

# Aspects Regarding Expanding the Area Occupied by Some Invasive Species in Dobrogea

*Aspecte privind extinderea suprafețelor ocupate de unele specii invazive în Dobrogea*

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## Abstract

*This work refers to only four species of the ones submitted to analysis and under on going monitoring in Dobrogea: *Ambrosia artemisiifolia*, *Cenchrus incertus*, *Conyza canadensis* and *Ailanthus altissima*. These invasive alien species have negative impact on biodiversity. Concerning the first two mentioned above they also have negative impact on people and animals' health.*

*From the analyses performed it clearly results that the four invasive species have a special settlement–occupancy capacity as a result of their special capacity of phenotypic and genotypic adaptation. It is needed in Romania and more so in Dobrogea to establish concrete measures by which invasive plants in general and the four plants described herein in particular be monitored or where appropriate removed from the priority habitats of community interest or of national natural heritage conservation importance. Scientific research is ongoing and it is desirable that this paper to contribute and identify effective measures to keep under control invasive species.*

**Keywords:** invasive species, survey area, Dobrogea – România

## Introduction

This work represents some preliminary observations on a study with numerous field trips which seek to bring a contribution to clarifying certain issues in connection with the presence and the expansion on increasingly larger surfaces of adventitious plants, which, at the same time, are considered invasive. This work only refers to four species of the studied and monitored species in the Dobrogea: *Ambrosia artemisiifolia*, *Conyza canadensis*, *Ailanthus altissima* and *Cenchrus incertus*.

Through the ongoing study attempts to provide complementary explanations, in addition to those already expressed by researchers, while two of the issues that need to be clarified is whether these plants are invasive only on land with poor vegetation, anthropogenic or whether a campaign should be conducted to eliminate them from any area of land where they are adventitious.

*Conyza canadensis* – from *Asteraceae* family, annual species, adventive from North America, frequent at the national level, lacking in few degraded places, is a first rank nitrophile but in recent years its presence is noticeable on soils of different types. Remarkable is the number of fruit on one plant of

this species and the expansion of this species in the various places whether stationary, ranging from loose soils to superficial soils and from the forest to urban areas (near sidewalks).

*Ambrosia artemisiifolia* – from *Asteraceae* family, annual species, adventive from North America found at national level in several regions, the quarantine allergenic weed species. It requires a special attention and performing continuous scientific studies to understand the causes of enlargement of the area occupied by the species, especially in Dobrogea and a detailed analysis of the ecology of this species, ever so more since by releasing pollen it causes respiratory diseases, skin rashes or dermatitis.

*Cenchrus incertus* – from *Poaceae* Family, annual species, adventive from tropical America, is mentioned in the literature as very rare species in Romania, more specifically in three places in Dobrogea and one in Moldova, although a colonization expansion of new areas in Dobrogea was noticed, which triggered conducting studies which are part of this work. It is important to know whether this plant once installed on fallow soil or on land of spontaneous vegetation flora prevents the natural development of native species population dynamics.

*Ailanthus altissima* – from *Simaroubaceae* family, wood species adventive from China on sunny mild lands, it is particularly prevalent in warmer areas of the country and is characterized by a very high capacity of vegetative propagation and using seeds that are carried by wind on great distances. The challenge that determined the species in a scientific study was born out of a desire to bring clarification on the ability of this species to invade native species since it was observed to settle and win the competition even on soils with good vegetation cover and not only on degraded soils as the saying goes far.

It should be further examined whether these four plants have supremacy only on anthropogenic, torn lands, or if they win the competition for filling any type of resort due to mechanisms they have for vegetative zoochore, anemochore or antropochore propagation.

### **Material and methods**

Species identification was performed within phytocenotic surveys clearly marked on the ground, permanent to analyze the evolution of vegetation over a period of several years. The scale for assessing the abundance dominance is the scale designed by Braun–Blanquet (1928, 1951) later amended:

- r = an isolated individual here and there;
- + = 2–5 individuals or stems <5% coverage;
- 1 = 6–50 individuals or stems <5% coverage;
- 2m = 50 individuals or stems <5% coverage;

- 2 = number of individuals regardless, 6–15% coverage;  
 2b = number of individuals regardless, 15–25% coverage;  
 3 = number of individuals regardless, 26–50% coverage;  
 4 = number of individuals regardless, 51–75% coverage;  
 5 = number of individuals regardless 75– 100% coverage.

As working materials measuring cord, 20x magnifier, Nikkon D 7000 Camera, flora determinator were used CIOCĂRLAN (2000) and *Iconografia florae partis austro-orientalis europae centralis – Akademiai Kiado* (1975). Survey and monitoring was realized between 2010 and 2014.

## Results and discussion

### 1. Identification of invasive plants of the ground on the four distinct areas of study

#### A) Garvăn village – Văcăreni Hill area, where adventitious and invasive species were identified: *Ambrosia artemisiifolia*, *Cenchrus incertus* and *Conyza canadensis*

Phytocenotic surveys were conducted 1–7 on 200 sqm surfaces, in the immediate vicinity of Garvăn village, south–west of it, in 2013, whose specific composition is shown below (Photo 1).

**Survey 1:** T – *Setaria pumila* 2 b, T – *Salsola kali* 1, T – ***Cenchrus incertus* 1**, T – ***Ambrosia artemisiifolia* +**, T – ***Conyza canadensis* +**, T – *Atriplex tatarica* +, T – *Xanthium italicum* +, T – *Reseda lutea* +, T – *Erysimum repandum* +, Ph – *Vitis vinifera* r+, Ph – *Juglans regia* r (one individual), T – *Artemisia annua* +, Ht – *Daucus carota* +, G – *Sonchus arvensis* +, T – *Tribulus terrestris* +, T – *Raphanus raphanistrum* +, T – *Setaria viridis* +.

**Survey 2:** T – *Xanthium italicum* 1, T – ***Cenchrus incertus* 1**, T – ***Ambrosia artemisiifolia* +**, T – ***Conyza canadensis* +**, T – *Setaria pumila* +, T – *Salsola kali* +, T – *Atriplex tatarica* + 1, Ph – *Vitis vinifera* +, T – *Tribulus terrestris* +, T – *Raphanus raphanistrum* +, T – *Reseda lutea* +, G – *Sonchus arvensis* +, T – *Erysimum repandum* +.

**Survey 3:** T – ***Ambrosia artemisiifolia* +**, T – *Atriplex patula* +, T – *Setaria pumila* +, T – *Atriplex tatarica* +, T – *Tribulus terrestris* +, T – *Xanthium italicum* + 1, T – *Raphanus raphanistrum* +, T – *Erysimum repandum* +, T – *Raphanus raphanistrum* +, G – *Sonchus arvensis* +.



Photo 1. Overview of the studied site  
Foto 1. Imagine din situl studiat

**Survey 5:** T – *Setaria pumila* 2b, T – ***Cenchrus incertus*** +, T – ***Conyza canadensis*** +, T – *Salsola kali* +, T – *Xanthium italicum* +, T – *Raphanus raphanistrum* +, T – *Erysimum repandum* +, T – *Tribulus terrestris* +, T – *Setaria viridis* +, G – *Sonchus arvensis* +, T – *Senecio vernalis* +.

**Survey 6:** T – *Setaria pumila* 3, T – ***Ambrosia artemisiifolia*** +, T – ***Cenchrus incertus*** +, T – *Erysimum repandum* +, T – *Salsola kali* 1, T – *Atriplex tataricum* +, T – *Xanthium italicum* 1, Ht – *Onopordon acanthium* +, T – *Tribulus terrestris* +, T – *Raphanus raphanistrum* +, T – *Atriplex rosea* +, G – *Cynodon dactylon* +, Ph – *Vitis vinifera* +, T – *Hibiscus trionum* +.

**Survey 7:** T – *Echinochloa crus-galli* 1, T – ***Ambrosia artemisiifolia*** +, T – ***Conyza canadensis*** +, T – *Polygonum arenarium* +, T – *Solanum nigrum* +, G – *Sonchus arvensis* +, Ht – *Daucus carota* r, T – *Salsola kali* +, T – H – *Lapsana communis* +, T – *Artemisia annua* +, Ph – *Juglans regia* r, T – *Erysimum repandum* +, T – *Xeranthemum annuum* +, T – *Solanum nigrum* +, T – *Eragrostis minor* +, T – *Heliotropium europeum* +, T – *Setaria pumila* +.



Photo 2. *Cenchrus incertus* – adventitious species in the studied site  
Foto 2. *Cenchrus incertus* – specie adventivă în situl studiat



Photo 3. *Ambrosia artemisiifolia* in the vicinity of Garvăn village  
Foto 3. *Ambrosia artemisiifolia* în apropierea satului Garvăn

The presence of the adventitious species *Cenchrus incertus* (Photo 2) is noticed, referred to by some researchers as very rare in Dobrogea, and noticed in only two places in Vama Veche in Constanța County and Jurilovca in Tulcea County, and according to others in Galați, Măcin and Jijila. Its occurrence is the result of xeromezophyte conditions favourable to species and zoochore equipment of spikelets favouring its spread.

Another common presence within the site, undesirable for the genetic fund and specific to meadows and fallow land around Garvăn village, the adventive species *Ambrosia artemisiifolia* (Photo 3) is a species which in many countries is declared quarantine plant species. The site area studied within the seven surveys described above and in the vicinity is represented by lots cultivated annually with crops or left fallow for 1–3 years. In this case in the interval between harvest and planting of new crops there is not enough time to end plant associations that have stable channels of energy and information. Analyzing of reports presented above we can say that we have only the characteristic elements of incomplete plant associations, in comparison with the standard composition cited in the speciality literature but representatives present throughout the studied area (fragments of association). This segetal association identified on the studied surfaces is ***Echinochloa* – *Setaria pumilae* 1924 Felföldy em.** frequently develops in weeding crops in wet years with greater participation of *Echinochloa crus-galli* and in dry periods, together with *Stellarietea mediae* R.Tx., Lohm. et Prsg. in R.Tx.1950, with greater participation of *Setaria pumila*.

**B) Survey conducted at the borderline of Mamaia beach, 100 m east of Hotel Central to the Black Sea**

**Identified plants:** T – *Cenchrus incertus* 2a; T – *Ambrosia artemisiifolia* +; T – *Tribulus terrestris* +; T – *Salsola kali* +; T – *Corispermum nitidum* +; H – *Centaurea arenaria* r; T – *Plantago arenaria* +; T – *Chenopodium album* +; H – *Lactuca tatarica* r +; T – *Xanthium italicum* +; T – *Polygonum aviculare* +; T – *Solanum nigrum* +; T – *Digitaria sanguinalis* +.

It is surprising that in a surface of only 200 square meters, in an area of intense human activities, we have met together two of adventive species and invasive under study in this work.

**C) Survey in the immediate vicinity of Ceatalchioi village – Danube Delta. Survey area 400 sq.m.**

**Identified plants:** T – *Ambrosia artemisiifolia* 2a; T – *Abutilon theophrasti* +; T – *Atriplex rosea* +; T – *Artemisia annua* + 1; H – *Cichorium intybus* +; G – *Cirsium arvense* 2; H – *Glycyrrhiza echinata* r +; H – *Marrubium peregrinum* +; Ph – *Morus alba* r +; Ht – *Melilotus officinalis* +; Ht – *Onopordum*

*acanthium* +; G.(HH) – *Phragmites australis* 1; Ph – *Salix viminalis* +; T–  
*Solanum nigrum* +.

Within the agricultural perimeter of Ceatalchioi, based on this survey, the area can be identified as one of the most compact area in the country with *Ambrosia artemisiifolia* (Photo 4).



Photo 4. *Ambrosia artemisiifolia* at Ceatalchioi– Danube Delta  
Foto 4. *Ambrosia artemisiifolia* la Ceatalchioi, Delta Dunării

#### **D) Phytocenotic surveys at the level of RO SPA Măcin – Niculișel with *Coryza canadensis* and *Cenchrus incertus***

**Survey 1:** Survey area 1,000 sq. M.

**Description:** Florești quarry, decommissioned after two years of operation. Operating means were withdrawn in 2009. Ecologic reconstruction was performed by recovering the area with fertile soil. Species that are installed after decommissioning the quarry have very different ecological demands.

**Trees:** Ph – *Quercus pedunculiflora* +; Ph – *Pyrus pyraeaster* +; Ph – *Quercus petraea* +; Ph – *Populus nigra* +.

**Shrubs:** Ph – *Prunus spinosa* +; Ph – *Crataegus monogyna* +.

**Herbaceous species:** H – *Stipa capillata* 3; H – *Dichanthium ischaemum* 2b; T – ***Conyza canadensis* 2m**; G – *Cynodon dactylon* 1; Ch – *Thymus pannonicus* 1; T – *Atriplex tatarica* +; H – *Achillea clypeolata* +; T – Ht – *Bromus squarrosus* +; T – *Carthamus lanatus* +; Ht – *Centaurea calcitrapa* +; Ht–H – *Centaurea bieberstenii* subsp. *bieberstenii* +; Ht–H – *Chondrilla juncea* +; H – *Convolvulus cantabricus* +; H – *Agropyron cristatum* subsp. *cristatum* +; H – *Coronilla varia* +; H – *Agropyron intermedium* +; Ht – *Crepis biennis* +; H – *Ajuga chamaeptytis* +; T–Ht – *Descurainia sophia* +; H – *Echinops ritro* s. *ruthenicus* +; T – *Eragrostis minor* +; T – *Erodium cicutarium* +; H – *Eryngium campestre* +; T – Ht–H – *Falcaria vulgaris* +; H – *Festuca valesiaca* +; H – *Filipendula vulgaris* +; H – *Fragaria vesca* +; H – *Galium humifusum* +; T – Ht–*Herniaria glabra* +; H – *Hieracium pilosella* +; H – *Hypericum elegans* +; H – *Koeleria glauca* +; H – *Koeleria lobata* +; T– Ht – *Lactuca saligna* +; Ht – *Lactuca serriola* +; H – *Linum austriacum* +; H – *Linum tauricum* +; T – H – *Medicago lupulina* +; H – *Odontites lutea* +; T – *Petrorhagia prolifera* +; H – *Phleum phleoides* +; H – *Phlomis tuberosa* +; G– Hh – *Phragmites australis* +; H–H – *Plantago lanceolata* +; T – *Polycnemum arvense* +; T – *Polygonum aviculare* +; T – *Portulaca oleracea* +; H – *Potentilla argentea* +; H – *Ajuga genevensis* +; T–Ht – *Amaranthus crispus* +; T – *Amaranthus retroflexus* +; Ch – *Artemisia austriaca* +; Ht–H – *Reseda lutea* +; T – *Salsola kali* +; H – *Salvia nemorosa* +; H – *Sanguisorba minor* +; T – *Setaria viridis* +; T – *Silene compacta* +; T – *Solanum nigrum* +; G – *Asparagus verticillatus* +; Ch – *Teucrium chamaedrys* +; Ch – *Teucrium polium* +; H – *Teucrium scordium* +; H – *Astragalus onobrychis* +; H – *Dactylis glomerata* r; G – *Chrysopogon gryllus* r; Ch – *Thymus zygioides* r; Ch – *Dianthus nardiformis* r.

**Survey 2:** Survey area 500 sq. m

**Description:** South of Văcăreni village on the hills of the National Park – pasture. There is a nearby dairy farm. Effects of overgrazing are noticeable.

**Herbaceous species:** Ht – *Onopordum acanthium* 4; T – *Xanthium spinosum* 3; Ch – *Artemisia austriaca* 1; G – *Cynodon dactylon* 1; T – *Cannabis sativa* +; Ht – *Carduus acanthoides* +; Ht – *Centaurea solstitialis* +; H – *Cichorium intybus* +; H – *Convolvulus cantabricus* +; T – ***Conyza canadensis* +**; H – *Agrimonia eupatoria* +; Ht – *Datura stramonium* +; H – *Galium humifusum* +; Ht–H – *Malva sylvestris* +; H – *Marrubium vulgare* +; H – *Mentha spicata* +; T – *Abutilon theophrasti* +; T – *Polygonum aviculare* +; Ht–H – *Reseda lutea* +; H – *Berteroa incana* +; H – *Urtica dioica* +; H – *Betonica officinalis* +; H – *Bupleurum asperuloides* r.



**Survey 3:** Survey area 3,000 sq. m

**Description:** On the Imbulzita Hill, at the southern limit of the ecological corridor. The belt of vegetation folds out from under former Imbulzita Hill which existed until 2008. In the associations described transition from associations with *Dichantium ischaemum* to those of *Stipa capillata* can be observed.

**Shrubs:** Ph – *Crataegus monogyna* +; Ph – *Prunus spinosa* +; Ph – *Rosa canina* +.

**Herbaceous species:** H – *Stipa capillata* 4; H – *Dichantium ischaemum* 2b; H – *Potentilla argentea* 2m; H – *Campanula romanica* 1; Ch – *Thymus pannonicus* 1; H – *Cichorium intybus* +; H – *Convolvulus cantabricus* +; **T – *Conyza canadensis* +**; H – *Astragalus asper* +; Ch – *Dianthus nardiformis* +; Ht – *Echium vulgare* +; T – *Eragrostis minor* +; H – *Eryngium campestre* +; H – *Festuca valesiaca* +; H – *Hypericum elegans* +; T – *Polycnemum arvense* +; H – *Berteroa incana* +; H – *Potentilla astracanica* +; H – *Achillea coarctata* +; H – *Asperula cynanchica* +; Ht-H – *Salvia aethiopis* +; H – *Salvia nemorosa* +; H – *Sanguisorba minor* +; Ht-H – *Scabiosa ochroleuca* +; T – *Centaurea diffusa* +; Ch – *Teucrium polium* +; H – *Teucrium scordium* +; Ht-H – *Centaurea bieberstenii* ssp. *bieberstenii* +; Ht – *Verbascum blattaria* +; T-H – *Medicago lupulina* r; H – *Rumex acetosella* r; Ch – *Thymus zygioides* r; Ch – *Sedum acre* r; Ht-H – *Chondrilla juncea* r; G – *Chrysopogon gryllus* r; Ch – *Sempervivum ruthenicum* r.

**Survey 4:** Survey area 600 sq. m

**Description:** North-west of Balabancea village from the road to the hill interfluve. Natural pasture where sheep are less stationary, following being better as grazing is made under less stressful conditions. On the ridge characteristic steppe grasslands species appear. Currently, the dominant plant association is the *Dichantietum ischaemi*.

**Shrubs:** Ph – *Crataegus monogyna* +.

**Herbaceous species:** H – *Dichantium ischaemum* 3; **T – *Conyza canadensis* 1**; H – *Festuca valesiaca* 1; H – *Berteroa incana* +; H – *Achillea coarctata* +; Ht – *Carduus acanthoides* +; T – *Carthamus lanatus* +; Ht-H – *Chondrilla juncea* +; H – *Cichorium intybus* +; G – *Cirsium arvense* +; Ch – *Artemisia austriaca* +; T – *Crepis rhoeadifolia* +; H – *Cynanchum acutum* +; G – *Cynodon dactylon* +; Ht – *Daucus guttatus* +; H – *Echinops ritro* ssp. *ruthenicus* +; H – *Eryngium campestre* +; Ht-H – *Erysimum repandum* +; H – *Astragalus onobrychis* +; H – *Fragaria vesca* +; H – *Galium humifusum* +; H – *Lolium perenne* +; H – *Marrubium peregrinum* +; T – *Medicago minima* +; H – *Odontites verna* +; T – *Petrorhagia prolifera* +; T – *Polygonum aviculare* +; H – *Potentilla argentea* +; H – *Salvia nemorosa* +; Ht-H – *Salvia nutans* +; H – *Sanguisorba minor* +; Ht-H – *Scabiosa ochroleuca* +; H – *Stachys recta* subsp. *nitens* +; Ch – *Teucrium chamaedrys* +;

Ch – *Thymus pannonicus* +; T – *Tragus racemosus* +; Ht – *Verbascum blattaria* +; T – *Xeranthemum annuum* +; H – *Artemisia vulgaris* r; H – *Taraxacum officinale* r; T-Ht – *Medicago falcata* r; Ht-H – *Salvia aethiopsis* r; T-Ht – *Tragopogon dubius* r; G – *Lathyrus niger* r; T – *Alyssum minutum* r; H – *Phlomis tuberosa* r.

**Survey 5:** Survey area 600 sq. m

**Description:** North of Pricopanului Crest near the former kaolin quarry. Kaolin mining activity was stopped for a long time. Plants occurring in the area are suggestive of human activity only near the road to Măcin Town and within the area of the former kaolin quarry. But from the way and to the highest area (southern edge of the quarry), the hill is well fallow (ecologically recovered through local resilient mechanisms), having in composition pioneering elements that will lead in time to stable steppe grasslands.

**Trees:** Ph – *Morus alba* r.

**Shrubs:** Ph – *Euonymus europaea* r.

**Herbaceous species:** H – *Dichanthium ischaemum* 2b; H – *Festuca valesiaca* 1; T – *Polygonum aviculare* 1; H – *Artemisia annua* +; Ch – *Artemisia austriaca* +; H – *Berteroa incana* +; H – *Achillea coarctata* +; Ht – *Carduus acanthoides* +; Ht – *Carduus thoermeri* +; T – *Carthamus lanatus* +; T – *Centaurea diffusa* +; H – *Cichorium intybus* +; G – *Cirsium arvense* +; T – ***Conyza canadensis*** +; Ep – *Cuscuta europaea* +; H – *Cynanchum acutum* +; Ht – *Daucus carota* +; Ch – *Dianthus nardiformis* +; Ht – *Echium vulgare* +; H – *Eryngium campestre* +; H – *Achillea millefolium* +; H – *Euphorbia seguierana* +; H – *Agropyron pectinatum* +; H – *Festuca callieri* +; T – *Alyssum saxatile* +; H – *Galium humifusum* +; H – *Galium verum* +; H – *Hieracium pilosella* +; T – Ht – *Lactuca saligna* +; T – *Malva neglecta* +; Ht-H – *Malva sylvestris* +; H – *Marrubium peregrinum* +; T – *Melilotus alba* +; T – *Amaranthus retroflexus* +; H-H – *Plantago lanceolata* +; T – *Arenaria serpyllifolia* +; T – *Portulaca oleracea* +; H – *Potentilla argentea* +; Ht-H – *Reseda lutea* +; T – *Salsola kali* +; H – *Sanguisorba minor* +; Ht-H – *Scabiosa ochroleuca* +; Ch – *Sedum acre* +; T – *Setaria glauca* +; H – *Taraxacum officinale* +; Ch – *Teucrium polium* +; H – *Teucrium scordium* +; Ch – *Thymus pannonicus* +; Ch – *Thymus zygoides* +; Ht – *Verbascum blattaria* +; H – *Verbascum nigrum* +; Ht – *Verbascum phlomoides* +; Ht – *Vicia cracca* +; T – *Xanthium spinosum* +; T – *Eragrostis minor* r; H – *Silene csereii* r; Ht – *Lactuca serriola* r; T – *Filago arvensis* r; T – *Valerianella costata* r.

## Survey 6

Survey area 1,000 sq. m

**Description:** Near Garvăn, the road that goes to the relay and SGA headquarters. On the observations date, 2010, it was a semi-meadow. In the

past introduction of crops was attempted, the ecosystem is in a transition phase from pioneering of ruderal and segetal species towards the reinstalling of secondary steppe grasslands. The adventitious species *Cenchrus incertus* is noticeable as mentioned in many works, only in Dobrogea but in other areas than the surveyed one. Its occurrence is the result of favorable xeromezophite conditions species and the equipment of zoochore spikes favouring its spread.

**Trees:** Ph – *Morus alba* +; Ph – *Elaeagnus angustifolia* r.

**Shrubs:** Ph – *Prunus spinosa* +; Ph – *Crataegus monogyna* r.

**Herbaceous species:** T – ***Cenchrus incertus* 3**; T – *Tragus racemosus* 2b; H – *Plantago arenaria* 1; T – *Centaurea diffusa* +; Ht-H – *Centaurea bieberstenii* subsp. *bieberstenii* +; T – *Chenopodium strictum* +; Ht-H – *Chondrilla juncea* +; H – *Convolvulus cantabricus* +; T – ***Conyza canadensis* +**; Ht – *Daucus carota* +; T-Ht – *Descurainia sophia* +; H-Ch – *Diplotaxis tenuifolia* +; H – *Artemisia annua* +; T – *Eragrostis minor* +; Ht-H – *Erysimum diffusum* +; H – *Euphorbia seguieriana* +; H – *Galium humifusum* +; H – *Helichrysum arenarium* +; T – *Heliotropium europaeum* +; H – *Jurinea arachnoidea* +; T – *Melilotus alba* +; T – *Atriplex patula* +; T – *Polygonum aviculare* +; T – *Brassica rapa* subsp. *sylvestris* +; Ht-H – *Reseda lutea* +; T – *Salsola kali* +; Ht-H – *Scabiosa ochroleuca* +; T – *Setaria glauca* +; T – *Solanum nigrum* +; T – *Torilis arvensis* +; Ht – *Carduus acanthoides* +; Ht – *Verbascum phlomoides* +; Ht – *Vicia cracca* +; T – *Xanthium strumarium* +; T-Ht – *Matricaria perforata* +; H – *Artemisia absinthium* +; T – *Bassia laniflora* r.

#### **Survey 7:** Survey area 500 sq. m

Description: North of Turcoaia quarry near the access road to the quarry.

**Herbaceous species:** G – *Cynodon dactylon* 2 m; Ch – *Artemisia austriaca* 1; H – *Festuca valesiaca* 1; T – *Amaranthus retroflexus* +; H – *Artemisia annua* +; H – *Achillea coarctata* +; H – *Asperula cynanchica* +; T – *Atriplex patula* +; H – *Dichanthium ischaemum* +; T-Ht – *Capsella bursa-pastoris* +; Ht – *Carduus thoermeri* +; T – *Centaurea diffusa* +; Ht-H – *Centaurea bieberstenii* s *bieberstenii* +; Ht-H – *Chondrilla juncea* +; H – *Cichorium intybus* +; G – *Cirsium arvense* +; Ht – *Cirsium vulgare* +; H – *Convolvulus cantabricus* +; T – *Conyza canadensis* +; Ht – *Crepis biennis* +; T – *Crepis rhoeadifolia* +; H – *Achillea millefolium* +; T-Ht – *Descurainia sophia* +; Ht – *Echium vulgare* +; T – *Erodium cicutarium* +; H – *Eryngium campestre* +; H – *Achillea ochroleuca* +; H – *Galium humifusum* +; T – *Heliotropium suaveolens* +; H – *Hieracium pilosella* +; Ht – *Hyoscyamus niger* +; T-Ht – *Lactuca saligna* +; Ht – *Lactuca serriola* +; H – *Linaria genistifolia* +; H – *Marrubium peregrinum* +; T-Ht – *Medicago falcata* +; Ht-H – *Reseda lutea* +; T – *Salsola kali* +; Ht-H – *Salvia aethiopis* +; T – *Setaria verticillata* +; H – *Silene bupleuroides* +; H – *Silene csereii* +; H – *Stachys recta* subsp. *nitens* +; H – *Stipa capillata* +; Ch –

*Teucrium polium* +; Ch – *Thymus pannonicus* +; T – *Tragus racemosus* +; Ht-H – *Trinia ramosissima* +; T – *Xanthium italicum* +; T – *Xanthium spinosum* +; T – *Xeranthemum annuum* +; H – *Agropyron cristatum* subsp. *brandzae* r+.

### E) Phytocenotic Surveys with *Ailanthus altissima* at the level of SPA Măcin – Niculișel

**Survey 1:** Survey area 600 sq. M.

**Description:** at the northern limit of Cherval Hill, grassland.

**Trees:** Ph – *Ailanthus altissima* +.

**Shrubs:** Ph – *Elaeagnus angustifolia* +; Ph – *Cerasus mahaleb* r; Ph – *Crataegus monogyna* +; Ph – *Prunus spinosa* +; Ph – *Rosa* sp. +.

**Herbaceous species:** H – *Dichantium ischaemum* 3; G – *Cynodon dactylon* 2a; T – *Polygonum aviculare* 1; H – *Lolium perenne* 1; H – *Stipa capillata* 1; Ch – *Thymus pannonicus* 1; H – *Cichorium intybus* +; H – *Convolvulus cantabricus* +; H – *Agropyron pectinatum* +; T – *Crepis setosa* +; H – *Cynanchum acutum* +; H – *Agropyron repens* +; Ch – *Dianthus nardiformis* +; H – *Echinops ritro* ssp. *ruthenicus* +; H – *Agropyron cristatum* ssp. *brandzae* +; H – *Festuca valesiaca* +; H – *Koeleria glauca* +; H – *Koeleria lobata* +; H – *Linaria genistifolia* +; H – *Linum austriacum* +; G – *Allium flavum* +; H – *Marrubium peregrinum* +; T-Ht – *Medicago falcata* +; H-H – *Onobrychis gracilis* +; H-H – *Plantago lanceolata* +; T – *Polycnemum arvense* +; H – *Potentilla argentea* +; Ch – *Artemisia austriaca* +; Ht-H – *Reseda lutea* +; H – *Agropyron intermedium* +; Ht-H – *Salvia aethiopis* +; H – *Salvia nemorosa* +; T – *Sideritis montana* +; H – *Campanula romanica* +; Ch – *Teucrium polium* +; Ht-H – *Chondrilla juncea* +; Ch – *Thymus zygioides* +; Ch – *Arenaria rigida* r; H – *Asplenium trichomanes* r; H – *Ajuga laxmannii* r; T – *Xeranthemum annuum* r.

**Survey 2:** Survey area 2,000 sq. m

**Description:** inside the former Jijila Lake, north-west to the rocky area from the acacia plantation, on both sides of the earth road that crosses the area at the north-eastern boundary.

**Trees:** Ph – *Ailanthus altissima* +; Ph – *Elaeagnus angustifolia* +; Ph – *Morus alba* +.

**Herbaceous species:** Hd – *Lemna minor* 3; Hd – *Hydrocharis morsus-ranae* 2b; T – *Salvinia natans* +; T – *Ambrosia artemisiifolia* 2m; G-Hh – *Bolboschoenus maritimus* 1; H – *Lolium perenne* 1; G – *Cynodon dactylon* 1; T – *Salsola kali* 1; T – *Setaria glauca* 1; T – *Setaria verticillata* 1; G-Hh – *Typha angustifolia* 1; G-Hh – *Typha latifolia* 1; H – *Cichorium intybus* +; H-G – *Convolvulus arvensis* +; H – *Convolvulus cantabricus* +; T – *Conyza*

**canadensis** +; T – *Amaranthus crispus* +; G – *Cyperus fuscus* +; Ht – *Daucus carota* +; H – *Achillea millefolium* +; T – *Eragrostis minor* +; Ch – *Artemisia austriaca* +; T – *Atriplex patula* +; H – *Achillea coarctata* +; H – *Dichantium ischaemum* +; T – *Polygonum aviculare* +; T – *Portulaca oleracea* +; T – *Cannabis sativa* +; G-Hh – *Schoenoplectus lacustris* +; T – *Cenchrus incertus* +; T – *Centaurea diffusa* +; H – *Stipa capillata* +; Ch – *Teucrium polium* +; T – *Tragus racemosus* +; Ht-H – *Centaurea bieberstenii* subsp. *bieberstenii* +; T – *Chenopodium album* +.

**Survey 3:** Survey area 2,000 sq. m

**Description:** in the vicinity of Alba Village, 2 km from the Alba Valley.

**Trees:** Ph – *Ailanthus altissima* +; Ph – *Carpinus orientalis* +.

**Shrubs:** Ph – *Prunus spinosa* +; Ph – *Crataegus monogyna* +; Ph – *Rosa* sp. +.

**Herbaceous species:** H – *Stipa capillata* 4; H – *Dichantium ischaemum* 2b; T – *Bromus sterilis* +; T – *Carthamus lanatus* +; H – *Centaurea orientalis* +; G – *Chrysopogon gryllus* +; T – *Consolida regalis* +; H – *Convolvulus cantabicus* +; H – *Agrimonia eupatoria* +; T – *Crucianella angustifolia* +; H – *Dactylis glomerata* +; T – *Digitaria sanguinalis* +; H – *Echinops ritro* s. *ruthenicus* +; T – *Eragrostis minor* +; H – *Eryngium campestre* +; H – *Euphorbia seguieriana* +; H – *Festuca valesiaca* +; T – *Filago arvensis* +; T-Ht – *Lactuca saligna* +; Ht – *Lactuca viminea* +; H – *Marrubium peregrinum* +; T-H – *Medicago lupulina* +; H – *Onobrychis viciifolia* +; H – *Origanum vulgare* +; T – *Petrorhagia prolifera* +; H-H – *Plantago lanceolata* +; T – *Polycnemum arvense* +; H – *Potentilla argentea* +; H – *Potentilla astracanica* +; H – *Agropyron pectinatum* +; H – *Achillea coarctata* +; H – *Salvia nemorosa* +; H – *Sanguisorba minor* +; Ht-H – *Scabiosa columbaria* +; Ch – *Sedum acre* +; H-T – *Sonchus arvensis* +; H – *Stachys recta* ssp. *nitens* +; G – *Allium flavum* +; H – *Taraxacum serotinum* +; Ch – *Teucrium polium* +; Ch – *Thymus zygoides* +; T – *Trifolium arvense* +; H – *Achillea ochroleuca* +; H – *Viola suavis* +; Ch – *Scutellaria orientalis* r; H – *Odontites vernus* r; Ch – *Dianthus nardiformis* r; H – *Helichrysum arenarium* r; T – *Heliotropium suaveolens* r; Ht – *Echium russicum* r.

**Survey 4:** Survey area 3,000 sq. m.

**Description:** Hill north of Măcin Town, near the national road. The survey was conducted from the national road to interfluvial hill, past the radio tower. Vegetation develops on altitudinal bands of above 500 sq. m. The substrate is rocky; parent rock is visible on the surface. The base is dominated by the *Dichantium ischaemum* association with other species of xerophytes. The next altitudinal stripe is represented by an association more compact, all of the same *Dichantium ischaemum* and the next band is dominated by *Stipa capillata* and *Dichantium ischaemum*. In the last band, at the peak, appears

dominant *Stipa* accompanied by important species such as *Cotoneaster integerrimus*, *Campanula romanica*, *Herniaria incana*. The introduced species of *Ailanthus altissima* 'conquers' new surfaces every year around existing nuclei, especially vegetatively.

**Trees:** Ph – *Ailanthus altissima* +.

**Shrubs:** Ph – *Prunus spinosa* r; Ph – *Crataegus monogyna* +; Ph – *Cotoneaster integerrimus* +.

**Herbaceous species:** H – *Stipa capillata* 4; H – *Dichanthium ischaemum* 3; Ch – *Dianthus nardiformis* 3; H – *Festuca valesiaca* 2m; H – *Euphorbia seguierana* 1; H – *Artemisia annua* 1; T – *Gypsophila muralis* 1; Ch – *Artemisia austriaca* 1; Ht-H – *Scabiosa ochroleuca* 1; H – *Echinops ritro* ssp. *ruthenicus* 1; Ch – *Thymus zygioides* 1; H – *Althaea cannabina* +; H – *Cynanchum acutum* +; H – *Agropyron cristatum* ssp. *cristatum* +; H – *Achillea setacea* +; H – *Eryngium campestre* +; H – *Euphorbia cyparissias* +; Ch – *Artemisia campestris* +; H – *Asperula cynanchica* +; T – *Filago arvensis* +; H – *Galium humifusum* +; H – *Ajuga chamaepytis* +; H – *Helichrysum arenarium* +; H – *Linaria genistifolia* +; H – *Linum austriacum* +; H – *Marrubium peregrinum* +; T-Ht – *Medicago falcata* +; T-H – *Medicago lupulina* +; T – *Melilotus alba* +; H – *Odontites lutea* +; H – *Potentilla argentea* +; Ht-H – *Centaurea bieberstenii* subsp. *bieberstenii* +; Ht-H – *Salvia aethiopsis* +; H – *Salvia nemorosa*+; Ht-H – *Salvia sclarea*+; T – *Consolida regalis* +; Ht – *Seseli tortuosum* +; T – *Sideritis montana* +; T – *Solanum nigrum* +; H – *Stachys recta* subsp. *nitens* +; T – *Conyza canadensis* +; Ch – *Teucrium polium* +; Ch – *Thymus pannonicus* +; H – *Ajuga reptans* +; T – *Trifolium arvense* +; Ht – *Verbascum blattaria* +; Ht – *Vicia cracca* +; T – *Xeranthemum annuum* +; H – H – *Plantago lanceolata* r; T – *Eragrostis minor* r; H – *Origanum vulgare* r.

**Survey 5:** Survey area 2,000 sq. m

**Description:** South of the village Niculițel, in its immediate vicinity. Natural grasslands derived from deforestation area. The hill was included in the process of afforestation, considering that afforestation adds value to biodiversity and stabilizes the ecosystem. The survey was conducted on an ascending meadow corridor in which the afforestation percentage is lower. At the bottom of the hill, just outside the village, there are obvious effects of overgrazing, but in the second quarter of the hill and consequently of the survey, the soil profile is thinning and the composition is typical to steppe grazing land. In the last quarter from the ridge, where the rocks are often at the surface, exponents of high conservation value of steppe bioregion can be seen.

**Trees:** Ph – *Ailanthus altissima* +; Ph – *Elaeagnus angustifolia* +; Ph – *Morus alba* +.

**Shrubs:** Ph – *Crataegus monogyna* +; Ph – *Prunus spinosa* +; Ph – *Rosa canina* +.

**Herbaceous species:** H – *Dichanthium ischaemum* 2b; H – *Festuca valesiaca* 1; H – *Poa bulbosa* 1; T – *Atriplex patula* +; H – *Berteroa incana* +; H – *Achillea nobilis* +; Ht – *Carduus acanthoides* +; T – *Carthamus lanatus* +; H – *Centaurea arenaria* +; Ht-H – *Chondrilla juncea* +; H – *Cichorium intybus* +; H-G – *Convolvulus arvensis* +; H – *Agrimonia eupatoria* +; Ht – *Crepis biennis* +; Ht – *Echium vulgare* +; H – *Agropyron pectinatum* +; H – *Eryngium campestre* +; H – *Achillea millefolium* +; H – *Galium humifusum* +; H – *Hieracium pilosella* +; H – *Hypericum elegans* +; H – *Leontodon autumnalis* +; H – *Linaria genistifolia* +; T – *Malva neglecta* +; H – *Marrubium peregrinum* +; T-Ht – *Medicago falcata* +; G – *Allium flavum* +; H – H – *Plantago lanceolata* +; T – *Polygonum aviculare* +; T – *Portulaca oleracea* +; H – *Potentilla argentea* +; H – *Potentilla astracanicum* +; H – *Artemisia annua* +; Ch – *Artemisia austriaca* +; H – *Rumex acetosella* +; H – *Salvia nemorosa* +; Ht-H – *Salvia nutans* +; H – *Sanguisorba minor* +; G – *Scorzonera mollis* +; Ch – *Sedum acre* +; Ch – *Teucrium polium* +; H – *Teucrium scordium* +; Ch – *Thymus zygioides* +; Ht-H – *Trinia ramosissima* +; Ht – *Verbascum blattaria* +; Ht – *Verbascum phlomidoides* +; Ch – *Sempervivum ruthenicum* +; H – *Euphorbia glareosa* r; Ch – *Dianthus nardiformis* r; H – *Campanula romanica* r.

**Survey 6:** Survey area 2,000 sq. m.

**Description:** North-west of Greci village at the base of the Pricopan Crest in the vicinity of Calea Săpată road from de forest.

**Trees:** Ph – *Ailanthus altissima* 3; Ph – *Fraxinus ornus* r; Ph – *Morus alba* r.

**Shrubs:** Ph – *Elaeagnus angustifolia* r; Ph – *Rosa canina* +.

**Herbaceous species:** H – *Dichanthium ischaemum* 2b; H – *Festuca valesiaca* 1; G – *Cynodon dactylon* 1; H – *Berteroa incana* +; H – *Achillea millefolium* +; T – *Cannabis sativa* +; Ht – *Carduus acanthoides* +; Ht – *Carduus thoermeri* +; T – *Carthamus lanatus* +; T – *Centaurea diffusa* +; Ht-H – *Chondrilla juncea* +; G – *Chrysopogon gryllus* +; H – *Cichorium intybus* +; Ht – *Cirsium vulgare* +; H – *Convolvulus cantabricus* +; T – ***Conyza canadensis*** +; Ep – *Cuscuta europaea* +; H – *Achillea coarctata* +; Ht – *Daucus carota* +; T-Ht – *Descurainia sophia* +; T – *Echinochloa crus-galli* +; Ht – *Echium vulgare* +; T – *Alyssum saxatile* +; T – *Erodium cicutarium* +; H – *Eryngium campestre* +; H – *Euphorbia glareosa* +; H – *Euphorbia myrsinites* +; H – *Festuca callieri* +; H – *Festuca pratensis* +; T – *Amaranthus retroflexus* +; H – *Artemisia annua* +; H – *Galium humifusum* +; H – *Galium verum* +; T – *Gypsophila muralis* +; T – *Heliotropium suaveolens* +; T-Ht – *Herniaria glabra* +; H – *Koeleria glauca* +; H – *Linaria genistifolia* +; H – *Moehringia grisebachii* +; Ch – *Artemisia austriaca* +; T – *Petrorhagia prolifera* +; H-H – *Plantago lanceolata* +; H – *Poa*

*bulbosa* +; T – *Polygonum aviculare* +; T – *Portulaca oleracea* +; H – *Potentilla argentea* +; H – *Potentilla astracanică* +; H – *Astragalus onobrychis* +; T – *Salsola kali* +; G – *Scorzonera mollis* +; Ch – *Sedum acre* +; H – *Silene bupleuroides* +; H – *Silene csereii* +; H – *Taraxacum officinale* +; Ch – *Teucrium chamaedrys* +; Ch – *Teucrium polium* +; H – *Teucrium scordium* +; Ch – *Thymus zygoides* +; T – *Tragus racemosus* +; Ht-H – *Trinia ramosissima* +; Ht – *Verbascum blattaria* +; H – *Verbascum nigrum* +; Ht – *Verbascum phlomoides* +; T – *Xeranthemum annuum* +; Ch – *Sempervivum ruthenicum* +; T – *Filago arvensis* r; H – *Campanula romanica* r; Ch – *Dianthus nardiformis* r.

**Survey 7:** Survey area 2,000 sq. m

**Description:** At the foot of Pricopanului Crest – Măcin Mountains National Park– Regia Tutunului area.

**Trees:** Ph–*Ailanthus altissima* 3.

**Shrubs:** Ph – *Eleagnus angustifolia* +, *Crataegus monogyna* +.

**Herbaceous species:** H – *Dichanthium ischaemum* 2; Ht – *Echium italicum* + 1; *Orlaya grandiflora* +; H – *Achillea coarctata* +; G – *Chrysopogon gryllus* +; H – *Galium humifusum* +; H – *Poa bulbosa* +; H – *Cichorium intybus* +; Ht – *Daucus carota* +; T – *Xeranthemum annuum* +; G – *Cynodon dactylon* +; H – *Berteroa incana* +; H – *Achillea millefolium* +; H – *Centaurea diffusa* +; H – *Convolvulus cantabricus* +; Ch – *Artemisia austriaca* +; H – *Koeleria glauca* +; H-H – *Plantago lanceolata* +; T – *Filago arvensis* +; H – *Potentilla argentea* +; H – *Festuca valesiaca* 1; T – *Alyssum saxatile* +; *Campanula romanica* +; Ch – *Teucrium polium* +; Ch – *Teucrium chamaedrys* +; Ch – *Thymus zygoides* +; G – *Allium rotundum* +.

## 2. The presence and evolution of species *Ailanthus altissima* in Măcin Mountains National Park

*Ailanthus altissima* is an adventitious woody species that is also considered invasive as it was found that it not only has acclimated very quickly on degraded lands on which it settled, at the foot and on the slopes of Măcinului Mountains (Photo 5) and especially since 1982, but also conquered vicinity lands little by little by vegetative propagation mainly spread by suckers or samara fruits.

*Ailanthus altissima* soon formed thickets after its artificial introduction for the fixation of natural or artificial screes resulting from former mining extraction when extracting rocks was performed through less successful methods (dynamiting) in places where few native wood species would have had settlement chances. These thickets once formed, constitute genetic nuclei out of which, by vegetative way, in particular, *Ailanthus altissima* expands on



larger areas, by invading and removing native herbaceous species of great genetic importance, specific and ecosystemic in terms of conservation of the natural national and European heritage.

The introduction of this species was scientifically motivated as a result of fixing degraded surface soil, especially on lands previously affected by human activity and because it is a species resistant to pollutants like dust, smoke (Fig.1-3). It was not planned that this species once introduced would affect biodiversity by altering biocenoses structure in ecosystems in which it has been introduced and we can state that it has become, by its ability to invade, a selection factor that may lead to the replacement of component populations of flora or altering their genetic inheritance.

In Romania some researchers consider it not only an adventitious species, but also invasive and it is therefore under investigation – monitoring within the perimeter of Măcin Mountains National Park, the evolution of plant associations whose composition comprise *Ailanthus altissima* (introduced before the establishment of the national park). The purpose of monitoring is to choose a solution for efficient management of these populations within the national park, more precisely taking a scientific decision on maintaining the species in the current population or reducing it, in connection with the natural vegetation type in which this adventive species was artificially integrated.



Photo 5. *Ailanthus altissima* – Pricopanului Crest in Măcin Mountains  
Foto 5. *Ailanthus altissima* în culmea Pricopanului din Munții Măcin

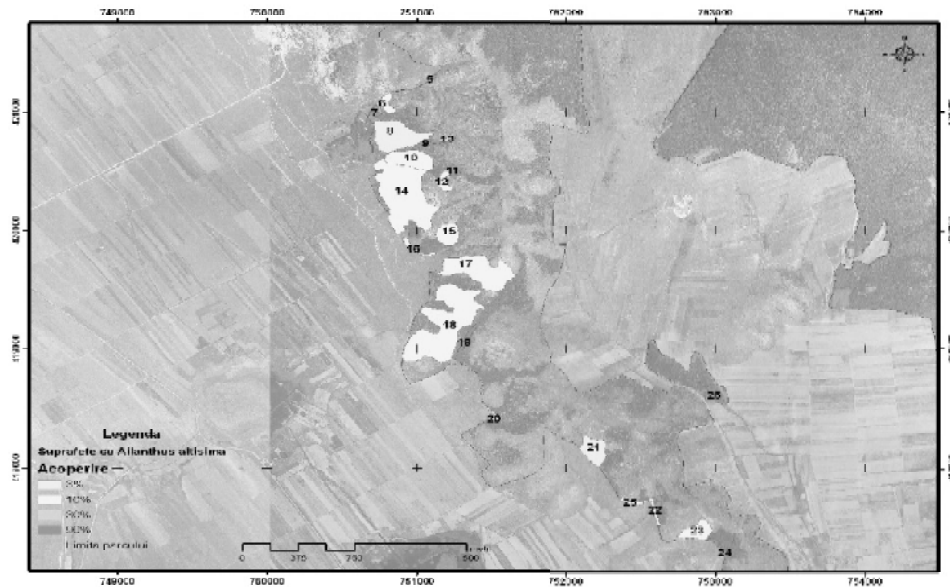


Fig. 1. Location of *Ailanthus altissima* species in Pricopanului Crest (Zone 1)

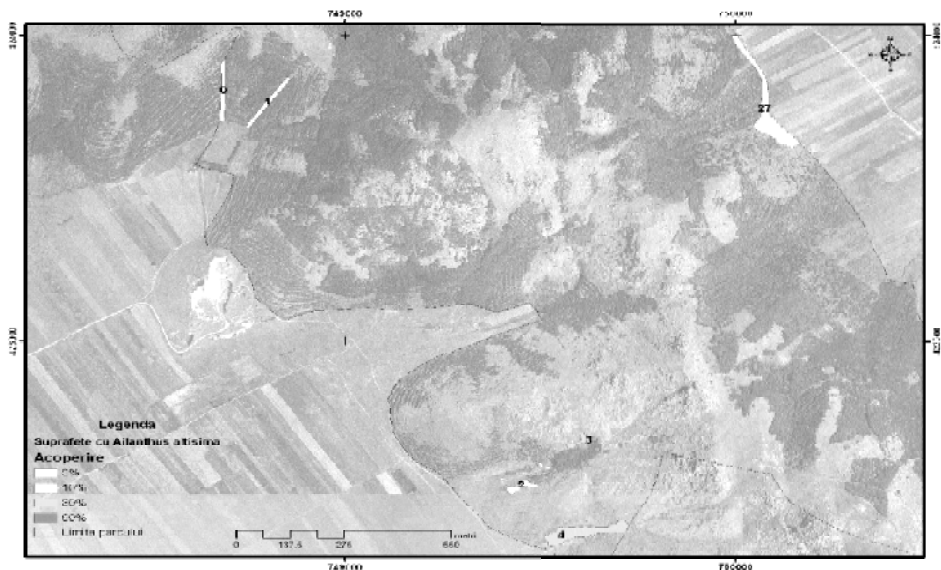


Fig. 2. Location of *Ailanthus altissima* species in Pricopanului Crest (Zone 2)

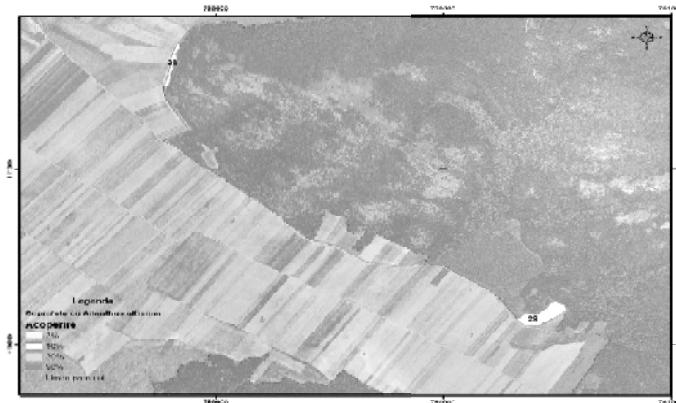
Fig.3 .Location of *Ailanthus altissima* species in Pricopanului Crest (Zone 3)

Table 1

Batch	Vegetation stage in <i>Ailanthus altissima</i>	Species	Surface	Provenance
1	Dispersed in groups 6–7 specimens	Cenuser	0,21	Invasive
2	Dispersed in groups 6–7 specimens	Cenuser	0,12	Invasive
3	Uniform distribution, 5–7 years specimens	Cenuser	0,12	Invasive
4	Uniform distribution, 5–7 years specimens	Cenuser	0,67	Planted
5	Compact with specimens of all ages	Cenuser	0,18	Invasive
6	Dispersed and in groups 6–7 specimens	Cenuser	1,03	Invasive
7	Compact with specimens of all ages	Cenuser	0,31	Planted
8	Dispersed – young specimens 2–3 years	Cenuser	6,73	Invasive
9	Compact with specimens of all ages	Cenuser	0,39	Invasive
10	Dispersed and in groups 6–7 specimens	Cenuser	3,95	Invasive
11	Compact with specimens of all ages	Cenuser	0,65	Invasive
12	Dispersed and in groups 6–7 specimens	Cenuser	1,04	Invasive
13	Uniform distribution, 5–7 years specimens	Cenuser	0,21	Invasive
14	Dispersed and in groups 6–7 specimens	Cenuser	15,73	Invasive
15	Dispersed and in groups 6–7 specimens	Cenuser	2,44	Invasive
16	Dispersed and in groups 6–7 specimens	Cenuser	0,59	Invasive
17	Dispersed and in groups 6–7 specimens	Cenuser	8,59	Invasive
18	Dispersed and in groups 6–7 specimens	Cenuser	17,45	Invasive
19	Compact with specimens of all ages	Cenuser	0,99	Planted
20	Uniform distribution, specimens 5–7 years	Cenuser	0,45	Invasive

21	Dispersed – young specimens 2–3 years	Cenuser	2,97	Invasive
22	Dispersed and in groups 6–7 specimens	Cenuser	0,50	Invasive
23	Dispersed and in groups 6–7 specimens	Cenuser	2,38	Invasive
24	Compact with specimens of all ages	Cenuser	0,71	Invasive
25	Dispersed and in groups 6–7 specimens	Cenuser	0,45	Planted
26	Compact with specimens of all ages	Cenuser	0,73	Invasive
27	Dispersed and in groups 6–7 specimens	Cenuser	0,98	Invasive
28	Dispersed and in groups 6–7 specimens	Cenuser	0,42	Invasive
29	Dispersed and in groups 6–7 specimens	Cenuser	1,41	Invasive
30	Dispersed and in groups 6–7 specimens	Cenuser	0,19	Invasive
<b>TOTAL</b>			<b>72,61</b>	<b>Hectars</b>

No.	Vegetation stafe	Hectar
1	Dispersed – young specimens 2–3 years (3% Coverage)	9,70
2	Dispersed and in groups 6–7 specimens (10% coverage)	57,50
3	Uniform distribution, specimens 5–7 years (30% coverage)	1,46
4	Compact with specimens of all ages (90% coverage)	3,96

### Preliminary conclusions

These conclusions are considered preliminary as the studies of which results are presented in this study are still ongoing. Since this is an important period of analysis on invasive and adventitious species of the year 2010 we can conclude on important issues on the presence and impact on biodiversity of the four adventitious and invasive species: *Conyza canadensis*, *Ambrosia artemisiifolia*, *Cenchrus incertus* and *Ailanthus altissima*.

The invasive plants analyzed affect indigenous biodiversity by altering the genetic inheritance and local ecofund and also cause damage on crops of local communities in the area where they are installed. The populations of four invasive species are not kept under control by farmers facing these invasion situations of crops against which they are inefficient through traditional maintenance works.

Through the mechanisms and special genotypic and phenotypic adaptations they hold, the four adventive species described above have better resilience capacity to human interventions than the native species of wild flora or culture species and also have mechanisms for spreading and installation or reinstallation superior functionally to existing ones from wild species.

Given the above mentioned, at national level and in Dobrogea in particular, identification of invasive species, monitoring and setting scientific measures to control or combat them, is deemed necessary.

The results of the study on invasive plants in Dobrogea clearly show why it is important that every state in the EU and in each region of these countries the six targets of the 2020 Biodiversity Strategy for the European Union, need to be achieved:

- Increasing the degree of implementation of legislation on nature protection;
- Ecosystem restoration and creation and use of green infrastructure;
- Sustainable forestry and agriculture;
- Sustainable fisheries;
- Fight against invasive adventitious species;
- Contributing to global biodiversity loss prevention.

It can be seen that the prevention, control and eradication of invasive adventitious species is not optional, it must become an obligation of each of us at the European level.

It is needed in Romania and more so in Dobrogea to establish concrete measures by which invasive plants in general and the four plants described here in particular be monitored or where appropriate removed from the priority habitats of Community interest or of national natural heritage conservation importance.

From preliminary scientific data presented above we can conclude that all four plants *Ambrosia artemisiifolia*, *Cenchrus incertus*, *Conyza canadensis* and *Ailanthus altissima* have negative effects on biodiversity and the first two listed also on human or animal health.

The analysis made it was found that four invasive plants have a capacity of settlement– occupation of land due to special adaptations these plants hold.

*Conyza canadensis* has a rare ability to spread in the plant world as a result of large number of fruit on one plant and the fact that the – achenes – are provided with dolls favoring the anemochore spread.

Once installed this species form colonies that are difficult to remove and plant height is up to 1.2 m or more and creates an inhibitory effect and thus eliminate native species seedlings that would arise from their seeds that reached a plant association with *Conyza canadensis*. In the literature this plant appears to be non-threatening for other species, but the study whose part is the present study shows that this species, by the number of fruits that can be produced by a mature plant (up to 1 million), the ability of anemochore spread over large distances, by the sizes of this plant, the high density of the leaves on the stem – eliminates the high value conservative species of the Ponto–Sarmatic meadow steppe habitat. The large leaf area relative to the total

biomass, the plant is considered by some specialists as belonging to C4 plants group, as they are good at fixing carbon in their body, but this phenomenon must be analyzed separately and cannot balance the negative effects on biodiversity of Community interest since this plant does not present a threat when it vegetates near a sidewalk in urban areas, but which can cause significant damage when colonizing areas of conservation interest in a protected natural area.

*Ambrosia artemisiifolia* is another invasive plant analyzed in this study and is clearly one of the species that occupies areas increasingly more compact, located in Dobrogea in the most diverse places in terms of soil and climate. It was identified in the Danube Delta, the Jijila, Garvăn, Mamaia beach – Constanța and not just as isolated specimens but with good participation in plant composition.

Its capacity of production and release of pollen in the air is superior to many species of plants reaching 8 billion pollen grains released from a plant *Ambrosia artemisiifolia* a year of vegetation.

This plant pollen can be carried by wind up to 40 km away from the parent plant and this should concern not only researchers but all those that identify this plant. The plant is anemochore, zoochore and anthropochore, being easy to accidentally spread unless measures are taken to monitor, control and eradicate the species. It reaches 1.5 m height and therefore once installed it is very difficult to be eliminated by another competing species of the native flora. In literature it appears as loving loose soils by human activities but it was found on fallow areas as Garvăn and Văcăreni Hill and on skeletal soils and once installed it has no competitor in the floristic composition. There are clear arguments showing that this species affects the biodiversity of native species and moreover, that is a quarantine plant (recommended on quarantine species list in our country) causing pollinosis with severe and long-lasting consequences to humans.

In our country the effects of pollen released by *Ambrosia artemisiifolia* are known, while some researchers have reported these issues as can they be seen in the Table 2:

However, there is no legislation requiring real quarantine for this plant, there are no measures provided regarding its identification, eradication or at least keeping under control the populations of *Ambrosia artemisiifolia*, while locals without scientific expertise are not aware of morphology or threats this species cause to local biodiversity from wild flora, sunflower crops, maize, sugar beet and potatoes or to human health, much less about eradication measures in the areas of Dobrogea where this species was identified.

Table 2 Frequency (%) of clinical manifestations in patients with pollinosis caused by de *Ambrosia artemisiifolia* (IANOVICI & SÂRBU, 2004)Tabel 2 Frecvența manifestărilor clinice (%) la pacienții cu polinoză cauzată de *Ambrosia artemisiifolia* (IANOVICI & SÂRBU, 2004)

Reference	Rhinitis, Conjunctivitis		Asthma	Hives	Eczema
Kressman 1969	54,5		36,5	3	1,5
Boyer 1980	83		17	0	0
Kennel 1987	89	57	51	0	0
Cohen 1984	93	75	55	10,4	11
Garcia–Lebris 1987	97	85	38,5	6,7	3,8
Dechamp 1994	88,7	71	43,5		

There are several bilateral agreements on cooperation of our country in terms of plant quarantine and protection such as those of Moldova (1997), Russia (1997), former Yugoslavia (1996), Kazakhstan (1999), Croatia (1999), Bulgaria (1969), but at national level no practical actions are conducted in a form of actively removing threats caused by invasive plants.

It is necessary in our country and especially in Dobrogea legislative framework whereby at least for allergenic plants such as *Ambrosia artemisiifolia* to provide clear and binding measures to identify and eliminate these species from indigenous flora spectrum.

*Cenchrus incertus* is an invasive species still little known nationally but it has one of the most aggressive forms of expansion of invasive species, especially in Dobrogea. It was found in the study at Garvăn in 2010 and now it occupies large areas of the Garvăn, Văcăreni and has also been identified on the beaches in Mamaia – Constanța.

*Cenchrus incertus* real spreading mechanisms through the thorny involucre of spiculetelor grouped in 2–3 in this type of involucre which clings easily by using the spins on any material it gets in touch with them: fur, hair, feathers component species of animals, human clothing, tires and wheel cart.

Thus, this plant has a zoochore and anthropofore multiplication which ensures long distance spread from the parent colony. Seeds can germinate after two to three years, and even if placed under furrow mechanically, germination occurs at 11 cm deep and sandy in soils such as the Garvăn germination takes place at depths of 20–24 cm. With the advent spikes with sharp thorns, animals do not consume this plant and avoid these areas

because the plant quickly colonize all the gaps in agricultural crops or fallow land where natural vegetation coverage is low and the all too sharp thorns cause hurt to any living thing that touches its thorny involucre.

The plant, compete and defeat "crops" especially during rainfall with deficient rainfall intake or nutrient-poor soils. It was noted that it installs easily on most varied soil texture (not only those loose) easily by setting up the hills and meadow steppe where celery is not complete, quickly occupying the gaps between native species. *Cenchrus incertus* is a real threat to the native biodiversity of natural and agricultural crops by reducing the faunal component surfaces for food and shelter and therefore shall be deemed to be declared (proposed also based on the conclusions of this study) invasive quarantine species. This quarantine should not have recommendation role only but to should be imposed by law, together with compulsory and clear measures to eradicate this species from the native flora.

*Ailanthus altissima* is an adventive and invasive species that spreads easily in warmer areas of our country. This plant was introduced in our country voluntarily to fix degraded lands with shallow soils or areas with large amounts of air pollutants generated by human activity.

This species has a exceptional capacity of reproduction through suckers and fructifies also abundant at the age of 5–6 years, the samaras being carried by the wind large distances away from the parent colony. In Măcin Mountains it was observed to settle easily on shallow soils, having a high capacity of installation, occupying vacant natural or artificial screees. Unfortunately there was noticed an extension of the species *Ailanthus altissima* both in areas belonging to these mountains and surrounding areas occupied by scrub and Ponto-Sarmatian grassland vegetation. As a first conservation measure of habitats and priority species in the park, is under analysis stopping the expansion of this species to new areas around the artificial those on which it has been introduced in the past by mechanical removal and felogen injection of each individual of synthetic substances – erbicide– acting systemically. This will keep under control the area occupied by *Ailanthus altissima* in the full protection zones of the national park area.

With a rapid growth of 1–3 m in height per year in young stage, it easily wins the battle field with herbaceous plants, vegetative propagation mechanism having the primary role in these extensions.

*Ailantus altissima* is a threat for the natural biodiversity of Dobrogea. This adventive and invasive species rapidly replaces priority species at the European or national level. Therefore, at least for the protected areas in Dobrogea, this species should be considered and analyzed as a species with high capacity of replacement of native species.



It should be also taken into consideration the opinion of some researchers that *Ailanthus altissima* is a species valued in terms of carbon sequestration process but it is clear that where the ground is covered with native vegetation, it should not be accepted or even less introduced voluntarily. This woody plant must be listed, based on scientific arguments identified, on the invasive and adventitious species list whose population at least at Dobrogea level. Here the Ponto-Sarmatic steppe habitats, with a high level of preservation, are present, so this species must be kept under control in farmland and social anthropic-economic systems. Gradually there should be reduced the area occupied by this species through scientific methods within natural ecosystems perimeter.

In Romania it is necessary to give due importance to monitoring, control or eradication of adventitious invasive species by translating the findings of research conducted on this component at the national level. This requires the capitalization of accumulated scientific expertise in relation to the problem of interest at European level, in clear and effective legal framework to ensure the tools to solve this problem. It is of paramount importance to restore the balance between the need to preserve the natural heritage and development of priority socio-economic systems that favour voluntary or accidental introduction of invasive species on a global scale.

### References

- CIOCÂRLAN, V., 2000, *Flora ilustrată a României*, ediția II, Ed. Ceres, București.
- DIHORU, G., 2004, *Plante invazive în flora României*, Analele Universității din Craiova, 9 (45), Craiova: 73–83.
- IANOVICI, N., SÂRBU, C., 2007, *Analysis of Airborne Ragweed (Ambrosia artemisiifolia) pollen*, Analele Univ.Oradea, fasc. Biol.,14: 101-108.
- JAVORKA – CSAPODY, 1975, *Iconographia florum partis Austro-Orientalis Europae centralis*, Academia Kiado, Budapesta.
- SÂRBU, C., 2011, *Impactul invaziei plantelor adventive asupra biodiversității naturale, economiei și sănătății umane: Considerații generale*, Universitatea de Științe Agricole și Medicină Veterinară Ion I. de la Brad, Iași.
- EU Biodiversity Strategy to 2020, EN – December 2011 – Biodiversity

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