

**GRASSLANDS CARTOGRAPHY IN TRANSYLVANIAN PLAIN  
(CÂMPIA TRANSILVANIEI), USING SATELLITE IMAGES**

VASILE CRISTEA<sup>1</sup> – CORINA BASNOU<sup>1</sup> – MIHAI PUSCAS<sup>2</sup>  
– MARIUS BARBOS<sup>1</sup> – JÓZSEF FRINK

<sup>1</sup> "Babeş-Bolyai" University, Faculty of Biology-Geology,  
Republicii 42, 3400 Cluj-Napoca, Romania

<sup>2</sup> Botanical Garden "Al. Borza", Republicii 42, 3400 Cluj-Napoca, România  
*lcristea@bioge.ubbcluj.ro, lcorinaesp@yahoo.com,*  
*puscasmihai@yahoo.com, barbos@go.ro*

**Abstract**

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The present paper is part of a larger study carried out on the cartography of grasslands in Romania, and it regards its Northern part, known as the Transylvanian Plain. The methods used are based upon the analysis of satellite images (scale: 1: 25.000). The qualitative and quantitative structures of phytocoenoses (alliances) were studied using transects and the coverage of each species was estimated according to Tansley's scale. Special attention was paid to endangered and endemic species. The anthropogenic influences are further analyzed, emphasizing the importance of cartography in vegetation studies.

**Key words:** cartography, alliance, Tansley's scale

**The importance of vegetation cartography**

Geobotanical cartography „is dealing, in map form, with the spatial and time-space phenomena concerning the flora and vegetation of a certain region” (PEDROTTI 1983, p. 317). The typology of vegetation maps is ample. There are phytosociological maps, maps of potential vegetation, dynamic maps, synphytosociological and geosynphytosociological maps. Among these maps, the phytosociological ones are the most important, because they have a high informational capacity (FALINSKI 1993). This kind of map represents a static picture of vegetation, an actual “photo” of the landscape, being the starting point for the realization of other kinds of maps; its basic condition is the use of the same scale, which is favorable for the comparison and establishing of dynamic series.

The present study is part of an ample project aiming the cartography of semi-natural grasslands from Romania (National Grassland Inventory Project Romania, PIN-MATRA-00 B.4.21) and it has been carried out in the central part of Transylvania, in a hilly region, improperly named the Transylvanian Plain (fig. 1).

The entire PIN-MATRA project includes grasslands cartography in some countries from Central and Eastern Europe: Slovakia, Hungary, Romania, Bulgaria.

### The Study Area

The so-called Transylvanian „Plain” is a geomorphological unit from the Transylvanian Depression, with soft hills (with altitudes between 400-550 m.s.m.), large and very large valleys and land slides on the Southern slopes. The name „plain” mostly refers to the land use, which is a predominantly agricultural one (MORARIU - SAVU 1970).

The geological substratum is dominated by sedimentary rocks (clay, chalky clay, sand) dating back to the Neogen and Oligocen ages (CIUPAGEA - PAUCA - ICHIM 1970). Chalky clays and salt - bearing clays (Turda, Cojocna) or methane gas nests (Sărmaş) also appear frequently.

The climate is of the continentally-temperate type, with medium annual temperatures of 8,5-9o C, rainfall between 500-550 l/m2, winds prevailing from the Western sectors and with drought periods in August and in the first half of September.

All these conditions, along with the dominant herbaceous vegetation (ord. *Festucetalia valesiaca* and *Arrhenatheretalia*) and a reduced wood vegetation (ord. *Quercetalia robori-petraeae*), generated the following soils: leached chernozems, brown soils, illuvial soils, with leached or psudogleyied profiles (FLOREA et al. 1968).

Our research concerned, at a first stage, the region from map no. L 35-37 Cc and L 35-37 Cd, belonging to the Frata (Cluj county) and Miheşu de Câmpie (Mures county) localities.

### Methods

Realizing a vegetation map means both field (relevés, transects, profiles) and laboratory work (interpretation of satellite images or aerial photos, study of bibliography, delimitation of vegetation units on the topographic map and so on).

The basic maps used for this study were satellite images and topographic maps, both of them on scale 1:25 000. Mapping units were represented by alliances, the smallest mapping unit having 0.5 ha. Surfaces below 0.5 ha were taken into account only if they had botanical relevance.

The polygons identified on satellite images were checked in the field and were correlated with the topographic map, thus being established the real limits of semi-natural grasslands (fig. 2).

The following areas within the polygons were not mapped:

- grassland invaded by weeds, namely those which contained more than 40% ruderal or foreign species, marked with R;
- agricultural fields, marked with A;
- erosion areas, marked with E;
- areas covered with more than 40% trees and 60% shrubs, marked with T.

A field file was completed for each over 0.5 ha polygon. This included the data regarding the geomorphologic aspects, the management of the area as well as the floristic

tic composition of transects of different length, in accordance with the heterogeneity and complexity of each polygon. If we had a complex of phytosociological units, the field file contained the dominant alliance, the minor ones being just mentioned.

The coverage of each species was estimated according to Tansley's scale (1 = presence < 1%, 2 = presence 1-50%, 3 = presence > 50%).

The species have been named according to the Flora Europaea I - V, the information concerning the endemic, endangered and rare plants were presented according to DIHORU - PARVU (1987) and OLTEAN et al. (1994).

## Results and Discussion

The Transylvanian Plain and his steppic vegetation with an important number of endemic and xerothermic relict species, were studied in particular from the floristical and phytosociological point of view, according to the French-Swiss School, by the botanists from Cluj (POP et al. 2002).

All these studies did not focus upon vegetation cartography, the main subject of the present study, which is important for studying the dynamics of the herbaceous vegetation, as well.

A number of 70 transects were realized during the summer 2001, corresponding to a total of 45 polygons, within which 6 alliances have been identified (tab. 1):

### 1. *Cynosurion* R. Tx. 1947 (CYN)

It is characteristic for hilly and mountainous, mesophilous grasslands, growing on well drained and nutrient-poor soils, with slightly acid reaction. The vegetation of this alliance dominates in our area of study the shadowed slopes of the hills.

Among the dominant and characteristic species there are *Agrostis capillaris*, *Cynosurus cristatus*, *Lolium perenne*, *Trifolium repens*, *Festuca pratensis*, *Leontodon autumnalis*, *Phleum pratense*, *Festuca rupicola* etc. In the flora of these grasslands, there have been identified 207 species of vascular plants, based on 37 transects, including *Salvia transsilvanica* (end, r) and *Dianthus collinus* ssp. *glabriusculus* (r).

### 2. *Festucion valesiacae* Klika 1931 (FDS)

This alliance contains xerophilous hilly and plateau grasslands which are frequently grown on sunny slopes (in the south-west, the north-west and the west), with soft or more abrupt slopes and with little erosion. In what surface is concerned, it stays immediately after *Cynosurion* communities and we think that it was secondarily settled, thanks to the old anthropic pression.

Among the dominant and characteristic species there are: *Dichanthium ischaemum*, *Stipa capillata*, *Festuca valesiaca*, *Festuca rupicola*, *Carex humilis*, *Astragalus austriacus*, *Adonis vernalis*, *Dorycnium pentaphyllum* ssp. *herbaceum* etc.

We identified in these grasslands 131 species; several of them are included in the Red List: *Cephalaria radiata* (r, end), *Salvia transsilvanica* (r, end), *Muscari neglectum* (r), *Crambe tataria* (r) and *Peucedanum tauricum* (r).

### 3. *Agrostion albae* Soó 1943 (AAP)

It consists of hygro-mesophilous grasslands, characteristic for river and brook side meadows and for the small depressions with slightly wet soils.

The dominant and characteristic species are *Agrostis stolonifera*, *Deschampsia caespitosa*, *Crepis biennis*, *Carex vulpina*, *C. distans*, *C. riparia* and others.

The floristic composition (based on 11 transects) includes 46 species, without any of them found in the Red List.

### 4. *Magnocaricion elatae* Koch 1926 (MAC)

They are hygrophilous grasslands from depressions and meadows with excessive and permanent humidity.

The dominant and characteristic species found are: *Glyceria maxima*, *Carex riparia*, *C. vulpina*, *Equisetum fluviatile*, *Phragmites australis*, *Agrostis stolonifera*.

Although only a single transect was performed, the floristic composition totalizes 30 species. No Red List taxa were found.

### 5. *Juncion gerardi* Wendelb. 1943 (PBJ)

These salt meadows are often found on salty and damp soils. The dominant and characteristic species found are: *Juncus gerardi*, *Scorzonera parviflora*, *Triglochin maritima*, *Phragmites australis*, *Trifolium fragiferum*.

According to extreme environmental conditions, and due to a limited number of transects investigated, only 17 species have been identified, none of them being included in the Red List.

### 6. *Sparganio-Glycerion fluitantis* Br.-Bl. et Sissingh 1942 (SGP)

This alliance consists of hydro-hygrophilous grasslands, found on the edge of bogs and ponds, inhabiting alluvial soils, rich in clay, neutral or slightly acid.

The only transect investigated revealed 12 species, the characteristic and the most important ones being: *Sparganium erectum*, *Scirpus lacustris*, *Glyceria plicata*, *Lycopus europaeus*, *Phragmites australis*

## Conclusions

1. Most of the grasslands investigated during this study belong to the *Cynosurion* alliance, which are used as pastures for cattle and sheep and only partly, at smaller scale, as meadows. In many cases we noticed an incipient phase of degradation, due to overgrazing, which led to the infiltration and even to the invasion of some species such as *Cirsium vulgare*, *Eryngium campestre*, *Euphorbia cyparissias*, *Xanthium spinosum*, *Arctium tomentosum*, *Capsella bursa-pastoris*, *Convolvulus arvensis* and *Lolium perenne*.

2. Anthropogenic and zoogenic causes led also to the formation of xerophilous phytocoenoses located on abrupt slopes, belonging to the *Festucion valesiacae* alliance. They are quantitatively not very important, being used as pastures for sheep. Some small

and somewhat protected areas, which were „spared” from anthropic pressure, maintain some interesting plant communities, sheltering many characteristic species for the so called Transylvanian „steppe” (*Agropyron cristatum* ssp. *pectinatum*, *Goniolimon tataricum*, *Vinca herbacea*, *Asparagus officinalis*, *Jurinea mollis*, *Linum flavum*, *Ajuga laxmanii* etc.).

3. Phytocoenoses of the *Agrostion albae*, *Magnocaricion elatae* and *Sparganio-Glycerion fluitantis* alliances cover only small areas, in the brook meadows and the depressions between the hills. They are used as meadows exclusively due to their high productivity. Processes of salt enrichment could appear, indicated by the presence of some species such as *Juncus gerardi*, *Trifolium fragiferum*, *Triglochin palustris*, *Plantago cornuti* etc. A higher loading with salt leads to *Juncion gerardi* grasslands distributed over even smaller areas.

4. The use of satellite images allowed a quick and accurate identification of the mapping units, according to the physiognomy and the structure of vegetation and to the real situations in the field.

5. The use of Tansley’s scale allowed a much quicker quantification of the coverage for each species, over large areas, and all the species resulted from the transects allowed the positive recognition and classification of grasslands in the proper alliances, as well as the evaluation of anthropogenic and zoogenic impact upon grasslands.

6. The studies which will be continued and extended in the following years, will either confirm or infirm the utility of the method used in this project.

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Tab. 1. The structure of the alliances, identified through transects of vegetation

<b>Alliance</b>	<b>CYN</b>	<b>FDS</b>	<b>AAP</b>	<b>MAC</b>	<b>PBJ</b>	<b>SGP</b>
<b>No. of transects</b>	<b>37</b>	<b>19</b>	<b>11</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>No. of species</b>	<b>207</b>	<b>131</b>	<b>46</b>	<b>30</b>	<b>17</b>	<b>12</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Dominant species</b>						
<i>Agrostis capillaris</i>	1-3	*	*	*	*	*
<i>Agrostis stolonifera</i>	1	*	3	3	2	*
<i>Carex distans</i>	*	*	2	*	1	*
<i>Carex humilis</i>	*	1-2	*	*	*	*
<i>Carex riparia</i>	*	*	2	1	*	1
<i>Dichanthium ischaemum</i>	1	1-3	*	*	*	*
<i>Festuca rupicola</i>	2-3	1-3	*	*	*	*
<i>Festuca valesiaca</i>	1	1-2	*	*	*	*
<i>Glyceria maxima</i>	*	*	1	2	*	1
<i>Glyceria plicata</i>	*	*	2	*	*	1
<i>Juncus gerardi</i>	*	*	1	2	2	*
<i>Phragmites australis</i>	*	*	1	2	2	1
<i>Sparganium erectum</i>	*	*	*	*	*	2
<i>Stipa capillata</i>	*	1-3	*	*	*	*
<b>Other types</b>						
<i>Achillea collina</i>	*	1-2	*	*	*	*
<i>Achillea millefolium</i>	1-2	1	1	*	1	*
<i>Adonis vernalis</i>	1	1	*	*	*	*
<i>Agrimonia eupatoria</i>	1	1	*	*	*	*
<i>Agropyron cristatum ssp. pectinatum</i>	*	1	*	*	*	*
<i>Agrostis gigantea</i>	2	*	*	*	*	*
<i>Ajuga genevensis</i>	1	*	*	*	*	*
<i>Ajuga laxmanni</i>	*	1	*	*	*	*
<i>Alisma lanceolatum</i>	*	*	*	1	*	1
<i>Alisma plantago-aquatica</i>	*	*	1	1	*	*
<i>Allium vineale</i>	*	1	*	*	*	*
<i>Althaea officinalis</i>	*	1	*	*	*	*
<i>Anagalis arvensis</i>	1	*	*	*	*	*
<i>Anthericum ramosum</i>	1	1	*	*	*	*
<i>Anthoxanthum odoratum</i>	1	*	*	*	*	*
<i>Anthyllis vulneraria</i>	1	*	*	*	*	*
<i>Arctium lappa</i>	*	*	1	*	*	*
<i>Arctium tomentosum</i>	1	*	*	*	*	*
<i>Arenaria serpyllifolia</i>	1	*	*	*	*	*
<i>Arrhenatherum elatius</i>	1	*	*	*	*	*
<i>Artemisia absinthium</i>	1	*	*	*	*	*
<i>Artemisia austriaca</i>	*	1	*	*	*	*

1	2	3	4	5	6	7
<i>Artemisia campestris</i>	*	1	*	*	*	*
<i>Artemisia pontica</i>	*	1	*	*	*	*
<i>Asparagus officinalis</i>	*	1	*	*	*	*
<i>Asperula cynanchica</i>	1	1	*	*	*	*
<i>Aster linosyris</i>	*	1	*	*	*	*
<i>Astragalus austriacus</i>	1	1	*	*	*	*
<i>Astragalus cicer</i>	1	*	*	*	*	*
<i>Astragalus monspessulanus</i>	1	1	*	*	*	*
<i>Bidens tripartita</i>	*	*	*	1	*	*
<i>Brachypodium pinnatum</i>	*	1	*	*	*	*
<i>Briza media</i>	1	*	*	*	*	*
<i>Bromus hordeaceus ssp. hordeaceus</i>	1	*	*	*	*	*
<i>Bromus sterilis</i>	1	*	*	*	*	*
<i>Buglossoides arvensis</i>	*	1	*	*	*	*
<i>Bupleurum falcatum</i>	*	1	*	*	*	*
<i>Butomus umbellatus</i>	*	*	*	1	*	1
<i>Campanula cervicaria</i>	1	*	*	*	*	*
<i>Campanula patula</i>	1	*	*	*	*	*
<i>Capsella bursa-pastoris</i>	1	*	*	*	*	*
<i>Cardaria draba</i>	1	*	*	*	*	*
<i>Carduus acanthoides</i>	1	1	*	*	*	*
<i>Carex acutiformis</i>	*	*	1	*	*	1
<i>Carex montana</i>	1	*	*	*	*	*
<i>Carex rostrata</i>	*	*	*	1	*	*
<i>Carex vulpina</i>	1	*	1	1	*	*
<i>Carlina vulgaris</i>	1	1	*	*	*	*
<i>Centaurea biebersteinii ssp. biebersteinii</i>	1	*	*	*	*	*
<i>Centaurea phrygia</i>	1	1	*	*	*	*
<i>Centaurea scabiosa</i>	1	1	*	*	*	*
<i>Centaurium erythraea</i>	1	1	*	*	*	*
<i>Cephalaria radiata</i>	1	1	*	*	*	*
<i>Cerastium fontanum</i>	1	*	*	*	*	*
<i>Cerintho minor</i>	1	1	*	*	*	*
<i>Chenopodium album</i>	1	*	*	*	*	*
<i>Cichorium intybus</i>	1	1	*	*	*	*
<i>Cirsium arvense</i>	*	*	1	*	*	*
<i>Cirsium canum</i>	*	*	1	1	1	*
<i>Cirsium vulgare</i>	1	1	*	*	*	*
<i>Clematis recta</i>	1	*	*	*	*	*
<i>Convolvulus arvensis</i>	1	1	*	*	*	*
<i>Conyza canadensis</i>	1	*	*	*	*	*
<i>Cornus sanguinea</i>	*	1	*	*	*	*
<i>Coronilla varia</i>	1	1	*	*	*	*
<i>Crambe tatarica</i>	*	1	*	*	*	*
<i>Crataegus monogyna</i>	1	1	*	*	*	*



Fig. 1: The situation of the Transylvanian Plain in Romania

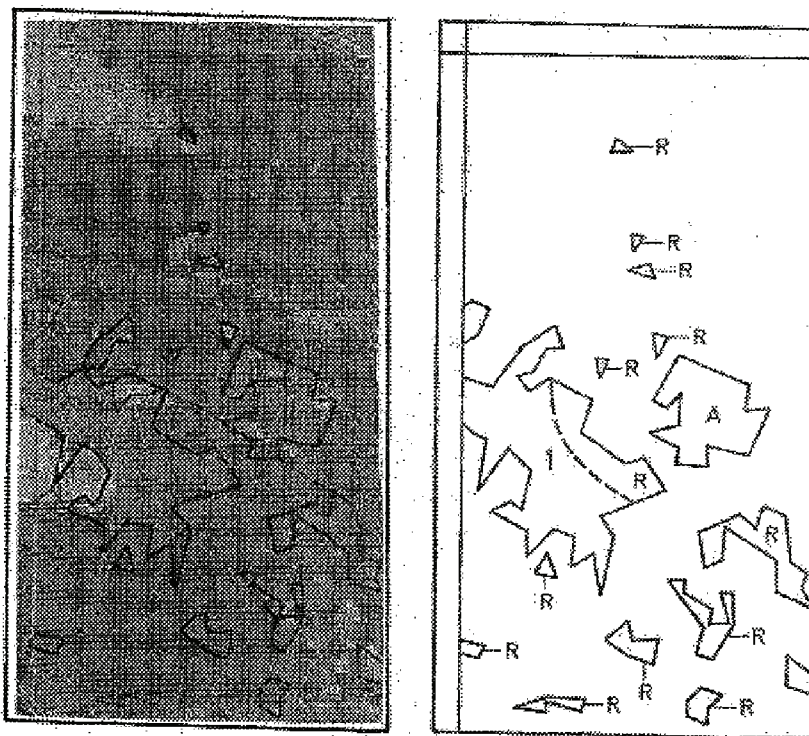


Fig. 2 Example of photointerpretation of satellite images (a) and the chorological map obtained: (b): A - cultivated fields, R - ruderal grasslands, I - homogenous polygon.



1	2	3	4	5	6	7
Crepis biennis	*	*	1	*	*	*
Crepis setosa	1	1	*	*	*	*
Cruciata glabra	1	*	*	*	*	*
Cynodon dactylon	1	1	*	*	*	*
Cynosurus cristatus	1	*	*	*	*	*
Cytisus hirsutus	1	*	*	*	*	*
Cytisus leucotrichus	1	*	*	*	*	*
Dactylis glomerata	1	*	*	*	*	*
Daucus carota ssp. carota	1	1	1	*	*	*
Delphinium consolida	1	*	*	*	*	*
Deschampsia caespitosa	*	*	1	*	*	*
Descurainia sofia	1	*	*	*	*	*
Dianthus armeria	1	*	*	*	*	*
Dianthus carthusianorum	1	*	*	*	*	*
Dianthus collinus ssp. glabriusculus	1	*	*	*	*	*
Dipsacus laciniatus	1	*	*	*	*	*
Dorycnium pentaphyllum ssp. herbaceum	1	1	*	*	*	*
Echinochloa crus-galli	*	*	1	*	*	*
Echinops sphaerocephalus	1	*	*	*	*	*
Echium vulgare	1	1	*	*	*	*
Eleocharis carniolica	*	*	2	*	2	*
Elymus hispidus	1-2	1	*	*	*	*
Elymus repens	1	1	*	*	*	*
Equisetum arvense	1	*	*	*	*	*
Equisetum fluviatile	*	*	*	1	*	*
Equisetum limosum	*	*	1	*	*	*
Erigeron acer	1	1	*	*	*	*
Erigeron annuus	*	1	*	*	*	*
Erodium cicutarium	1	*	*	*	*	*
Eryngium campestre	1	1	*	*	*	*
Eryngium planum	1	1	*	*	*	*
Euphorbia cyparissias	1	1	*	*	*	*
Euphorbia epithymoides	*	1	*	*	*	*
Euphorbia salicifolia	1	*	1	1	*	*
Falcaria vulgaris	1	1	*	*	*	*
Festuca pratensis	1	*	1	*	*	*
Filipendula vulgaris	1	1	*	*	*	*
Fragaria viridis	1-2	1-2	*	*	*	*
Galium boreale	1	*	*	*	*	*
Galium mollugo	1	*	*	*	*	*
Galium verum	1-2	1	*	*	*	*
Genista tinctoria	1	*	*	*	*	*
Geranium columbinum	1	*	*	*	*	*
Goniolimon tataricum	*	1	*	*	*	*
Gratiola officinalis	*	*	*	1	*	*

1	2	3	4	5	6	7
<i>Gypsophila muralis</i>	1	*	*	*	*	*
<i>Helianthemum nummularium</i>	1	*	*	*	*	*
<i>Helleborus purpurascens</i>	1	*	*	*	*	*
<i>Hieracium prealtum</i> ssp. <i>bauhinii</i>	1	*	*	*	*	*
<i>Hieracium pilosella</i>	1	1	*	*	*	*
<i>Hordeum murinum</i>	1	*	*	*	*	*
<i>Hypericum perforatum</i>	1	1	*	*	*	*
<i>Inula britannica</i>	1	1	*	*	*	*
<i>Juncus effusus</i>	1	*	1	*	*	*
<i>Jurinea mollis</i>	1	1	*	*	*	*
<i>Knautia arvensis</i>	1	*	*	*	*	*
<i>Koeleria macrantha</i>	*	1	*	*	*	*
<i>Lathyrus tuberosus</i>	1	*	*	*	*	*
<i>Leontodon autumnalis</i>	1	1	*	*	*	*
<i>Leontodon hispidus</i>	1	1	*	*	*	*
<i>Leonurus cardiaca</i>	1	*	*	*	*	*
<i>Lepidium campestre</i>	1	1	*	*	*	*
<i>Leucanthemum vulgare</i>	1	1	*	*	*	*
<i>Ligustrum vulgare</i>	*	1	*	*	*	*
<i>Linaria vulgaris</i>	1	*	*	*	*	*
<i>Linum austriacum</i>	1	1	*	*	*	*
<i>Linum catharticum</i>	1	*	*	*	*	*
<i>Linum flavum</i>	*	1	*	*	*	*
<i>Linum perenne</i>	1	1	*	*	*	*
<i>Linum tenuifolium</i>	*	1	*	*	*	*
<i>Lolium perenne</i>	1-2	*	*	*	*	*
<i>Lotus corniculatus</i>	1	1	*	*	*	*
<i>Lotus tenuis</i>	*	*	*	*	1	*
<i>Lycopus europaeus</i>	*	*	1	*	*	1
<i>Lythrum salicaria</i>	*	*	1	1	*	*
<i>Medicago lupulina</i>	*	1	*	*	*	*
<i>Marrubium vulgare</i>	*	1	*	*	*	*
<i>Matricaria perforata</i>	1	*	*	*	*	*
<i>Medicago lupulina</i>	1	1	*	*	*	*
<i>Medicago sativa</i>	1	1	*	*	*	*
<i>Medicago sativa</i> ssp. <i>falcata</i>	1	1	*	*	*	*
<i>Melampyrum arvense</i>	1	1	*	*	*	*
<i>Melampyrum bihariense</i>	1	*	*	*	*	*
<i>Melica ciliata</i>	*	1	*	*	*	*
<i>Mentha arvensis</i>	1	*	*	*	*	*
<i>Mentha longifolia</i>	1	*	1	1	*	*
<i>Mentha pulegium</i>	*	*	1	1	*	*
<i>Muscari comosum</i>	1	1	*	*	*	*
<i>Muscari neglectum</i>	*	1	*	*	*	*

1	2	3	4	5	6	7
<i>Nigella arvensis</i>	1	1	*	*	*	*
<i>Nonca pulla</i>	1	1	*	*	*	*
<i>Odontites lutea</i>	*	1	*	*	*	*
<i>Odontites verna</i>	1	*	*	*	*	*
<i>Oenanthe silaifolia</i>	*	*	*	1	*	*
<i>Onobrychis viciifolia</i>	1-2	1	*	*	*	*
<i>Ononis arvensis</i>	1	1	*	*	*	*
<i>Oxytropis pilosa</i>	*	1	*	*	*	*
<i>Pastinaca sativa</i>	1	*	1	*	*	*
<i>Peucedanum oreoselinum</i>	1	*	*	*	*	*
<i>Peucedanum tauricum</i>	*	1	*	*	*	*
<i>Phleum phleoides</i>	1	*	*	*	*	*
<i>Phleum pratense</i>	1	*	*	*	*	*
<i>Picris hieracioides</i>	1	*	*	*	*	*
<i>Pimpinella saxifraga</i>	1	1	*	*	*	*
<i>Plantago argentea</i>	1	1	*	*	*	*
<i>Plantago cornuti</i>	*	*	*	1	*	*
<i>Plantago lanceolata</i>	1	1	*	*	*	*
<i>Plantago major</i>	1	*	1	*	1	*
<i>Plantago media</i>	1-2	1	*	*	*	*
<i>Poa annua</i>	1	*	*	*	*	*
<i>Polygala amara</i>	1	*	*	*	*	*
<i>Polygala major</i>	1	*	*	*	*	*
<i>Polygonum aviculare</i>	1	*	*	*	*	*
<i>Polygonum lapathifolium</i>	*	*	1	*	*	*
<i>Potentilla argentea</i>	1	*	*	*	*	*
<i>Potentilla cinerea</i>	1	1-2	*	*	*	*
<i>Potentilla erecta</i>	1	*	*	*	*	*
<i>Potentilla recta</i>	1	1	*	*	*	*
<i>Potentilla reptans</i>	1	*	*	*	*	*
<i>Prunella laciniata</i>	1	*	*	*	*	*
<i>Prunella vulgaris</i>	1	*	*	*	*	*
<i>Prunus spinosa</i>	1	1	*	*	*	*
<i>Prunus tenella</i>	*	1	*	*	*	*
<i>Puccinellia distans</i>	*	*	*	*	1	*
<i>Pyrus pyraister</i>	*	1	*	*	*	*
<i>Ranunculus bulbosus</i>	1	*	*	*	*	*
<i>Ranunculus polyanthemus</i>	1	*	*	*	*	*
<i>Ranunculus repens</i>	*	*	1-2	1	1	*
<i>Ranunculus sardous</i>	1	*	*	*	*	*
<i>Rapistrum perenne</i>	*	1	*	*	*	*
<i>Reseda lutea</i>	1	1	*	*	*	*
<i>Reseda luteola</i>	*	1	*	*	*	*
<i>Rhinanthus angustifolius</i>	1	*	*	*	*	*
<i>Rhinanthus rumelicus</i>	1	1	*	*	*	*

1	2	3	4	5	6	7
Robinia pseudocacia	*	1	*	*	*	*
Rosa canina	1	1	*	*	*	*
Rubus caesius	1	1	*	*	*	*
Rumex acetosa	1	*	*	*	*	*
Rumex crispus	1	*	1	*	*	*
Rumex obtusifolius	*	*	1	*	*	*
Salvia austriaca	1	*	*	*	*	*
Salvia nemorosa	1	1	*	*	*	*
Salvia pratensis	1	1	*	*	*	*
Salvia transsilvanica	1	1	*	*	*	*
Salvia verticillata	1	1	*	*	*	*
Sambucus ebulus	1	1	*	*	*	*
Sanguisorba minor	1	1	*	*	*	*
Scabiosa ochroleuca	1	1	*	*	*	*
Scirpus lacustris	*	*	1	1	*	1
Scirpus maritimus ssp. maritimus	*	*	*	*	1	*
Scirpus sylvaticus	*	*	1	*	*	1
Scorzonera parviflora	*	*	*	*	1	*
Senecio jacobea	1	*	*	*	*	*
Serratula tinctoria	1	*	*	*	*	*
Seseli annuum	1	1	*	*	*	*
Setaria pumila	1	*	*	*	*	*
Sideritis montana	*	1	*	*	*	*
Silene alba	1	*	*	*	*	*
Silene vulgaris	1	*	*	*	*	*
Sisymbrium officinale	1	*	*	*	*	*
Stachys annua	1	1	*	*	*	*
Stachys germanica	1	*	*	*	*	*
Stachys officinalis	1	*	*	*	*	*
Stachys recta	1	1	*	*	*	*
Stellaria graminca	1	*	*	*	*	*
Stellaria media	1	*	*	*	*	*
Symphytum officinale	1	*	1	1	*	*
Taraxacum bessarabicum	*	*	*	*	1	*
Taraxacum officinale	1	*	1	*	*	*
Teucrium chamaedrys	1	1-2	*	*	*	*
Teucrium montanum	*	1	*	*	*	*
Thalictrum lucidum	1	*	*	*	*	*
Thalictrum minus	1	1	*	*	*	*
Thesium arvense	1	*	*	*	*	*
Thesium linophyllon	1	1	*	*	*	*
Thlaspi arvense	1	*	*	*	*	*
Thlaspi perfoliatum	1	*	*	*	*	*
Thymus glabrescens	1	1	*	*	*	*
Thymus pulegioides	1	1	*	*	*	*

1	2	3	4	5	6	7
<i>Tragopogon pratensis</i> ssp. <i>orientalis</i>	1	*	*	*	*	*
<i>Trifolium alpestre</i>	1	*	*	*	*	*
<i>Trifolium campestre</i>	*	1	*	*	*	*
<i>Trifolium fragiferum</i>	*	*	1-2	1	2	*
<i>Trifolium hybridum</i>	*	*	1	2	*	*
<i>Trifolium montanum</i>	1	*	*	*	*	*
<i>Trifolium pratense</i>	1-2	1	1	1	*	*
<i>Trifolium repens</i>	1-2	*	1-2	*	*	*
<i>Triglochin maritima</i>	*	*	1	1	1	*
<i>Triglochin palustris</i>	*	*	1	1	*	*
<i>Tussilago farfara</i>	1	*	*	*	*	*
<i>Typha latifolia</i>	*	*	*	1	*	1
<i>Urtica dioica</i>	1	*	*	*	*	*
<i>Verbascum phoeniceum</i>	1	1	*	*	*	*
<i>Verbena officinalis</i>	1	*	*	*	*	*
<i>Veronica austriaca</i> ssp. <i>teucrium</i>	1	*	*	*	*	*
<i>Veronica chamaedrys</i>	1	*	*	*	*	*
<i>Veronica spicata</i>	1	1	*	*	*	*
<i>Veronica spicata</i> ssp. <i>orchidea</i>	*	1	*	*	*	*
<i>Vicia cracca</i>	*	*	*	1	*	*
<i>Vicia tetrasperma</i>	1	*	*	*	*	*
<i>Vinca herbacea</i>	*	1	*	*	*	*
<i>Viola canina</i>	1	*	*	*	*	*
<i>Viola hirta</i>	1	*	*	*	*	*
<i>Viola tricolor</i>	1	*	*	*	*	*
<i>Xanthium italicum</i>	1	*	1	*	*	*
<i>Xanthium spinosum</i>	1	*	1	*	*	*
<i>Xanthium strumarium</i>	1	*	1	*	1	*

Studies performed on July-August 2001, in Frata (Cluj county) and Miheșu de Câmpie (Mures county).

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**CARTOGRAFIEREA PAJIȘTILOR DIN CÂMPIA TRANSILVANIEI, PRIN  
UTILIZAREA IMAGINILOR SATELITARE**  
(Rezumat)

Lucrarea de față face parte dintr-un studiu mai amplu, cu referire la mai multe regiuni din România și la câteva țări din Europa Centrală și de Sud-Est (proiectul PIN-MATRA-00 B. 4. 21).

Pe lângă aspectul cartografic, scopul acestui studiu a fost și acela al evidențierii structurii calitative și cantitative (după scara Tansley) a pajiștilor seminaturale.

Metoda folosită pentru cartarea pajiștilor este cea descrisă de Sărbu (2002), având ca bază cartografică imaginile satelitare (Land Cover) și hărțile topografice. Pe teren s-au verificat toate poligoanele identificate pe imaginile satelitare (fig. 2) și s-au realizat transecte numai în acele poligoane în care nu s-a manifestat puternic fenomenul de ruderalizare, cel de invadare cu arbuști ori în care existau culturi agricole. În același timp, s-au corectat contururile reale ale acestor poligoane, astfel încât să includă doar comunități vegetale de tip semi-natural.

Folosind hărți la scara 1: 25 000, cartarea a avut ca unitate cenotaxonomică alianța, unitate considerată ca suficient de sugestivă și pentru evidențierea structurii acestor pajiști.

Din cele 6 alianțe identificate (tab. 1), doar două (Cynosurion și Festucion vale-siaca) au și rol conservativ pentru unele specii de cormofite incluse în lista roșie: *Salvia transsilvanica* (end, r), *Dianthus collinus* subsp. *glabriusculus* (r) *Cephalaria radiata* (r, end), *Muscari neglectum* (r), *Crambe tataria* (r) și *Peucedanum tauricum* (r).

Deși rezultatele noastre cuprind doar prima etapă din proiectul eșalonat pe trei ani, considerăm că metoda folosită este practică, suficient de sugestivă sub aspect fitosociologic și cu o importantă cantitate de informație sozologică.

**GYEPEK TÉRKÉPEZÉSE AZ ERDÉLYI MEZŐSÉGEN SZATELITES  
FELVÉTELEK HASZNÁLATÁVAL**  
(Összefoglalás)

Jelen dolgozat része egy nagyobb terjedelmű több romániai régiót, valamint néhány Közép- és Délkelet-európai térséget is érintő tágabb feldolgozásnak, melyet a PIN-MATRA-00 B. 4. 21. sz. projekt fog össze.

A térképezési munkálatokon kívül, jelen tanulmány célja még a természetközeli gyepvegetáció szerkezeti elemcinek minőségi és mennyiségi feltárása, értékelése (Tansley skála). A módszerek tekintetében, a Sărbu (2002) által közölt gyeptérképezési útmutatásokat követtük, az alaptérképek tekintetében szatelit felvételeket (Land Cover) és topográfiai térképeket használtunk. A terepi bejárások során megjelöltük és meghatároztuk az összes szatelites mintaterületet (2. ábra), transekteket csak azokban a poligonokban készítettünk amelyekben erős volt a ruderalizáció, a cserjésedés vagy a

mezőgazdasági kultúrák jelenléte. Kijavítottuk ugyanakkor egyes poligonok reális konturjait úgy, hogy csak a természetközeli gyepvegetáció egységei tükröződjenek rajta.

Az 1: 25.000 léptékű gyepvegetáció térképezésének cönotaxonomiai alapját a társuláscsoport képviseli, mely eléggé reprezentatív ahhoz, hogy a gyepvegetáció szerkezetét is magába foglalja. A tárgyalt 6 társuláscsoportból (1. táblázat), csak kettő (Cynosurion, Festucion valesiacae) konzerváló szerepe jelentős a vörös listás védett edényes növényfajok megőrzésében: *Salvia transsilvanica* (end, r), *Dianthus collinus* subsp. *glabriusculus* (r), *Cephalaria radiata* (r, end), *Muscari neglectum* (r), *Crambe tataria* (r), *Peucedanum tauricum* (r).

Bár a jelen közlemény egy három évre tervezett projektnek csak első eredményeit foglalja magába, meggyőződésünk, hogy a használt módszer praktikus és fitocönológiailag eléggé meggyőző, jelentős mennyiségű tudományos információt tartalmaz.