

## XERIC MEADOWS AFFECTED BY THE ZOO-ANTHROPOGENIC FACTOR FROM THE OLTENIA REGION (ROMANIA)

**RĂDUȚOIU Daniel, MĂCEȘEANU Daniela Mihaela**

**Summary.** The xeric meadows in Oltenia are very well represented in the south part of this region. Because of the zoo-anthropogenic activities from the last 15 years (irrational grazing, throwing garbage at these places edge, sheepfold installation, the waste spill from roads construction nearby, etc.), the physiognomy has changed substantially. The lack and/or the extinction of the important fodder species, the development of the invasive species represent other contributing factors for the irreversible degradation of the xeric meadows in Oltenia. The presence of some rare taxa in these meadows is an important reason for considering a sustainable management of these places.

**Keywords:** zoo-anthropogenic factor, Oltenia, grazing, Romania.

**Rezumat. Pajiști xerice afectate de factorul zoo-antropogen din regiunea Olteniei (România).** Pajiștile xerice din Oltenia au o bună reprezentare la partea sudică a acestei regiuni. Datorită activităților zoo-antropogene din ultimii 15 ani (pășunat irațional, aruncarea gunoaielor menajere la marginea acestor locuri, târlitul unor suprafețe datorită instalării stânelor, deversarea resturilor rezultate de la construirea drumurilor din apropiere, etc.), fizionomia acestora s-a schimbat substanțial. Lipsa și/sau dispariția speciilor bune furajere, dezvoltarea speciilor invazive sunt alți factori care contribuie la degradarea ireversibilă a pajiștilor xerice din Oltenia. Prezența unor taxoni rari în aceste pajiști este un motiv important pentru care considerăm utilă gestionarea durabilă a acestor locuri.

**Cuvinte cheie:** factor zoo-antropogen, Oltenia, pășunat, România.

### INTRODUCTION

The influence of the zoo-anthropogenic factor on the xeric meadows vegetation condition in Oltenia is varied in terms of intensity and manifestation. On one hand, in some areas, a reduction of the surfaces occupied by these meadows took place while, on the other hand, this fact has brought the extinction of some valuable species as food but especially for science. As a result of the negative activities made by man and domestic animals on these meadows, many changes have occurred regarding their floristic composition, the important fodder species being replaced with the non-fodder ones or sometimes with species manifesting an invasive potential on the surfaces where they installed.

The first information regarding the natural meadows in Romania is found in the research papers published by D. Brândză (1879-1883) and D. Grecescu (1898). Subsequently, we find important data in the research paper published by Enculescu (1923). In this research paper are found details regarding the grassy vegetation, especially in the steppe and silvosteppe area, in correlation with the climatic and soil factors.

I. Prodan (1924-1939) grouped the grassy vegetation in large ecological groups, bringing extensive information about these places flora (PRODAN, 1939). In the same period, the first floristic and phytocoenology studies have appeared regarding some territories.

Generally, the complete characterization of the xeric meadows from this country side is combining the information from the specialty literature (BUIA & POPESCU-MIHĂILĂ, 1952; BUIA, 1959; 1960; BUIA & PĂUN, 1960; BUIA et al., 1961; POPESCU et al., 2003) with the personal experience gained during researching on meadows in Oltenia (RĂDUȚOIU, 2006; 2008). While the meadows from the nord part of Otenia have been carefully studied by a researchers group coordinated by prof. univ. dr. Buia et al. (1962) and another one coordinated by prof. univ. dr. Popescu Gh. (POPESCU et al., 2001), data regarding the meadows from the south part of the region is sporadic found in papers regarding the flora or vegetation of a specific territory (BUIA & POPESCU-MIHĂILĂ, 1952; BUIA, 1959; 1960; BUIA & PĂUN, 1960; PĂUN, 1969; PĂUN & POPESCU, 1975).

### MATERIAL AND METHODS

The present paper refers to the meadows from the south part of Oltenia region namely to those from Oltenia Plain (Fig. 1). The research has been performed both on route and stationary. The route research involved the establishing of some routes which include those areas where the negative influence on these meadows is becoming higher and higher. All the vegetal formations met in field have been noted in the notebook. These itineraries have been few times repeated during one year (from April to October) to observe the dynamics of these meadows flora throughout vegetation. From the collected data over 15 years of studying, it can be observed a multiannual dynamics under the influence of numerous climatic and zoo-anthropogenic factors.

The research in stationary is very important because it completes the study on routes, offering information about the dynamics aspects of vegetation on a longer or shorter time period and how the climatic and zoo-anthropogenic factors have influences on these meadows composition and floristic structure and especially the succession of these vegetal association.

Authors' names were provided by BRUMMITT & POWELL (1992).

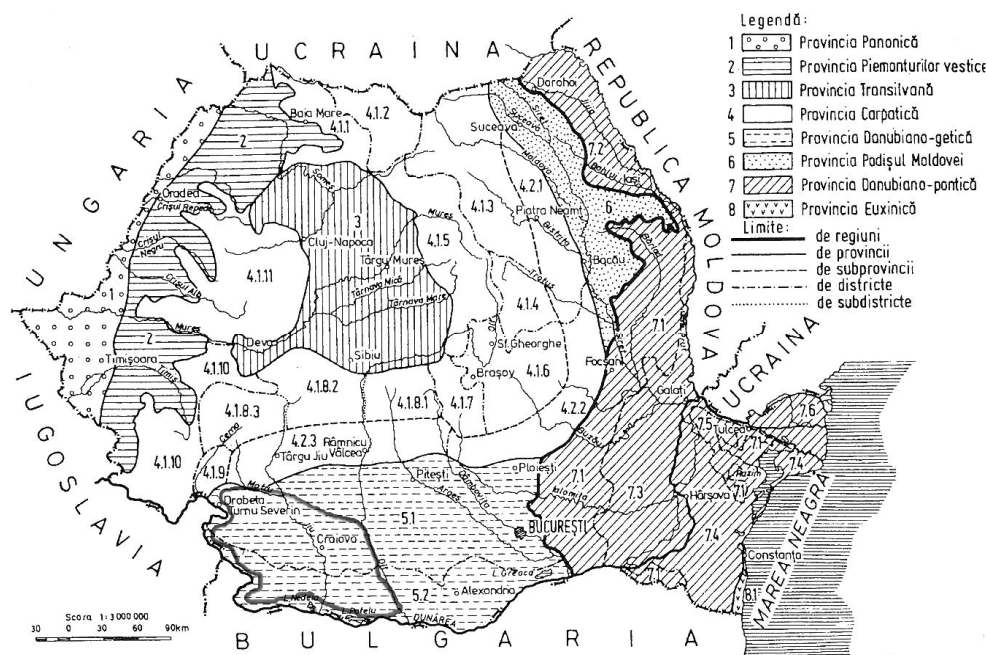


Figure 1. The delimitation of the researched area related to the Romania floristic provinces (from Ciocârlan, 2000).

## RESULTS AND DISCUSSIONS

The xeric meadows in the south part of Oltenia belong to *Festuco-Brometea* Br.-Bl. et R. Tx. in Br.-Bl. 1949. It is the specific class of this area.

The presence of steppe vegetation in Oltenia has been debated from 1960 when professor Buia was saying that a natural steppe does not exist in this part of the country, but an artificial one, resulting from the anthropogenic activities although on some areas are met some elements characteristic to the steppe vegetation (BUIA, 1960).

The actual vegetation shape from the south part of Oltenia is represented almost entirely by secondary steppe association which have been formed from primary vegetation only as small fragments placed along some valleys or on some steeper slopes.

These primary and secondary meadows represent the only evidences of some extinct vegetation, with a special phytogeographic significance (PUȘCARU-SOROCEANU EVD. et al., 1963).

Following the analysis of these xeric meadows we can say that these are the most affected vegetal association by the zoo-anthropogenic factors: *Medicagini – Festucetum valesiacae* Wagner 1940 including the surfaces added by Păun et Popescu (1972) to *sternbergietosum colchiciflorae* Păun et Popescu 1972, *Stipetum capillatae* Schneider-Binder 1967, *Haynaldietum villosae* Buia et Păun 1959, *Bothriochloetum ischaemi* (Krist. 1937) Pop 1977.

From the associations mentioned above, the *Medicagini – Festucetum valesiacae* association occupies the largest area in the south part of Oltenia, even if in the specialty literature (PUȘCARU-SOROCEANU EVD. et al., 1963) is mentioned that *Festuca valesiaca* Schleicher in Gaudin 1811 association with different species is rare, occupying small surfaces and measuring few hundreds square meters.

The association is found on dry slopes with south, south-east or south-west exposure and flat lands. These are not present on the north exposure slopes.

Almost all the surfaces covered by these association phytocoenosis are strongly influenced by the zoo-anthropogenic factor. An irrational grazing is practiced during all vegetation period, with higher intensity in spring. The sheepfolds installation determines the extinction of all species from these surfaces.

By comparing the actual data with those in specialty literature about this association floristic composition is found a great reduction of species number. In the past, 92 species have been discovered in the floristic composition (BUIA et al., 1959) while today the number is reduced to 48.

The presence of some potential invasive species in some areas (e.g. *Ambrosia artemisiifolia* Linnaeus 1753, *Carthamus lanatus* Linnaeus 1753, *Echium italicum* Linnaeus 1753 (Fig. 2) etc.) makes us believe that in the future, if grazing and sheepfolds installation are not going to be stopped, the terms of meadows will be replaced by ruderalised places. If we consider also that the sheepfolds position and irrational grazing are found on recognized reservations (ex. Valea Rea Radovan) or enlightened by rare species: *Sternbergia colchiciflora* Waldstein et Kitaibel 1805 (*sternbergietosum colchiciflorae* Păun et Popescu 1972) we can measure the gravity of the actual meadows situation.

Figure 2. Xeric meadows with *Echium italicum* (original).Figure 3. The physiognomy of the meadows enlightened by *Dichanthium ischaemum* (original).

The importance of these meadows is given not only by some species with scientific value but also by their food, honey or medical value (*Hypericum perforatum* Linnaeus 1753, *Cichorium intybus* Linnaeus 1753, *Agrimonia eupatoria* Linnaeus 1753 etc.).

*Bothriochloetum ischaemi* (Krist. 1937) Pop 1977

The meadows with *Bothriochloetum ischaemi* are usually placed on the fields with moderate inclination, less fertile, which hardly can be used for something else except grazing. These areas phytocoenosis have a characteristic physiognomy. Besides the species characteristic to the alliance, order and class are found others belonging to *Sisymbrietalia* Tuxen in Lohmeyer et. Al. 1962: *Carthamus lanatus*, *Verbena officinalis* Linnaeus 1753, *Lactuca serriola* Torner 1756, *Erigeron annuus* Persoon 1807 subsp. *strigosus* (Mühl. ex Willd.) Wagenitz, *Cephalaria transylvanica* (Linnaeus 1753) Schrader 1814 etc., fact which proves that these meadows are under an intense process of ruderalization.

The surfaces enlightened by *Bothriochloetum ischaemi* are poorly in terms of food, appearing after the association enlightened by *Festuca valesiaca* or *F. rupicola* Heuffel 1858 by their degradation.

The floristic composition of some areas covered by *Bothriochloetum ischaemi* is decreasing although as physiognomy, these meadows are uniform (Fig. 3). This is due to the dominant species called *Dichanthium ischaemum* (Linnaeus 1753) Roberty which has a good coverage. It is a poorly fooder species.

While in the research made by M. Păun (1969) regarding the floristic composition of this association 59 species were present, today the number was reduced to 38. If we consider also that some species belong to *Sisymbrietalia*, we can realize the need for these meadows protection.

*Stipetum capillatae* Schneider-Binder 1967

The meadows enlightened by *Stipetum capillatae*, characteristic to this area, are found as clusters on small surfaces, on dry and sunny slopes. The area is small in Oltenia (Radovan and Mărăcine localities –Dolj County).

They are affected by irrational grazing, practiced especially during spring. Although they have a low economic importance, these surfaces have a great phytosociological value.

*Haynaldietum villosae* Buia et Păun 1959

These are meadows characteristic to the south part of Oltenia, being found as isolated surfaces and varying as size. It has been identified in Olt, Dolj and Mehedinți Counties, both on flat lands and sunny slopes.

In the past the surfaces occupied by these association phytocoenosis had a great phytodiversity (around 100 species) (BUIA et. al., 1959). Today, from this meadows floristic composition numerous richly fooder species have disappeared (*Trifolium campestre* Schreber 1804, *T. pallidum* Waldstei et Kitaibel 1802, *T. resupinatum* Linnaeus 1753, *Medicago arabica* (Linnaeus 1753) Alioni 1785, *M. orbicularis* (Linnaeus 1753) Alioni 1785, *M. falcata* Linnaeus 1753, *M. rigidula* (Linnaeus 1753) Desrousseaux in Lamarck 1789 *Hordeum bulbosum* Torner 1756 etc.). The number of species from the surfaces enlightened by *Haynaldia villosa* (Linnaeus 1753) Schur 1866 has been halved.

The main cause of these meadows degradation is grazing with horses and cattle until the extinction of all species from some areas. These animals are eating inclusive the dominant species during its first stages of vegetation.

The need of these meadows protection is sustained by the limited area in this side of the country, by the rare species from some areas dominated by *Haynaldia villosa* (*Hordeum bulbosum*, *Medicago arabica*, *M. polymorpha* Linnaeus 1753) and by numerous southern elements from their floristic composition (ex. *Chrysopogon gryllus* (Linnaeus 1753) Trinius 1820).



## CONCLUSIONS

The influence of the zoo-anthropogenic factor on these areas is very high, this contributing to the extinction or reducing of some rare species (*Medicago arabica*, *M. polymorpha*, *Ziziphora capitata* Linnaeus 1753, *Sternbergia colchiciflora*) or to the replacement of some good fooder species with the ruderal, adventive or invasive ones.

The actual stage of the xeric meadows in Oltenia, highlighting the necessity of their protection and conservation

Urgent measures like a rational grazing, prohibiting the disposal of garbage at these meadows edges, wool abandoning and soil collection from the places where we still can find important species from a scientific point of view, are recommended to be taken.

## REFERENCES

- BRÂNDZĂ D. 1879-1883. *Prodromul Florei române sau enumerațiunea plantelor până astăzi cunoscute în Moldova și Valachia*. Tipografia Acad. Române. București. 568 pp.
- BRUMMITT R. K. & POWELL C. E. 1992. *Authors of plant names*. Royal Botanic Gardens. Kew. (EDS.) 732 pp.
- BUIA AL. & POPESCU-MIHĂILĂ ANA 1952. Contribuții la flora regiunii Craiova. *Buletin Științific. Secțiunea de Științe Biologice, Agronomice, Geologice și Geografice*. Edit. Universitaria. București. 4(3): 519-536.
- BUIA AL. 1959. Plante rare pentru flora R.P.R. existente în Oltenia. *Buletinul Comisiei pentru Ocrotirea Monumentelor Naturii. Ocrotirea Naturii*. București: 13-42.
- BUIA AL. 1960. Există stepă naturală în Oltenia? *Comunicări de Botanică*. Edit. Academiei R. S. R. București: 93-101.
- BUIA AL., PĂUN M., SAFTA I., POP M. 1959. Contribuții geobotanice asupra pășunilor și fânețelor din Oltenia. *Lucrări Științifice*. Institutul Agronomic "Tudor Vladimirescu". Craiova: 1-90.
- BUIA AL. & PĂUN M. 1960. Materiale pentru flora și vegetația împrejurimilor orașului Craiova. SSNG. *Comunicări de Botanică*, 1957-1959. Edit. Academiei R. S. R. București: 281-296.
- BUIA AL., PĂUN M., MALOȘ C. 1961. Pajiștile naturale din Regiunea Craiova și îmbunătățirea lor (II). *Probleme Agricole*. Institutul Agronomic "Tudor Vladimirescu". Craiova. 13: 31-40.
- CIOCĂRLAN V. 2009. *Flora ilustrată a României. Pteridophyta et Spermatophyta*. Edit. Ceres. București. 1038 pp.
- DIHORU GH. & NEGREAN G. 2009. *Cartea roșie a plantelor vasculare din România*. Edit. Acad. Române. București. 630 pp.
- ENCULESCU P. 1923. *Zonele de vegetație lemnoasă din România*. Instit. Geologic București. 268 pp.
- GRECESCU D. 1898. *Conspectul Florei României*. Tipografia "Dreptatea". București. 836 pp.
- PĂUN M. & POPESCU G. 1975. Considerații asupra pajiștilor xerofile din Oltenia. *Studii și Cercetări*. C.C.E.S. Mehedinți: 95-99.
- PĂUN M. 1969. Vegetația pajiștilor de locuri uscate din împrejurimile Balșului. *Studii și Cercetări. Biologie. Seria Botanică*. Edit. Universitaria. București. 21(1): 35-44.
- PĂUN M. & POPESCU G. 1972. La vegetation des sables de la courbure du Danube (Oltenia). *Acta Horti Bot. Bucurest.* Botanical Garden. Bucharest: 569-587.
- POPESCU GH., COSTACHE I., RĂDUȚOIU D., BORUZ VIOLETA. 2003. Valea Rea – Radovan, Dolj district, floristic and vegetation point of great scientific importance. *Acta Horti Bot. Bucurest.* Botanical Garden. Bucharest. 30: 83-94.
- POPESCU G., COSTACHE I., RĂDUȚOIU D., GĂMĂNECI G. 2001. Flora pajiștilor din nordul Olteniei: 63-115; Vegetația pajiștilor: 116-215. In I. Ionescu (ed.). *Pajiștile permanente din nordul Olteniei*. Edit. Universitaria, Craiova. 300 pp.
- PRODAN I. 1939. *Flora pentru determinarea și descrierea plantelor ce cresc în România. Noțiuni generale de Fitogeografie. Fiziografia generală a României. Fitogeografia României*. Tipografia "Cartea Românească" Cluj. 2. 713 pp.
- PUȘCARU-SOROCEANU EVDOCHIA, PUȘCARU D., BUIA AL., BURDUJA C., CSUROS ȘT., GRÎNEANU A., NIEDERMAYER K., POPESCU P., RĂVĂRUȚ M., RESMERIȚĂ I., SAMOILĂ Z., VASIU V., VELEA C. 1963. *Pășunile și fînețele di Republica Populară Română. Studiu geobotanic și agroproductiv*. Edit Acad. Române. București. 458 pp.
- RĂDUȚOIU D. 2006. Herbaceous phytocoenoses in the Cerna of Olteț River Basin and their antierosional action. *Acta Horti Bot. Bucurest.* Botanical Garden. Bucharest. 33: 111-117.
- RĂDUȚOIU D. 2008. *Flora și vegetația Bazinului Cernei de Olteț*. Edit. Sitech. Craiova. 407 pp.

Răduțoiu Daniel

University of Craiova, Faculty of Horticulture, Biology Department Libertății Street 15, Craiova, 200585, Romania.

E-mail: radutoiu02daniel@gmail.com

Măceșeanu Daniela Mihaela

Museum of Oltenia Craiova, Popa Șapcă Street, No. 8, Craiova, 200410, Romania.

E-mail: daniela.maceseanu@yahoo.com

Received: April 29, 2018

Accepted: August 2, 2018