

## The medicinal plants from the pastures of the Aninei mountains

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### SUMMARY

Medicinal species from the spontaneous flora of East-European countries become an increasing important source for the pharmaceutical industry, as the areal of the natural habitats of plants constantly decrease due to industrialization and pollution. The pastures of the Aninei Mountains can offer an important number of medicinal species appreciated in phytotherapy, but also a constant source for the research and discovery of new medicines. There have been identified 107 plants of pharmacoeutic interest, among which the following present a particular importance because of their higher occurrence and importance in therapy: *Achillea* sp., *Thymus* sp., *Viola* sp., *Hypericum perforatum*, *Plantago lanceolata*, *Origanum vulgare*, *Primula* sp., *Taraxacum officinale*, *Urtica dioica*, *Filipendula ulmaria*.

### ÖSSZEFOGLALÓ

A kelet-európai országok természetes flórának gyógynövényei mind fontosabb forrássá válnak a gyógyszerészeti ipar számára, azon mértékben, hogy az iparosítás és szennyeződés jobban korlátozza a növények természetes életközvetet. Az Aninai hegységek gyepei nagyszámú, a fitoterápiában értékelt gyógynövényeket kínálnak. Ugyanakkor ezek a gyepek egy állandó forrást alkothatnak új kutatások és orvosságok felfedezése számára. Százhet gyógyszerészeti érdekű faj lett azonosítva, amelyekből a következők nagyobb számban fordulnak elő: *Achillea* sp., *Thymus* sp., *Viola* sp., *Hypericum perforatum*, *Plantago lanceolata*, *Origanum vulgare*, *Primula* sp., *Taraxacum officinale*, *Urtica dioica*, *Filipendula ulmaria*.

### INTRODUCTION

The pastures of the Aninei Mountains are stretching on a surface of about 250 km<sup>2</sup>, with altitudes ranging between 400 and 1000 m height. The expositions are very varied, the partially sunny ones prevail (50%), and the sunny and shady expositions are also well represented (approximately 25% each). The medium slope is about 20°. The average annual temperature varies between 8.8 °C in the area of hills with reduced altitude, and 5.4°C at heights of about 1000m, in the mountain area. The annual precipitation quantities are between 880-1050 mm in the hills and rise up to 1140 mm in the mountains. The dominant winds are from the SW direction (Sencu, 1987).

### MATERIAL AND METHODS

The study was carried out between 2002-2004. The identification of the vegetal species was made

using mainly The Flora of Romania (Săvulescu, 1952-1976) and The Illustrated Flora of Romania (Ciocârlan, 2000), but other sources were also employed: Csedö et al., 1968; Stichmann, 1999; Schönfelder, 2001.

The establishment of the dominant active principles in medicinal plants was done according to the techniques described by and Ciulei et al., 1993 and by the Romanian Pharmacopoeia, X<sup>th</sup> edition (1993).

### RESULTS AND DISCUSSIONS

The species of pharmacoeutic interest which can be harvested from these pastures are presented in tables 1 and 2, according to the dominant active principles they contain.

Among the medicinal plants the following present a particular interest because of their higher occurrence and importance in phytotherapy: *Achillea* sp., *Thymus* sp., *Viola* sp., *Hypericum perforatum*, *Plantago lanceolata*, *Origanum vulgare*, *Primula* sp., *Taraxacum officinale*, *Urtica dioica*, *Epilobium* sp., *Filipendula ulmaria*.

*Achillea millefolium* can be encountered in about 85% of the pastures, with a varying density, ranging from 1-2 individuals per m<sup>2</sup> (ind/m<sup>2</sup>), in about 25% of the pastures, up to 10-15 ind/m<sup>2</sup> (in 10% of pastures).

*Thymus* sp. are very frequent, growing in all the territory, as small circular groups with 10-50 fertile stems per group. Per square meter can be found 1-2 groups (in 65% of the pastures) to 5-6 groups (in 10% of pasture surface). *Th. pulegioides* and *Th. pannonicus* prevail. All species of wild thyme are used in pharmacy under the collective name *Serpylli herba*.

*Viola* sp. can be encountered in about 40% of the pastures, with densities ranging from 20 ind/m<sup>2</sup> in the lawns near the settlements and villages, to 1-2 ind/m<sup>2</sup> in the rest. Greater amounts have been found near the villages Steierdorf and Carașova. *Hypericum perforatum* grows in about 80% of the pastures, being more frequent in the areas with altitudes of around 700 m (up to 5-8 ind/m<sup>2</sup> in 20% of pastures) and less frequent (1-2 ind/m<sup>2</sup>) in 50% of pastures, the rest of the territory containing intermediate densities. *Plantago lanceolata* is frequent in the well-kept lawn in vicinity of the settlements, reaching average densities of 30 ind/m<sup>2</sup>. *Taraxacum officinale* agg. can be found mostly in areas with lower altitudes, usually less than 700 m. Its density is of 15-30 ind/m<sup>2</sup>.

Table 1

Plants of pharmaceutical interest, containing glucides and heterosides				
Dominant active principles	Species	V.P.	Species	V. P.
Polyholosides	<i>Arctium lappa</i>	Rx	<i>Elymus repens</i>	Rh
Mucilages	<i>Althaea officinalis</i>	Fl+Rx	<i>Plantago major</i>	Fl
	<i>Linum flavum</i>	S	<i>Tussilago farfara</i>	Fl
	<i>Linum hirsutum</i>	S	<i>Verbascum densiflorum</i>	Fs
	<i>Malva neglecta</i>	Fs+Fl	<i>Verbascum lychnitis</i>	Fs
	<i>Malva sylvestris</i>	Fs+Fl	<i>Verbascum nigrum</i>	Fs
	<i>Orchis morio</i>	T	<i>Verbascum phlomoides</i>	Fs
	<i>Plantago lanceolata</i>	Fl	<i>Verbascum phoeniceum</i>	Fs
	<i>Plantago media</i>	Fl	<i>Verbascum thapsus</i>	Fs
Phenolic glycosides	<i>Filipendula ulmaria</i>	Fs+Hb		
Cardiotonic glycosides	<i>Helleborus odoratus</i>	Rh	<i>Leonurus cardiaca</i>	Hb
Anthracenosides	<i>Rumex acetosa</i>	Rh	<i>Rumex crispus</i>	Rh
	<i>Rumex acetosella</i>	Rh		
Saponines	<i>Bellis perennis</i>	Fs	<i>Saponaria officinalis</i>	Rx
	<i>Eryngium campestre</i>	Rx	<i>Solidago virgaurea</i>	Hb
	<i>Equisetum arvense</i>	Hb	<i>Viola arvensis</i>	Hb
	<i>Ononis arvensis</i>	Rx	<i>Viola hirta</i>	hb
	<i>Primula elatior</i>	Rh+Rx	<i>Viola odorata</i>	Hb
	<i>Primula veris</i>	Rh+Rx	<i>Viola tricolor</i>	Hb
Flavonoids	<i>Capsella bursa-pastoris</i>	Hb	<i>Polygonum aviculare</i>	Hb
	<i>Eupatorium cannabinum</i>	Rh+Rx	<i>Veronica chamaedrys</i>	Hb
	<i>Hieracium pilosella</i>	Hb	<i>Veronica officinalis</i>	Hb
	<i>Hypericum perforatum</i>	Hb	<i>Veronica spicata</i>	Hb
	<i>Linaria vulgaris</i>	Hb	<i>Veronica teucrium</i>	Hb
	<i>Polygonum hydropiper</i>	Hb	<i>Vincetoxicum hirsundinaria</i>	Rx
Isoflavonoids	<i>Medicago falcata</i>	Hb	<i>Trifolium hybridum</i>	Hb
	<i>Trifolium dubium</i>	Hb	<i>Trifolium repens</i>	Hb

V.P. - vegetal product used in pharmacy; Fl – folium; Fr – fructus; Fs – flos; Hb – herba; Rx – radix; Rh – rhizoma; T - tubera

Table 2

Plants of pharmaceutical interest, containing coumarins, tannins, terpenic derivatives and alkaloids				
Dominant active principles	Species	V.P.	Species	V. P.
Coumarins	<i>Cruciata laevipes</i>	Hb	<i>Heracleum sphondylium</i>	Rx+Fl
	<i>Galium aparina</i>	Hb	<i>Medicago falcata</i>	Hb
	<i>Galium mollugo</i>	Hb	<i>Medicago sativa</i>	Hb
	<i>Galium verum</i>	Hb	<i>Melilotus officinalis</i>	Hb+Fs
Tannins	<i>Agrimonia eupatoria</i>	Hb	<i>Lythrum salicaria</i>	Hb
	<i>Alchemilla vulgaris</i>	Hb	<i>Potentilla anserina</i>	Hb
	<i>Anthyllis vulneraria</i>	Fs	<i>Potentilla erecta</i>	Rh
	<i>Epilobium angustifolium</i>	Hb	<i>Potentilla inclinata</i>	Rh
	<i>Epilobium hirsutum</i>	Hb	<i>Potentilla recta</i>	Rh
	<i>Fragaria vesca</i>	Hb	<i>Potentilla reptans</i>	Rh
	<i>Lysimachia vulgaris</i>	Hb	<i>Sanguisorba minor</i>	Hb
Volatile oils	<i>Angelica archangelica</i>	Rx	<i>Origanum vulgare</i>	Hb
	<i>Achillea millefolium</i>	Fs	<i>Thymus dacicus</i>	Hb
	<i>Achillea collina</i>	Fs	<i>Thymus glabrescens</i>	Hb
	<i>Melissa officinalis</i>	Fs	<i>Thymus pannonicus</i>	Hb
	<i>Mentha arvensis</i>	Fl	<i>Thymus pulegioides</i>	Hb
	<i>Mentha longifolia</i>	Fl	<i>Valeriana officinalis</i>	Rh+Rx
	<i>Mentha pulegium</i>	Fl		
Glycoresins	<i>Convolvulus arvensis</i>	Hb		
Bitter principles	<i>Artemisia absinthium</i>	Hb	<i>Gentiana cruciata</i>	Rx
	<i>Artemisia vulgaris</i>	Hb	<i>Glechoma hederacea</i>	Hb
	<i>Ballota nigra</i>	Hb	<i>Tanacetum vulgare</i>	Fs
	<i>Centaurium erythraea</i>	Hb	<i>Taraxacum officinale</i>	Hb+Rx
	<i>Cichorium intybus</i>	Hb+Rx	<i>Teucrium chamaedrys</i>	Hb
Diverse principles	<i>Daucus carota</i>	Rx+Fs	<i>Urtica dioica</i>	Hb
	<i>Lycopus europaeus</i>	Hb		
Alkaloids	<i>Colchicum autumnale</i>	Sm	<i>Galanthus nivalis</i>	B
	<i>Conium maculatum</i>	Fr	<i>Solanum dulcamara</i>	St
	<i>Echium vulgare</i>	H	<i>Veratrum album</i>	Rh

V.P. - vegetal product used in pharmacy; Fl – folium; Fr – fructus; Fs – flos; Hb – herba; Rx – radix; Rh – rhizoma; Sm – semen; St – stipites

*Origanum vulgare* can be found in about 30% of the pastures, with the average density of 1 ind/m<sup>2</sup>, some pastures containing larger quantities (the Baciului hill; the Lăpușnic Valley). *Primula veris* and *P. elatior* are present in 20% of the pastures, being frequent at altitudes of 600-800 m. In the vicinity of Steierdorf (Dealul Frumos) has been encountered the highest density of *P. veris*, with 15-20 ind/m<sup>2</sup>.

*Urtica dioica* is common in the pastures from the banks of rivers, with the most frequent density being 30-40 ind/m<sup>2</sup> in these areas. *Epilobium sp.* grow in humid places, like the spring of the Buhui, the bank of the rivers Crainic, Bârzava, Buhui, Scocu, with densities of 2-5 ind/m<sup>2</sup>. *Filipendula ulmaria* also grows on the riversides; it can only be found in few places, like the valley of the Miniș river and the

Bârzava river, with an average density of 10-20 ind/m<sup>2</sup>.

### CONCLUSIONS

The pastures of the Aninei Mountains can offer, when rationally exploited, a great number of medicinal species appreciated in phytotherapy, but also a constant source of plant material for research in order to discover new medicines. There have been identified 107 species of pharmaceutical interest, belonging to 29 families. The spontaneous flora of the pastures of this region can supply greater quantities of: *Achillea sp.*, *Thymus sp.*, *Viola sp.*, *Hypericum perforatum*, *Plantago lanceolata*, *Origanum vulgare*, *Primula sp.*, *Taraxacum officinale*, *Urtica dioica*, *Filipendula ulmaria*

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