ECONOMIC AND ECOLOGICAL OPPORTUNITIES AND LIMITATIONS OF VALORISING FALLOWS IN THE FĂGET – MARGINA – COŞAVA AREA (TIMIS COUNTY, ROMANIA)

POSIBILITAŢI ŞI LIMITE ECONOMICE ŞI ECOLOGICE PRIVIND REPUNEREA ÎN VALOARE A TERENURILOR AGRICOLE ABANDONATE DIN ZONA FĂGET-MARGINA-COŞAVA (JUDEŢUL TIMIŞ, ROMÂNIA)

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Abstract. *In this paper, we approach an issue of importance in ecological reconstruction related to the dynamics of plant species on fallows in the Faget – Margina – Cosava area (Timis County). The area under study covers 400 km^2 if we take into account all the fallows aged 1-7 after grain or tillage crops. In the study of the flora, we used the two steps – field and lab – and phyto-coenologic research in the area are based on the principles of the Central-European floristic school with broad application in the study of the vegetal cover in Europe and applied for the first time in Romania by Borza (1984). As a result of the study on the sampling areas we managed to inventory the superior plant species on the fallows and the characteristics of the flora and vegetation (number of families, number of species, height of the vegetal cover, stratification, and mosaic-like configuration), and phyto-geographical, biological, ecological, and economic indices. In this paper we also refer to the evolving trends of the phyto-coenoses, the changes it undergoes, its dynamics, and man-made activities*

Rezumat. *In referatul de fată am atins o problemă actuală cea a reconstrucţiei ecologice legată de dinamica speciilor vegetale de pe terenurile agricole abandonate din zona Făget-Margina-Coşava, judeţul Timiş. Suprafaţa luată in studiu are o dimensiune de 400 km^2, luând in calcul toate suprafeţele agricole abandonate de la 1 la 7 ani după culturi de păioase sau prăşitoare. In studiul florei am folosit cele doua etape, de teren şi de laborator, iar cercetările fitocenologice realizate in suprafaţa de studiu au la bază principiile şcolii fitocenologice floristice central europene cu larga aplicaţie in studiul covorului vegetal din Europa, aplicată pentru prima dată in România de Borza (1984). In urma studiului întreprins pe suprafeţele de probă s-a realizat conspectul speciilor de plante superioare de pe terenurile agricole abandonate din zona studiată, cât şi caracteristicile florei si vegetaţiei legate de, număr de familii, număr de specii, înălţimea covorului vegetal, stratificarea, mozaicarea cat si indicii fitogeografici, biologici, ecologici si economici. In lucrarea de faţă s-a făcut referire şi la direcţiile evolutive ale fitocenozelor, transformările suferite de acestea, dinamica cât si acţiunile antropice.*

Key words: *valorising fallows, specific biodiversity, ecological restoration, flora and vegetation.*
Cuvinte cheie: *valorificarea terenurilor necultivate, biodiversitate specifica, restaurare ecologica, flora şi vegetaţie*

INTRODUCTION

This study is the continuation of other studies focussing on the dynamics of vegetation in general and on the dynamics of the grassy vegetation on fallows in particular. In this study we have used information and examples from other studies directly related to plant setting, succession of vegetation, dynamics of vegetation and biodiversity, that we have also found in works such as: BUJOREAN G. (1931); HARALAMB, RADULESCU (1936); BELDIE (1951); ARSENE G. G. (1998); CHELU A., ARSENE G. G. (2002); PATRUT D., GRIGORE S., COSTE I.

(2002); BORLEA G. F., RADU S., HERNEA C. (2002), In the depression area of the Faget hills there are lots of fallows to be studied, areas that stopped being worked more or less recently, as well as areas resulted from forestry activities. To note the evolution of these areas and the trends of the dynamics of vegetation together environmental protection, setting and enriching biodiversity factors and, finally yet importantly, turning these areas into agricultural lands again systematically.

GEOGRAPHICAL LOCATION AND NATURAL ENVIRONMENT

The area under study is located in the hill area of the Banat, in northeast Timis County, close to the border with the Hunedoara and Arad counties. The studied area covers the localities of Faget and Cosava, having Margina as central and reference point. The plots on which we carried out observations cover 400 km^2; the shape of the studies area is almost square, as it measures 20 km x 20 km; it is bordered by the Faget Hills at north-west and by the Poiana Rusca Mountains south-east. The studied area is a depression as it is surrounded by natural barriers of different size and at altitudes between 500 and 800 m. The village of Margina is in the middle of the studied area. The total agricultural area is made up of three land groups:

- the Faget agricultural land, 4898 ha, of which 1502 arable land, 2701 ha pastures, 695 ha vineyards and orchards;
- the Margina agricultural land, 5064 ha, of which 1852 arable land, 2989 ha pastures, 223 ha vineyards and orchards;
- the Curtea agricultural land, 3892 ha, of which 1431 arable land, 1890 ha pastures, 571 ha vineyards and orchards.

Each of these localities has its own agricultural and forestry funds.

The geographical coordinates of the area are 22^0 latitude and $45^0$50' longitude.

The relief of the studied area is quite varied, and is located at about 150-200 m altitude compared to the Adriatic Sea, with most of the area made up of plane areas but also with hilly areas with smooth slopes making the passage to the hilly and mountain relief.

The areas has the aspect of a plain slightly inclined towards south-west downstream along the Bega River and is spotted by numerous meanders of the Bega, Icui, Brezova, and Vadana rivers.

From a geological point of view, on the studied area there are numerous water meadows, new forms of relief, with features specific depending on each river, on their dynamics, on their climate variations, and on the tectonic movements (particularly subsidence ones).

Their aspect differs depending on the area crossed by the generating agent; in the medium area of the rivers Icui and Vadana, the water meadows are narrower and have a longitudinal slope longer than 1-2 m/km, covered with rougher material; the lower river Bega has created parallel, wider water meadows with front or lateral deposits of alluvial material finely textured, and with slopes of 0.4 m/km.

In order to establish the genetic soil types, we made 81 magisterial profiles, and in about 53 profiles, we sampled and made lab analyses.

On the ground of these studies and analyses, we identified seven genetic soil types. The argiluvisoils are predominant (73%), of which 57% are brown pseudogleyed soils, followed by brown argiluvisoils (16%) and cambisoils (26%), most of which are brown eumseobasic soils.

All the soils have an acid reaction (pH is between 4.0 and 6.5). Humus accumulation indices oscillate between very poor in humus and moderate in humus; mobile phosphates are poorly represented and exchangeable potassium appears in all the profiles and the horizons Ao, Am, Bv, El, and Bt.

Parental materials of soils have generally a medium fine granulometric structure alternating with rough deposits. To the northern and southern borders of the plain there are aluvio-proluvial materials brought down from the hills by a network of secondary valleys of torrential origin and deposited under the form of waste cones that unite or overlap over several generations. The correction of the river Bega has removed the water meadow area from the impact of floods and thus the soils are in an incipient depositing state characteristic to the "brown eu-mesobasic soil" group of soils.

The thermal regime of the area is characterised by soft winters with temperatures that rarely go below -20^{0}C, the average of the coldest month of the year, January, being in general -2^{0}C.

The springs are shorter, and summers are, generally, very hot, the frequency of hot days over the year (above 30^{0}C) is lower 920-25 days), and that of the days with temperatures over 15^{0}C is 126-134 days/year.

The rainfall regime has annual averages of potential evapo-transpiration below 690 mm. For the studied area rainfall, amounts are on the average 700-800 mm/year, rarely (in rainy years) over 900-1000 mm/year and increase with altitude with about 100 mm/year for every 200 m. On the average, the number of rainy days in the studied area is about 125-130 days. Abundant spring rains lead to an increase of the water levels and result in ample floods with devastating effects.

The hydrographic network in the studied area well represented on the river Bega and on its affluents, Brezova and Vadana. The river Bega has a bed that is 10-15 m wide and an alluvial water meadow 10-40 m wide with a permanent regime with high fluctuations of the flow. The multiannual average supply is 4.53 m^3/s. The maximum supply is in spring while the minimum supply is in summer and early autumn.

MATERIALS AND METHODS

We established sampling areas in the field in the studied area. We started by recording fallows with the help of environmental points, then we recorded the fallows depending on the northeast geographical coordinates through GIS. Then, until plants started vegetation, we tried to find out from the locals the last year the lands were cultivated, the pre-emergent crops, and the years to go on as fallows.

Finally yet importantly we inquired about the management of the lands (haymaking, grazing) of the areas.

After we got these data, we systematically sampled the area on plots of 100 m^2 (10 m x 10 m) which we synthesised in our tables.

In each of the tables, we recorded:

- the location – in relation to the neighbouring localities and to geographical coordinates;
- the altitude – in relation to the Adriatic Sea;
- the general covering – estimated in percentage;
- average height of the vegetation – measured in cm;
- period of fallowing – measured in years;
- the sampling area – measured in m^2;
- the time the study was carried out.

The distribution in the studied area of the sampling areas was meant to be as even as possible and to cover the entire area, without focussing on several sampling areas detrimental to other sampling areas.

The distribution of the fallows in the studied area is not even; we could notice that most fallows are concentrated towards the extremities of the localities, because of the long

distance from the locality (implying more time, more transportation, more care, etc.) which made villagers prefer to work closer agricultural lands.

In order to edit our paper, we studied the biological material. Research concerning the flora had two steps:

- the field stage;
- the lab stage.

In the field stage, we visited the area several times to find species in different development stages. We determined the plants and we made up the phyto-coenologic tables. In the field, we used the "Flora mica ilustrata a Romaniei" de *(Ciocîrlan 2000)*. In the processing of data, we guided ourselves after the "Flora Romaniei" (vol. I-XII).

After determining the species, we developed the inventory of the vascular flora. In each species, we mentioned indices referring to the phyto-geographic element and to the biform of the species. We used the following terms in assessing the plant distribution over the area we studied.

The analysis of the flora was done from several points of view:

- Phyto-geographically (geographic spreading);
- Biologically (types of bioforms);
- Ecologically, as we took into account the behaviour of the species to the main ecological factors moisture, temperature, and soil reaction (Sanda et al., 1983). Ecological categories are as follows: moisture indices (U), temperature indices (T), soil reaction indices (R).
- Economically, the share of the species relevant for the different sectors of socio-economic activity or for the plant parts we use. We have in mind the following economically relevant plant categories: food, feed, honey making, medicinal, industrial, toxic, and decorative.

Phyto-oenological research in the studied area (the Faget Hills) are based on the floristic phyto-coenologic school principles, with broad application in the study of the vegetal cover in Europe, and applied for the first time in Romania by Borza (1934).

This research school is based on the postulate according to which the floristic composition of a phyto-conenoses reflects the whole ensemble of ecological factors in the biota it covers; therefore, this is the composition we need to study. For this school, the basic unit in the study of the vegetal cover is the vegetal association.

Field studies were done by choosing samples (land areas) from the fallows with different years of fallowing and in different development stages within the vegetal cover with similar physiognomy and ecological conditions. The areas of the samples was around 100-200 m^2. We present below a list of the species from the sampling areas with notes on their abundance and dominance and local frequency. The abundance and dominance is a quantitative phyto-coenologic index that shows the abundance of a species, i.e. the number of individuals and their dominance representing the covering degree of the area by those individuals.

The abundance and dominance index has a specific assessment scale, as that of the Braun-Blanquet scale, with 5+1 steps.

Local frequency is another quantitative index used by the Romanian school of geobotany (Borza & Boşcaiu, 1965) supplying information on the frequency of individuals on a sampling area. In order to assess the index the sampling area must be divided into smaller units then they are granted degrees according to the 5-step scale.

After mapping and sampling the fallows in the studied area, we could see that there are 44 plant families with 271 species. The inventory of the superior plant species shows that the best-represented families are Asteraceae with 44 species, Poaceae with 33 species and Leguminosae with 31 species.

RESULTS AND DISCUSSION

Inventory of superior plant species on the fallows in the Făget – Margina – Coşava area

Fam. Equisetaceae
Equisetum arvense G, Cosm; U3, T3, R0.
Equisetum fluviatile L., HH, Circ(bor); U5, T3, R0.
Equisetum palustre G, Circ(bor); U5, T2, R0.
Fam. Urticaceae
Urtica dioica H-G, Cosm; U3, T3, R4.
Fam. Aristolochiaceae
Aristolochia clematitis H-G, Euc(Med); U2,5, T3,5, R5.
Fam. Polygonaceae
Polygonum aviculare L., Th, Cosm; U2,5, T0, R3.
Polygonum convolvulus L., Th, Eua; U2,5, T3, R3.
Polygonum lapathifolium L., Th, Cosm; U4, T0, R3.
Polygonum minus Hudson, Th, Eua; U4,5, T3, R4.
Polygonum persicaria Th, Eua; U4,5, T3, R0.
Rumex acetosa Cosm; U3, T0, R0.
Rumex acetosella H-G, Cosm; U2, T3, R2.
Rumex conglomeratus H, Circ; U4, T4, R4.
Rumex crispus H, Eua; U4, T3, R0.
Fam. Chenopodiaceae
Chenopodyum album Th, Cosm; U3, T3, R0.
Fam. Caryophyllaceae
Cerastium arvense L., Ch, Circ(bor), Balc; U2,5, T0, R3,5.
Cerastium banaticum (Rochel), Heuffel, Ch, Carp-Balc; U2, T4,5, R4.
Cerastium pumilum Curt., Th, Eur(Med); U2, T3, R0.
Dianthus carthusianorum H, Eur; U2, T5, R5.
Gypsophila muralis L., Th, Eua(cont); U2, T3, R2.
Lychnis flos-cuculi L., H, Eua; U3,5, T2,5, R0.
Fam. Ranunculaceae
Clematis integrifolia H, Eua(cont); U3, T3,5, R5.
Consolida regalis S.F.Gray, Th, Eua; U2, T4, R4.
Ranunculus acris L., H, Eua(Med); U3,5, T0, R0.
Ranunculus arvensis L., Th, Eua(Med); U3, T3, R0.
Ranunculus bulbosus L., H-G, Eur; U2, T3, R3.
Ranunculus repens L., H, Eua(Med); U4, T0, R0.
Ranunculus sardous Th-TH, H, Eua; U3, T3, R4.
Fam. Liliaceae
Alium schorodoprasum L., G, Euc-Med, U2, T3, R4.
Fam. Papaveraceae
Fumaria schleicheri Soyer-Willemet, Th, Eua(Med); U2,5, T4, R4.
Papaver dubium L., Th, Med; U2, T3,5, R3.
Papaver rhoeas L., Th, Eua(Med); U3, T3,5, R4.
Fam. Cruciferae
Armoracia rusticana G(H), Adv; U3, T3,5, R0.
Capsella bursa-pastoris (L.), Medicus, Th, Cosm(Med); U3, T0, R0.
Cardaria draba H, Eua; U2, T4, R4.
Diplotaxis tenuifolia (L.), DC., H(Ch), Med; U2, T4, R0.
Draba verna Th, Eua(Med); U2,5, T3,5, R0.
Rorippa austriaca (Grantz), Besser, H-G, Euc; U4, T3,5, R4.
Rorippa sylvestris (L.) Besser., H-G, Eur; U4, T3, R4.
Sisymbrium orientale Th-TH, Eua(Med); U2,5, T4, R3.
Fam. Rosaceae
Agrimonia eupatoria H, Eua; U2,5, T3, R4.
Crataegus monogyna M, Eur; U2,5, T3, R3.
Filipendula vulgaris H, Eua; U2,5, T3, R0.
Fragaria vesca L., H, Eua; U3, T2,5, R0.
Geum urbanum L., H, Eua(Med); U3, T3, R0.
Potentilla anserine H, Cosm; U4, T3, R4.
Potentilla argentea L., H, Eua; U2, T4, R2.
Potentilla erecta L., H, Eua; U1,5, T3,5, R4.
Potentilla reptans H, Cosm; U3,5, T0, R4.
Prunus spinosa M, Eua; U2, T3, R3.
Rosa canina L., N, Eur; U2, T3, R3.
Rubus caesius H(N), Eua(Med); U4,5 T3, R4.
Fam. Leguminosae
Amorpha fruticosa L., M., Adv; U3, T4, R0.
Astragalus glycyphyllos H,Eua; U3, T3, R4.
Coronilla varia H,Euc-Med; U2, T3, R4.
Glychyrriza echinata L., H, Pont-Med; U4, T4, R0.
Lathyrus niger H, Euc; U2,5, T3, R3.
Lathyrus nissolia L., Th, Atl-Med; U2, T3,5, R2.
Lathyrus pratensis H, Eua; U3,5, T3, R4.
Lathyrus sativus L., Th, Adv; U3, T3, R4.
Lathyrus sylvestris L., H, Eur(Med); 2,5, T3, R4.
Lathyrus tuberosus H(G), Eua(Med); U2, T4, R4.
Lolium perenne L., H, Eua(med); U2,5, T4, R4,5.
Lotus corniculatus H, Eua; U2,5, T0, R0.
Medicago falcata L., H, Eua(Med); U2, T3, R5.
Medicago lupulina Th-TH, Eua; U2,5 T3, R4.
Melylothus officinalis (L.), Pallas, Th-TH, Eua; U2,5, T3,5, R0.
Ononis repens L., Ch-H, Eur; U2,5, T3, R4.
Ononis spinosa L., H(Ch), Eur(Med); U0, T3,5, R0.
Trifolium arvense L., Th, Eua(Med); U1,5, T3, R4.
Trifolium campestre Schreber, Th-TH, Eur; U3, T3, R0.
Trifolium diffusum Ehrh, Th-TH, Pont-Med; U0, T3,5, R3.
Trifolium dubium Sibth, Th-RH, Eur(Med); U3,5, T2, R0.
Trifolium hybridum L., H, Eur(Med); U3,5, T3, R4.
Trifolium medium L., H, Eua; U3, T3, R0.
Trifolium pretense L., H-TH, Eua; U3, T0, R0.
Trifolium repens L., H, Eua; U3,5, T0, R0.
Vicia cracca L., H, Eua; U3, T0, R3.
Vicia grandiflora Scop, Th-TH, Balc-Pont-Cauc; U3, T3, R0.
Vicia hirsuta (L.), S.F.Gray, Th, Eua(Med); U2,5, T3,5, R4.
Vicia sativa Th, Adv; U0, T3, R0.
Vicia tenuifolia Roth, H, Eua(Med); U2, T0, R4,5.
Vicia tetrasperma (L.), Schrader, Th, Eua; U3,5, T3, R3.
Fam. Geraniceae
Geranium dissectum Th, Eua; U3, T3,5, R0.
Geranium palustre L., H, Eua(cont); U4, T3, R4,5.
Fam. Euphorbiaceae
Euphorbia cyparissias H(G), Eua; U2, T3, R4.
Fam. Polygalaceae
Polygala vulgaris H, (Ch), Eua; U3, T3, R3.
Fam. Malvaceae
Malva sylvestris L., Th-TH, H, Eua(Cosm); U3, T3, R0.
Fam. Guttiferae
Hypericum perforatum H, Eua; U3, T3, R0.
Fam. Violaceae
Viola arvensis Murray, Th, Eua; U3, T3, R0.
Viola hirta L., H, Eua; U2, T3, R4.
Viola tricolor L., TH, Th-H, Eua; U2,5, T3, R0.
Fam. Umbelliferae
Carum carvi L., Th, Eua; U3,5, T3, R3.
Chaerophylum bulbosum L., TH-H, Eur(cont), U4, T3,5, R4,5.
Conium maculatum L., Th-TH, Med(est), U3, T3, R3.
Daucus carota TH-H, Eua(Med); U2,5, T3, R0.
Eryngium campestre H, Pont; U1, T5, R4.
Pastinaca sativa L., TH-H, Eua; U3, T4, R4.
Peucedanum plalustre (L.), Moench, H, Eua; U5, T3, R0.
Pimpinella major (L.), Hudson, H, Eur; U3,5, T0, R4.
Fam. Rubiaceae
Cruciata laevipes H, Eua; U2,5, T3, R3.
Galium album Miller, H, Eua; U2,5, T2,5, R3.
Galium mollugo L., H, Eua; U3, T0, R3.
Galium verum H, Eua; U2,5, T2,5, R0.
Fam. Convolvulaceae
Calystegia sepium H, Eua; U4, T3, R4.
Convolvulus arvensis H-G, Cosm; U0, T0, R0.
Fam. Plantaginaceae
Plantago lanceolata L., H, Eua; U0, T0, R0.
Plantago major L., H, Eua; U3, T0, R0.
Plantago media L., U2,5, T0, R4,5.
Fam. Lamiaceae (Labiatae)
Ajuga genevensis L., H, Eua(Cont), U2,5, T3, R4.
Ajuga reptans L., H-Ch, Eur; U3,5, T0, R0.
Glechoma hederacea L., Ch-H, Eua; U3,5, T3, R0.
Lamium purpureum L., Th(H), Eua; U3, T0, R4.
Lycopus europaeus L., HH, Eua; U5, T3, R0.
Mentha aquatica L., HH-H, Eua; U5, T3, R0.
Mentha arvensis L., H-G, Circ(bor); U4, T3, R0.
Mentha longifolia (L.), Hudson, H(G), Eua(Med); U4,5, T3, R0.
Mentha pulegium L., H, Eua(Med), U4, T3, R5.
Mentha spicata L., H, Med; U3, T3, R0.
Nepeta cataria L., H(Ch), Eua(Med); U3, T3, R4.
Prunella grandiflora (L.), Scholler, H, Eur(Med); U3, T3, R4,5.
Prunella vulgaris L., H, Circ(bor); U3, T3, R0.
Salvia nemorosa L., H, Euc, U2,5, T4, R3.
Scutellaria galericulata L., H, Circ(bor); U4, T3, R4.
Scutellaria hastifolia L., H, Euc; U5, T3, R3.
Stachys annua L., Th, Med(est), U3, T3,5, R4,5.
Stachys officinalis L., H, Eua(Med); U3, T3, R0.
Stachys palustris L., H(G), Circ(bor); U4, T3, R4.
Stachys aylvatica L., H, Eua, U3,5, T0, R0.

Fam. Verbenaceae
Verbena officinalis L., Th-H, Cosm; U3, T3, R4.
Fam. Boraginaceae
Echium vulgare L., TH, Eua; U2, T3, R4.
Echium rubrum Jacq., Th, Pont-Pan; U2, T4, R4.
Myosotis arvensis (L.), Hill, TH, Eua; U3, T3, R0.
Myosotis collina Hofmf, Th, Eur; U2, T3,5, R3.
Myosotis palustris (L.), Hill, H, HH, Eua; U5, T3, R0.
Myosotis stricta Link, Th, Eua(Med); U1,5, T3, R0.
Myosotis sylvatica Hoffm, H, Eua; U3,5, T3, R3.
Symphytum officinale H, Eua; U4, T3, R0.
Fam. Scrophulariaceae
Digitalis grandiflora Miller., H, Eur; U3, T3, R3.
Digitalis purpureum L., TH, Med; U3, T3,5, R4.
Gratiola officinalis L., H, Eua; U4,5, T3, R4.
Linaria vulgaris Miller, H(TH), Eua; U2, T3, R4.
Rhinanthus rumelicus Velen, Th, Dac-Balc-Anat; U3, T4, R0.
Scrophularia nodosa L., H, Eua; U3,5, T3, R0.
Verbascum banaticum Schrader, TH, Balc; U2, T4, R4.
Veronica arvensis L., Th, Eua; U2,5, T3, R3.
Veronica austriaca L., H, Euc; U1,5, T4, R4,5.
Veronica chamaedrys L., H-Ch, Eua; U3, T0, R0.
Veronica hederifolia L., Th, Eua; U2,5, T3, R4.
Veronica longifolia L., H, Eua; U4, T3, R4.
Veronica persica Poiret, Th, Adv; U3, T0, R4.
Fam. Valerianaceae
Valerianella locusta L., Th, Med-Euc; U3, T3,5, R4.
Fam. Dipsacaceae
Dipsacus laciniatus L., TH, Eua(cont); U4, T3,5, R4.
Dipsacus sylvestris Hudson, TH, Med-Euc; U3,5, T3,5, R4.
Knautia arvensis L., H, Eur; U2,5, T3, R0.
Fam. Campanulaceae
Campanula patula L., Th, Eur; U3, T2,5, R3.
Campanula rotundifolia L., H, Circ(bor); U2, T0, R3.
Campanula sibirica L., H, Eua(cont); U2,5, T4, R4.
Fam. Asteraceae
Achillea millefolium L., H, Eua; U3, T0, R0.
Anthemis arvensis L., Th, Eur(Med); U3, T3, R0.
Arctium lappa L., TH., Eua(Med); U3, T3, R0.
Artemisia vulgaris L., H-Ch, Circ(bor); U3, T3, R4.
Aster linosyris (L.), Bernh, H, Eua(cont); U2, T3, R4.
Bellis perenis L., H, Eur(Med); U3, T2,5, R0.
Carlina vulgaris L., TH-H, Eua(Med); U2,5, T3,5, R0.
Centaurea cyanus L., Th, Cosm; U3, T4, R0.
Centaurea jacea L., H, Eua; U3, T0, R0.
Centaurea orientalis L., H, Pont; U2, T4, R4,5.
Chondrilla juncea L., H, Eua(cont); U1,5, T3,5, R4.
Chrysanthemum leuchantemum L., H, Eua; U3, T0, R0.
Cichorium intybus L., H-TH, Eua; U2,5, T3,5, R4,5.
Cirsium arvense L., G, Eua(med); U0, T0, R0.
Cirsium canum (L.), All, G, Eua(cont); U4,5, T3, R4,5.
Cirsium heterophyllum (L.), Hill, G, Eua; U4, T2, R2.
Cirsium oleraceum (L.), Scop, H, Eua; U4, T3, R4.
Cirsium palustre L., Scop., TH., Eua(Med); U4,5, T3, R2,5.
Cirsium vulgare (Savi), Ten., Th, Eua; U3, T3, R0
Crepis biennis L., Th, Eur; U3, T3, R4.
Crepis mollis (Jacq), Ascherson, H, Eur; U3, T2,5, R3.
Erigeron annuus L., Th, Adv; U4, T0, R4.
Erigeron canadensis L., Th-TH, Adv; U2,5, T0, R0.
Gnaphalium uliginosum L., Th, Eua; U5, T3, R4.
Helianthus tuberosus L., H, Eua; U2, T3, R0.
Hieracium bauhinii Besser, H, Eua(cont); U1,5, T3, R3,5.
Hieracium dacicum Uechtr., H, Carp(end); U3, T2, R2,5.
Hypochoeris radicata L., H, Eur; U3, T3, R2,5.
Inula britanica L., TH-H, Eua(Med); U3, T3, R0.
Inula germanica L., H, Pont-Pan; U1,5, T3,5, R4.
Inula helenium L., H, Pont-Pan; U1,5, T3,5, R3.
Inula salicina L., H, Eua; U2,5, T3, R3.
Lactuca serriola L., Th-TH, Eua(med); U1,5, T3,5, R0.
Leucanthemum vulgare Lam, H, Eur; U3, T0, R0.
Matricaria chamomilla L., Th, Eua(Med); U3, T3,5, R0.
Matricaria inodora L., Th-TH, Eua; U0, T3, R3,5.
Mycelis muralis L., H, Eur; U3, T3, R0.
Picris hieracioides L., TH-H, Eua; U1,5, T3, R4.
Seneccio jacobaea L., H, Eua; U2,5, T3, R3.
Sonchus arvensis L., H, Eua(Cosm); U3, T3, R4.
Sonchus oleraceus L., Th, Eua; U2,5, T3, R4,5.
Tanacetum vulgare L., H, Eua; U3, T3, R0.
Taraxacum officinale Weber, H, Eua(Med)(Cosm); U3, T0, R0.
Tragopogon pratensis L., TH-H, Eua; U3, T2, R3.

Fam. Iridaceae
Iris pseudacorus L., G-HH, Eur; U5,5, T0, R0.
Fam. Poaceae
Agropyron repens L., Beauv, G, Eua; U0, T0, R0.
Agrostis capillaris L., H, Circ(bor), U0, T0, R0.
Agrostis stolonifera L., H, Circ(bor); U4, T0, R0.
Alopecurus pratensis L., H, Eua; U4, T3, R0.
Anthoxanthum odoratum L., H, Eua; U0, T0, R0.
Apera spica-venti L., Th, Eua; U3,5, T0, R2,5.
Arrhenatherum elatius (L.), Beauv, H, Eur(Med); U3, T3, R4.
Bromus hordeaceus L., Th, Eua; U0, T0, R0.
Bromus inermis Leysser, H, Eua(cont); U2,5, T4, R4.
Bromus sterilis L., Th, Eua(med); U2, T4, R4.
Bromus tectorum L., Th, Eua; U1,5, T3,5, R0.
Calamagrostis arundinacea L., H(G), Eua; U2,5, T3, R2.
Calamagrostis epigeios L., H(G), Eua(med); U2, T3, R0.
Calamagrostis varia (Schrader), Host, H, Eua; U3, T2, R4,5.
Cynodon dactylon (L.), Pers, G(H), Cosm; U2, T3,5, R0.
Cynosurus cristatus L., H, Eur; U3, T3, R3.
Dactylis glomerata L., H, Eua(Med); U3, T0, R4.
Digitaria sanguinalisL., Scop., Th, Cosm; U1,5, T0, R4.
Festuca ovina L., H, Circ(bor); U2, T0, R2.
Festuca pratensis Hudson, H, Eua; U3,5, T0, R0.
Festuca rubra L., H, Circ(bor); U3, T0, R0.
Festuca rupicola Heuffel, H, Eua(cont); U1,5, T4, R4.
Festuca valesiaca Schleicher, H, Eua(cont); U1,5, T4, R4.
Holcus lanatus L., H, Eua; U3,5, T3, R0.
Hordeus murinum L., Th, Eua(med); U2,5, T4, R0.
Nardus stricta L., H, Eur; U0, T0, R1,5.
Phleum pretense L., H, Eua(Med); U3,5, T0, R0.
Phragmites australis Cav., HH, Cosm; U4, T0, R4.
Poa pratensis L., H, Circ; U3, T0, R0.
Poa trivialis L., H, Eua; U4, T0, R0.
Setaria glauca (L.), Beauv, Th, Cosm; U2,5, T4, R0.
Setaria pumila (Poiret) L., (Beauv), Th, Cosm; U2,5, T4, R0.
Fam. Cyperaceae
Carex hirta L., G, Eur(Med); U0, T3, R0.
Carex riparia Curtis, HH, Eua(med); U5, T4, R4.
Crex sylvatica Hudson., H, Eur; U3,5, T3, R4.
Carex vulpina L., HH-H, Eua(med); U4, T3, R4.
Fam. Juncaceae
Juncus articulatus L., H, Circ(bor); U5, T2, R0.
Juncus bulbosus L., h, Eur; U4,5, T2,5, R0.
Juncus compressus Jacq., G, Eua; U4, T3, R4.
Juncus conglomeratus L., H, Eua; U4,5, T3, R3.
Juncus effusus L., H, Cosm; U4,5, T3, R3.
Juncus tenuis Willd, H, Adv; U3,5, T3, R4.
Fam. Oxilidaceae
Oxalis acetosella L., H-G, Circ(bor); U4, T3, R3.
Oxalis corniculata L., Th, Eua(Med); U2,5, T4, R0.
Oxalis stricta L., Th, Eur(Med); U3,5, T0, R0.
Fam. Primulaceae
Anagallis arvensis L., Th, Cosm; U3, T3, R0.
Lysimachia nummularia L., Ch, Eur; U4, T3, R0.
Lysimachia vulgaris L., H-HH, Eua; U5, T0, R0.
Primula elatior (L.), Hill, H, Eua; U3, T3, R4.
Fam. Onagraceae
Epilobium collinum C.C.Gemelin, H, Eur; U3, T3, R1,5.
Epilobium hirsutum L., H(HH), Eua(Med); U4, T3, R3.
Epilobium palustre L., H, Circ(bor); U5, T0, R2.
Fam. Lythraceae
Lythrum salicaria L., H-HH, Cosm; U4, T3, R0.
Lythrum virgatum L., H-HH, Eua(cont); U4,5, T3,5, R4.
Fam. Gentianacea
Centaurium erythraea Rafn, Th, Eua; U3, T3, R2.
Fam. Cuscutaceae
Cuscuta campestris Yunckers, Th, Adv; U3, T3, R0.
Fam. Salicaceae
Populus alba L., MM-M, Eua; U3,5, T3, R3.
Populus nigra L., MM, Eua; U4, T3, R4.
Populus tremula L., MM-M, Eua; U3, T2, R2.
Salix fragilis L., MM, Eua; U4,5, T3, R4.
Salix triandra L., M, Eua; U5, T3, R0.
Fam. Corylaceae
Carpinus betulus L., MM-M, Eur, U3, T3, R3.
Fam. Solanaceae
Datura stramonium L., Th, Cosm, U3, T4, R4.
Solanum dulcamara L., Ch(N), Eua(Med), U4,5, T3, R4.
Fam. Amaranthaceae
Amaranthus retroflexus L., Th, Adv, U3, T3, R0.

The vegetal cover is 80-100 cm high oscillating between 30 and 150 cm, quite mosaic-like and stratified.

The vegetation in the studied area is much diversified, since the fallowing period is not identical in all the plots, and the location, the exposition, the soil configuration, and the natural neighbours are different. On fallows aged 1-3 years after grain crops, the following species predominate: *Holcus lanatus, Erigeron annuus, Matricaria inodara, Plantago lanceolata, Trifolium campestre, Ranunculus sardous.* From the ecological spectrum of these areas, we can see that the phyto-coenoses have a meso-phytic, meso-dermous, and amphi-tolerant character.

In the case of the fallows aged 1-3 years, the dominant species are *Agropiron repens, Daucus carota, Holcus lanatus, Matricaria inodora, Calamagrostis arundinacea, Apera spica-venti, Achillea millefolium, Garţiola officinalis, Convolvulus arvensis* and the U, T, and R indices are slightly similar to the previous ones.

To note the plots on which in several years there are changes in the vegetal cover: on these fallows aged 4-7 previous species are still present, but there are also new species such as *Dipsacus sylvestris, Cichorium inthybus, Dactilis glomerata, Galium mollugo, Galium verum, Glechoma hederacea, Hipericum perforatum, Lisimachia numularia, Prunela vulgaris, Rhiantus rumelicus, Rumex crispus.* After 7 years of fallowing, there is also a tree and bush vegetation such as *Prunus spinosa, Quercus robur, Salix fragilis, Salix triandra, Fagus silvatica, Rosa canina,* etc.

In the case of the studied area, there are a few well-determined and established vegetation associations characteristic for the area, since it is under the direct influence of the Poiana Rusca Mountains whose impact on climate is considerable and that under the action of biodiversity also influences the structure of the species in the near-by phyto-coenoses.

It is known that there have been numerous social and economic changes during the last 15 years. There was in the area a passage from agrarian economy (the years 1950-1060) to an agrarian-industrial economy, which concentrated most of the labour force.

There have also been changes in the agricultural activities, since they have passed from an intensive agriculture (collectively owned) to an extensive one (privately owned) still present, practiced on small plots which resulted in a change in the structure of the crops, i.e. a diminution of the number of species and cultivars.

Because of the social and economic situation in the area and of the old population, which is also relatively, poor recultivating the fallows is rather scarce and selective. The happiest situation would be to turn the fallows into pastures, with minimal costs, through grass cutting and grazing; the problem is that they prefer fallows closer to the villages because of the transportation and of the low number of animals.

At present, under the impact of natural and man-made factors, we could distinguish the following scenarios: 60% of the fallows are of no agricultural interest and are left to go on fallowing, while 40% have at least two types of uses.

Grass cutting is the most widespread method in the area and of considerable importance, with direct implications on the evolution of the vegetal cover, removing low-value fodder species and leading to a haymaking phyto-coenosis with better quality and quantity.

It is known that in most weeds cutting is also efficient if done during leaf development and early blooming with direct impact on seed forming and spreading. Grazing is done mainly by sheep or goats; it is rather low and practice occasionally or selectively, which makes that 1-year aged fallows previously cultivated with grains are grazed in the first and second year of fallowing while the other fallows are grazed after the fifth year of fallowing when the vegetation starts to establish with a helping hand from farmers cutting the grass three years in a row.

CONCLUSIONS

The dynamics of succession offers scenarios for previously existing phyto-coenoses and for phyto-coenoses to come. With the help of data and of observations on plant successions and through processing them, we can infer the possible trends in the evolution of the phyto-coenoses.

The main trend in the evolution of the vegetal cover on these areas is discernable after 7-8 years of fallowing when there are trees and bushes on the fallows with the perspective of vegetal associations of the forestry type depending on the soil and climate conditions in the area. All these actions are directly guided and influenced by the vegetation characteristic to the region, with forests of *Quercus cerris, Quercus fernetto, Acer campestre, Acer tataricum, Tilia tomentosa, Carpinus betulus,* or small water meadow forests of *Quercus robur, Fraxinus angustifolia, Ulmus minor, Acer campestre, Populus nigra*, and with flooding meadows along the water courses made up of *Salix alba, Salix fragilis, Salix triandra, Populus nigra* etc.

The study of the dynamics of the phyto-coenoses draws the attention on the changes of the phyto-coenoses in time and under the influence of man-made activities under the form of phyto-coenosis disturbances resulting mainly in the disappearance of plant species from the world's vegetation.

LITERATURE

ARSENE G.-G., Studiul ecologic şi fitosociologic al pajiştilor permanente din Munţii Poiana Ruscă (teză de doctorat) U.S.A.B.Timişoara., 1998

ARSENE G.-G., Pajiştile de Festuca rubra L. Cu Agrostis capillaris L. din Munţii Poiana Ruscă (lucrare ştiinţifică) U.S.A.B. Agr., XXXII, III 889-896 Timişoara, 2000

BORZA. A., BOŞCAIU N., Introducere în studiul covorului vegetal, Ed. „Academiei Române" Bucureşti, 1965

BOTNARIUC N., Evoluţia sistemelor biologice supraindividuale, Ed. Universităţii Bucureşti, 1999

BUJOREAN G., Contribuţii la cunoaşterea succesiunii şi întovărăşirii plantelor (teză de doctorat), Ed. „Imprimeria naţională" Bucureşti, 1931

COSTE I., Ecologie agricolă, Lito. I.A.T, Timişoara., 1986

COSTE I., BORZA I., ARSENE G.-G., Ecologie generală şi agricolă, Ed. „Orizonturi universitare" Timişoara, 2001

CRISTEA V., Fitosociologie şi vegetaţia României, Ed. Cluj-Napoca, 1993

IVAN D., Fitocenologie şi vegetaţia „R.S.R.", Ed. „Didactică şi Pedagogică" Bucureşti, 1979

MOISUC, A., SAMFIRA, I., CARRERE, P., Pajişti naturale şi exploataţii ecologice, Ed. Agroprint, Timişoara, 26-52., 2001

OPREA I.V.,OPREA V., Grupări fitosociologice ierboase din câmpii şi dealuri, Ed. „Mirton" Timişoara, 2000

PAŞCOVSCHI S., Succesiunea speciilor forestiere, Ed. „Agrosilvică" Bucureşti, 1967

PÎRVU C., Ecologie generală, Ed. „Tehnică" Bucureşti, 1999

SAMOILĂ Z.A., SAFTA I., GRIGORE S., POPA T., LAUER C., TEACI D., CRIŞAN I., COSTE I., ARVAT N., OLTEANU D., CRISTOI I., Pajiştile din Banat, sporirea producţiei şi îmbunătăţirea calităţii lor, Ed. „Bucureşti", 1979

SANDA V., POPESCU A., BARABAŞ N., Cenotaxonomia şi caracterizarea grupărilor vegetale din România Ed. „I.Borcea" Bacău, 1997

ŞCHIOPU D., VÎNTU V., BĂBEANU N., BERCA M., BORZA I., COSTE I., COTIGĂ C., DUMITRSCU N., OLTEANU I., PENESCU A., RĂDULESCU H., ŞCHIOPU T., ŞTIRBAN M., Ecologie şi protecţia mediului, Ed. „Ion Ionescu de la Brad" Iaşi, 2002

STUGREN B., Bazele ecologiei generale, Ed. „Ştiinţifică şi enciclopedică" Bucureşti, 1982

TONESCU A., BERCA M., Ecologie şi protecţia ecosistemelor, Ed. Bucureşt, 1988