (2-2 g), then 25 ml of the mixture ethanol:water (7:3) was added to them. Afterwards the solution was shaken at room temperature with 60 revolution/minute, and after filtering it was completed with the mixture to 50 ml.

The tests were the following: quercetin and camphorol as flavonoid-aglucones, rutin as glycoside and chlorogenic acid as phenolic acid. The tests and the samples were applied to 9.5x20 cm silica gel plates with a microcapillary (5-5 µl). The mobile phase was a solvent mixture: ethyl-acetate : formic acid : acetic acid : water (100:11:11:27), which is suitable for detection of flavonoids. After 20 minutes saturation and development the plates dried at 105°C for 5 minutes

and developed with Naturstoff-reagent (=diphenyl-boryloxy-ethyl-amin and 5% ethanolic polyethylene glycol). Following another drying at 105°C; the plates were investigated under UV=366 nm. Quantitative evaluation was carried out with a densitometer.

### Results

The morphological measurements showed that the number of inflorescence, the length of rhizome and the total height of the plants were bigger at populations living at habitats with low humus content. These data can be explained by nutritive matter- and dryness-stress of the habitats. The plants of these populations often derive from one stock. They have more branches and buds on the rhizome. These populations had a lower seed production. Besides examining the number of seeds, they were less viable than in the other populations living at humus rich habitats.

The seeds of *Euphorbia cyparissias* L. didn't germinate under laboratory conditions in the year of collection; the germination percentage was 40% next year and only 20% after 1 year. The small numbers refer probably to longer dormancy. Besides generative reproduction this perennial plant is able reproduce vegetatively with its rhizome (= shoot modification in the soil). There are no data about the ratio of the 2 reproduction types. Further studies may include the seed bank investigation of the species.

Literature reports on 2 main flavonoids of *Euphorbia cyparissias* L.; there are glycosides. The flavonoids are in this species most in glycoside-form. The samples of each population produced 2 main spots on the plates at each collection time, besides other flavonoids. The orange spot is most probably quercetin-3-glucuronide and the green spot camphorol-3-glucuronide. The Rf-values are the following: 0.54 for quercetin-3-glucuronide and 0.61 for camphorol-3-glucuronide. Other spots: camphorol-glycosides as green spots only in the leafy extracts (Rf=0.82), quercetin-glycosides in inflorescences (Rf=0.54), phenolic acids in stems (Rf=0.17), in leaves and in inflorescences (Rf=0.44). No phenolic acids were detected in the leaf extracts from populations on humus poor soil. The detected phenolic acid

\*Corresponding author. E-mail: nora4595@ttk.pte.hu

is not the chlorogenic acid, which is common in plants. The lack of this phenolic acid, of rutin, of camphorol and of quercetin was detected in *Euphorbia cyparsissias* L.

Red spots were detected in the extracts, whose R<sub>f</sub> was 0.93; they are probably galloic acid derivatives.

The stem extracts contained the least, whereas the inflorescences the most flavonoids by quantitative detection (flavonoids are responsible for the yellow, yellow-green colour of the inflorescences).

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### References

- Frohne D, Jensen U (1992) Systematik des Pflanzenreichs 4. Auflage. Gustav Fischer Verlag, Stuttgart, Jena, New York.
- List PH, Hörhammer L (1973) Hagers Handbuch der Pharmazeutischen Praxis IV. Springer Verlag Berlin, Heidelberg, New York.
- Schermann Sz (1967) Magismeret II. Akadémiai Kiadó Budapest.
- Stadtmann H, Pohl R (1966) Quercetin-3-glucuronide and camphorol-3-glucuronide, main flavonoids in *Euphorbia cyparsissias* L. Naturwissenschaften, 53 pp. 362.
- Wagner H, Bladt S, Zgainski EM (1983) Drogenanalyse. Springer Verlag Berlin, Heidelberg, New York, pp. 163-173.