

## **PTERIDIUM AQUILINUM (L.) KUHN. – COLONISING SPECIES IN THE SOUTH-WESTERN OF ROMANIA**

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### **ABSTRACT**

According to the geobotanical research carried out between 2000-2012, in the south-western part of Romania, there were identified one plant community - *Clinopodio vulgaris-Pteridietum aquilini* Dihoru 1975, edified by *Pteridium aquilinum* (L.) Kuhn. - colonizing species. The fern *Pteridium aquilinum* (L.) Kuhn, known under the names "wolf's clothes" and "field fern", is an example of a plant very well adapted, which ensures its being widespread as compared to other cormophytes. Wolf's clothes is a colonising and invasive species (Pysek, P., 1995) which fits very well to agroecosystems and natural, degraded ecosystems, being almost impossible to combat. In the south-western of Romania this plant community meets in the Capatanii Mountains, Parang Mountains, Valcan Mountains, Lotru Mountains, Semenic Mountains, Aninei Mountains, Cernei Mountains, Tarcu Mountains, Godeanu Mountains and SubCarpathian area of Oltenia.

### **INTRODUCTION**

The fern *Pteridium aquilinum* (L.) Kuhn, known under the names "wolf's clothes" and "field fern", is an example of a plant very well adapted, which ensures its being widespread as compared to other cormophytes. *Wolf's clothes* is a colonising and invasive species (Pysek, P., 1995) which fits very well to agroecosystems and natural, degraded ecosystems, being almost impossible to combat. Although it is a native plant, because it stretches over large areas in our country, more particularly in the hill and lower mountain areas, due to the inefficient methods of combat, we think that it should be paid special attention to. The extension of the invaded areas underlies three main causes: agricultural desertion, the reduction of pasturing and deforesting. The effects are: economic, ecological (the reduction of biodiversity) and they also affect the health of both the animals and man (West, T.M., Lawrie, J., Cromack, T., 1995).

### **MATERIALS AND METHODS**

For the study of the vegetal carpet we have used methods of phyto-sociologic research characteristic to the Central European phyto-sociologic School, which was based on the principles and methods elaborated by J. Braun-Blanquet (1926).

The plant community were identified and distinguished according to the characteristic, edifying, dominant and differential species. The name of the vegetal association was given taking into account the regulations stated by the Phytosociologic Nomenclature Code (2000).

### **RESULTS AND DISCUSSION**

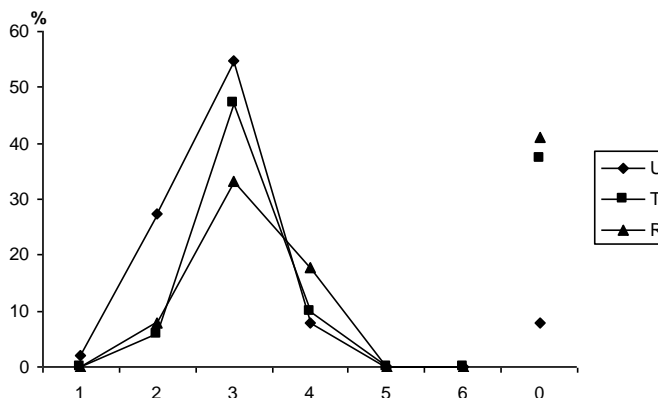
Its spreading in Romania arouses interest and the clarification of some aspects which are to lead to the limitation of the expansion of the field fern. In our country, even a vegetal association was described *Clinopodio vulgaris-Pteridietum aquilini* Dihoru 1975 (Table 1), for the first time by Dihoru in 1975. The paper shall focus on the corology, ecology, and the floristic composition of this plant community, edified by *Pteridium*

*aquilinum* (L.) Kuhn in the south-western of Romania.

**Ass. *Clinopodio vulgaris*-*Pteridietum aquilinii* Dihoru 1975**

**Corology.** This association is widely spread in the hill area, at the edge of the woods, on formerly potatoe cultures, on slopes generally oriented to the S, SW and SE. In the south-western of Romania, this plant community of wolf's clothes is spread over control and the return of the fields to the agricultural circuit. In the south-western of Romania this plant community meets in the Capatanii Mountains, Parang Mountains, Valcan Mountains, Lotru Mountains, Semenice Mountains, Aninei Mountains, Cernei Mountains, Tarcu Mountains, Godeanu Mountains and SubCarpathian area of Oltenia.

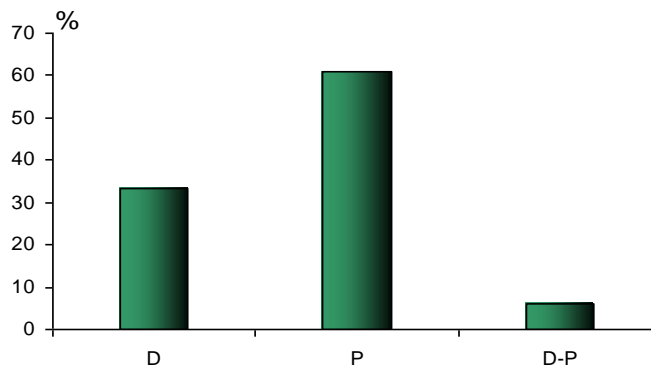
**Ecology.** Analysing the behaviour of the species which compose the phytocoenoses on account of the main ecological factors, we can notice the prevalence of mesophyle species, micromesothermic species and amphotolerant (euriionic) species (Borhidi, A., 1995 and Niculescu M., 2006)(fig. 1).



**Fig.1. Ecologic indexes for the ass. *Clinopodio vulgaris*-*Pteridietum aquilinii* Dihoru 1975 (for the relevés from the Capatanii Mountains)**

**Physiognomy and floristic composition.** These phytocoenoses (fig. 3, 4, 5, 6) do not have a special composition, being characterised by the dominance of the species *Pteridium aquilinum*, and also the species: *Potentilla reptans*, *P. argentea*, *Agrostis capillaris*, *Ranunculus repens*, *Thymus pulegioides*, *Prunella vulgaris*, *Viola tricolor*, *V. reichenbachiana*, *Urtica dioica*, *Fragaria viridis*, *Festuca rubra*, *Carex caryophyllea*.

Analysing these phytocoenoses on the basis of bioforms, we notice the prevalence of geophytes. The results which were obtained as a result of the analyses upon the phytocoenoses, according to phyto-geographic criteria underline the prevalence of the Eurasian elements, followed by circumpolar elements. The caryologic spectrum prevailingly contains polyploid species, followed by the diploid and diplo-polyploid species (fig. 2).



**Fig. 2. Caryologic spectrum for the ass. *Clinopodio vulgaris*-*Pteridietum aquilinii* Dihoru 1975**



**Fig .3. *Pteridium aquilinum* by invading the meadows from the south-western part of the country (Semenic Mountains) (foto Alma Lioara Nicolin)**



**Fig. 4. Ass. *Clinopodio vulgaris*-*Pteridietum aquilini* Dihoru 1975 La Table, Capatanii Mountains (foto Mariana Niculescu)**





**Fig.5. Ass. *Clinopodio vulgaris*-*Pteridietum aquilinii* Dihoru 1975, Jaristea Vaideenilor-Capatanii Mountains (foto Mariana Niculescu)**



**Fig. 6. Ass. *Clinopodio vulgaris*-*Pteridietum aquilinii* Dihoru 1975, Dealul Mare – Capatanii Mountains (foto Mariana Niculescu)**

**Syndynamics.** The fern groups usually grow at the edge of the Turkey oak and the common oak reaching up to the oak forests.

They are ecotone groups, stages in the process of the wooden vegetation rebirth.

In the initial stages, these areas are invaded by shrubs, especially by hawthorn and bramble, then by pioneer trees such as the birch tree (in the coenoses in the Siriu Mountain described by G. Dihoru (1975) and at Zeicani- an investigated territory).

**Ass. *Clinopodio vulgaris*-*Pteridietum aquilinii* Dihoru 1975**

Table no. 1

No. of relevée	1	2	3	4	5	6	7	8	9	10	K
Altitude m.o.s. (x 10 m)	55	60	60	30	30	30	75	80	75	89	
Exposure	SV	V	SE	E	-	-	N	S	SV	SE	
Inclination (in grades)	15	7	10	5	-	-	50	40	40	30	
Coverage (%)	95	100	100	100	95	100	100	100	100	95	
Area (m <sup>2</sup> )	200	200	200	200	200	200	100	100	100	100	
Vegetation height	170	170	175	140	140	150	100	60	60	120	
<b>Char. ass.</b>											
<i>Pteridium aquilinum</i>	5	5	5	5	5	5	5	5	5	5	V
<i>Clinopodium vulgare</i>	+	+	+	+	+	+	+	+	+	+	V
<b>Trifolio-Geranietea sanguineii &amp; Origanetalia</b>											
<i>Astragalus glycyphyllos</i>	-	-	+	-	+	+	-	-	-	-	II
<i>Coronilla varia</i>	-	-	+	-	+	+	-	-	-	-	II
<i>Origanum vulgare</i>	-	+	+	-	-	-	+	-	-	-	II
<i>Viola hirta</i>	+	-	-	-	+	+	-	-	-	-	II
<i>Campanula rapunculoides</i>	-	+	-	-	-	-	-	+	-	-	I
<i>Euphorbia epithymoides</i>	-	+	-	-	-	-	-	+	-	-	I
<i>Stachys germanica</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Peucedanum oreoselinum</i>	-	+	-	-	-	-	+	+	-	-	I
<i>Prunella laciniata</i>	-	-	-	-	-	+	+	+	-	-	II
<b>Molinio-Arrhenatheretea &amp; Molinietalia</b>											
<i>Trifolium repens</i>	+	-	+	-	+	-	-	-	+	-	II
<i>Poa pratensis</i>	+	-	+	-	+	+	+	-	-	-	III
<i>Medicago lupulina</i>	-	+	+	-	-	+	-	+	-	-	II
<i>Achillea millefolium</i>	-	+	-	-	+	+	+	-	+	-	III
<i>Bromus mollis</i>	+	-	+	-	-	-	-	+	-	-	II
<i>Ranunculus repens</i>	+	-	+	+	-	+	+	+	-	+	IV
<i>Trifolium pretense</i>	+	+	-	+	+	-	+	+	+	-	IV
<i>Festuca rubra</i>	+	+	+	+	+	+	+	+	+	+	V
<i>Anthoxanthum odoratum</i>	-	+	+	+	-	-	-	-	-	-	II
<i>Potentilla reptans</i>	+	+	+	+	+	+	+	+	+	+	V
<i>Stellaria graminea</i>	-	-	+	+	-	+	+	+	-	+	III
<i>Thymus pulegioides</i>	+	+	+	+	+	+	+	+	+	+	V
<i>Prunella vulgaris</i>	-	+	+	+	+	+	+	+	+	+	V
<i>Leucanthemum vulgare</i>	+	-	+	-	-	-	+	+	-	-	II
<i>Agrostis capillaris</i>	+	+	+	+	+	+	+	+	+	+	V
<i>Vicia cracca</i>	+	+	+	+	-	+	+	+	-	-	IV
<i>Viola tricolor</i>	+	+	+	+	-	+	+	-	-	-	III
<i>Cerastium fontanum ssp. vulgare</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Dactylis glomerata</i>	+	-	-	+	+	-	-	+	-	-	II
<i>Euphrasia rostkoviana</i>	-	-	-	+	-	-	-	-	+	-	I
<i>Festuca pratensis</i>	+	-	-	+	-	+	+	+	+	-	III
<i>Holcus lanatus</i>	-	+	-	-	+	+	-	-	-	-	II
<i>Leontodon hispidus</i>	+	-	-	-	+	+	-	-	-	-	II
<i>Plantago lanceolata</i>	-	+	-	-	-	-	-	+	-	-	I
<i>Achillea millefolium</i>	-	+	-	-	-	-	-	+	-	-	I
<i>Anthriscus sylvestris</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Knautia arvensis</i>	-	+	-	-	-	-	+	+	-	-	I
<i>Luzula campestris</i>	-	-	-	-	-	+	+	+	-	-	II
<i>Dactylorhiza maculata</i>	-	-	-	-	-	-	-	+	+	-	I
<i>Juncus effusus</i>	-	-	-	-	-	-	-	+	+	-	I
<i>Lychnis flos-cuculi</i>	-	-	-	-	-	-	-	+	+	-	I
<i>Linum catharticum</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Rorippa pyrenaica</i>	-	-	-	+	-	-	-	+	-	-	I

<i>Trifolium dubium</i>	+	-	-	-	+	-	-	-	-	-	I
<i>Daucus carota</i>	-	-	-	-	+	+	-	-	-	-	I
<b>Molinion</b>											
<i>Galium boreale</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Molinia caerulea</i>	-	-	-	-	-	+	-	+	-	-	I
<i>Succisa pratensis</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Viola elatior</i>	-	-	-	-	-	-	+	+	-	-	I
<b>Nardetalia &amp; Nardo-Callunetea</b>											
<i>Nardus stricta</i>	-	-	-	-	-	-	-	+	-	+	I
<i>Danthonia decumbens</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Potentilla erecta</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Antennaria dioica</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Carex pallescens</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Hypericum maculatum</i>	-	-	-	-	+	+	-	+	-	-	II
<i>Veronica officinalis</i>	+	+	-	-	+	+	-	-	-	-	II
<b>Cynosurion</b>											
<i>Phleum pratense</i>	-	-	-	+	-	+	+	-	-	-	II
<i>Achillea crithmifolia</i>	-	-	-	+	-	-	+	-	-	-	I
<b>Fesuco-Brometea</b>											
<i>Lotus corniculatus</i>	-	+	+	+	-	-	+	-	-	-	II
<i>Teucrium chamaedrys</i>	-	+	+	+	-	-	-	-	-	-	II
<i>Carex caryophylla</i>	+	+	+	-	+	-	-	+	+	-	III
<i>Potentilla argentea</i>	+	+	+	+	+	+	-	+	+	+	V
<i>Hypericum perforatum</i>	-	+	+	+	-	+	-	-	-	+	III
<i>Agrimonia eupatoria</i>	-	-	+	+	-	-	+	-	-	-	II
<i>Festuca rupicola</i>	-	-	-	-	+	+	-	-	-	+	I
<i>Ajuga genevensis</i>	+	+	+	-	-	+	+	+	-	+	IV
<i>Asperula cynanchica</i>	-	-	-	+	+	-	-	-	-	-	I
<i>Brachypodium pinnatum</i>	-	-	+	+	+	-	-	-	-	-	II
<i>Campanula glomerata</i>	-	+	-	-	-	+	-	+	-	-	II
<i>Dichanthium ischaemum</i>	-	-	-	+	+	-	-	-	-	-	I
<i>Eryngium campestre</i>	-	-	-	+	+	-	-	-	-	-	I
<i>Euphorbia cyparissias</i>	-	-	-	-	-	+	+	+	-	-	II
<i>Galium mollugo</i>	-	+	-	+	+	-	-	-	-	-	II
<i>Pimpinella saxifraga</i>	-	+	-	+	-	+	+	-	-	-	II
<i>Potentilla recta</i>	-	+	-	+	-	+	+	-	-	-	II
<i>Seseli annuum</i>	-	-	-	-	-	+	+	-	-	-	I
<b>Artemisietea</b>											
<i>Urtica dioica</i>	+	+	+	-	-	+	+	+	-	+	IV
<i>Ballota nigra</i>	-	+	+	+	+	-	-	-	-	-	II
<i>Erigeron annuus</i>	-	-	+	+	+	-	-	-	-	-	II
<i>Chrysopogon gryllus</i>	-	+	-	+	-	+	+	-	-	-	II
<i>Cruciata laevipes</i>	-	+	-	+	-	+	+	-	-	-	II
<b>Chenopodietea</b>											
<i>Veronica persica</i>	+	-	+	-	-	-	-	+	-	-	II
<i>Lamium purpureum</i>	-	-	+	+	-	-	-	-	-	-	I
<i>Solanum nigrum</i>	-	+	-	-	-	+	-	+	-	+	II
<i>Veronica hederifolia</i>	-	+	-	+	-	+	+	-	-	-	II
<i>Centaurea phrygia</i> ssp. <i>pseudophrygia</i>	-	-	-	-	+	+	-	-	-	-	I
<b>Querco-Fagetea</b>											
<i>Viola reichenbachiana</i>	+	+	+	-	+	+	+	+	+	+	V
<i>Euphorbia amygdaloides</i>	-	-	+	+	-	-	+	-	-	-	II
<i>Brachypodium sylvaticum</i>	-	+	+	+	-	-	+	-	-	-	III
<b>Fagetalia</b>											
<i>Myosotis sylvatica</i>	-	-	-	-	+	-	+	-	-	-	I
<i>Scophularia nodosa</i>	-	-	+	-	-	+	-	-	-	-	I
<i>Lilium martagon</i>	-	-	-	-	+	+	-	-	-	-	I

<i>Pulmonaria officinalis</i>	-	-	-	+	+	-	-	-	-	-	I
<b>Quecetalia pubescentis</b>											
<i>Campanula persicifolia</i>	+	+	-	-	+	-	-	-	-	-	II
<i>Lychnis coronaria</i>	-	-	-	+	+	-	-	-	-	-	I
<i>Quercus petraea</i> reg.	-	-	-	-	+	+	-	-	-	-	I
<b>Prunetalia</b>											
<i>Crataegus monogyna</i>	+	+	-	-	+	-	-	-	-	-	II
<i>Rosa canina</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Prunus spinosa</i>	-	-	-	+	+	-	-	-	-	-	I
<b>Variae Syntaxa</b>											
<i>Solanum dulcamara</i>	+	+	-	-	+	-	-	-	-	-	II
<i>Fragaria viridis</i>	+	+	+	+	+	+	+	+	+	+	V
<i>Rumex acetosella</i>	+	+	-	+	-	+	-	-	-	+	III
<i>Rorippa sylvestris</i>	-	+	+	+	-	-	+	+	-	-	III
<i>Campanula patula</i> ssp. <i>patula</i>	-	+	+	-	+	-	-	+	+	-	III
<i>Euphorbia cyparissias</i>	-	+	+	+	-	-	-	+	-	-	III
<i>Carthamus lanatus</i>	-	-	-	+	+	-	-	-	-	-	I
<i>Briza media</i>	-	-	-	-	+	-	-	+	-	+	II
<i>Aira elegantissima</i>	-	-	-	-	-	+	-	+	-	-	I
<i>Alchemilla monticola</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Carex acuta</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Carex ovalis</i>	-	-	-	-	-	-	-	+	-	+	I
<i>Calamagrostis epigeios</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Cichorium intybus</i>	-	-	-	-	-	+	+	-	-	-	I
<i>Juncus tenuis</i>	-	-	-	-	-	-	-	+	-	+	I
<i>Potentilla reptans</i>	-	-	-	-	-	-	-	+	+	+	II
<i>Odontites verna</i> ssp. <i>serotina</i>	-	-	-	-	-	+	+	-	-	-	I
<i>Lolium perenne</i>	-	-	-	-	-	-	-	+	+	+	II
<i>Thymus pulegioides</i>	-	-	-	-	-	-	-	+	+	+	II
<i>Thymus pannonicus</i>	-	-	-	-	-	-	-	+	+	+	II
<i>Thymus x porcii</i>	-	-	-	-	-	-	-	+	+	+	II
<i>Agrimonia eupatoria</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Nepeta nuda</i> ssp. <i>nuda</i>	-	-	-	-	-	-	-	+	+	+	
<i>Centaurium erythraea</i> Rafn ssp. <i>erythraea</i>	-	-	-	+	-	-	-	+	-	-	I
<i>Calamagrostis arundinacea</i>	-	-	+	+	-	-	-	+	+	-	II
<i>Scabiosa ochroleuca</i>	-	-	-	-	-	-	-	+	-	+	I
<i>Achillea setacea</i>	-	-	-	-	-	+	+	-	-	-	I
<i>Chamaespartium sagittale</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Polygala vulgaris</i>	-	-	-	-	+	+	-	-	-	-	I
<i>Viola canina</i>	-	-	-	-	-	-	+	+	-	-	I
<i>Cirsium vulgare</i>	-	-	-	-	+	-	-	+	-	-	II
<i>Vulpia myuros</i>	-	-	-	-	-	+	-	+	-	-	II
<i>Veronica serpyllifolia</i>	-	-	-	+	-	+	-	+	-	-	II
<i>Veronica chamaedrys</i>	-	-	-	-	+	+	-	+	-	-	II
<i>Trifolium montanum</i>	-	-	-	-	-	-	-	+	+	+	II
<i>Stachys annua</i>	-	+	-	+	-	-	-	+	-	-	II
<i>Solidago virgaurea</i>	-	-	-	-	-	-	-	+	+	+	II
<i>Primula vulgaris</i>	-	-	-	+	+	-	-	-	-	-	I
<i>Potentilla argentea</i>	+	-	-	-	-	+	+	-	-	-	II
<i>Rubus fruticosus</i>	-	-	-	-	-	+	-	+	-	-	I
<i>Rubus plicatus</i>	-	-	-	-	-	+	+	-	-	-	I
<i>Rubus discolor</i>	-	-	-	-	-	+	+	-	-	-	I
<i>Silene nutans</i> ssp. <i>dubia</i>	-	-	-	-	-	-	-	+	-	+	I
<i>Spiranthes spiralis</i>	-	-	-	-	-	-	-	+	-	+	I
<i>Quercus cerris</i> reg.	-	-	-	+	+	-	-	-	-	-	I

**Place and data of the relevés:** 1, 2, 3 – Luncavat V., Capatanii Mountains, 12.07.2005, 4, 5, 6 – Pestisani – Gorj, 7.08.2010, 7, 8, 9, 10 – Semenic Mountains, 10.08.2003

**Importance.** They have no economic importance, being harmful plants. Nevertheless, the leaves of the bracken fern are used as sheets for animals, especially for pigs. The spores of this fern are cancerous for human beings: Hirayama (Page, C.N., 1997 and Scragg, E.B., McKelvie, A.D., Kilgour, D.W., 1972) discovered a high rate of cancer in one region in Japan where the new leaves of the fern are considered dainties. In

England, the ashes of the plant were used to prepare a lye which replaced the soap or as a fertilizer for potatoes (West, T. M., Lawrie, J., Cromack, T., 1995). The other uses of the plant were limited to caustic in dye industry.

## CONCLUSIONS

The areas with *Pteridium aquilinum* have largely extended in south-western of Romania in the last years. The causes of this expansion are: the mismanagement of pastoral patrimony, pasture degradation, bad agricultural practices, and the degradation of some agricultural land because of the lack of interest of some categories of landowners, the bad and very expensive chemical control taking into account the current economic framework and the biological features of the plant. The extension of the fern has multiple repercussions: the disappearance of some agricultural regions, the deterioration of the agricultural land, further threats to the health of people and animals, the reduction of the specific biodiversity.

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