STUDY OF PHYTOSOCIOLOGY AND ECOLOGY OF AILANTHUS ALTISSIMA (MILLER) SWINGLE – INVASIVE SPECIES IN THE SOUTH-WESTERN OF ROMANIA

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ABSTRACT

The intensive abiotic activity, but not only that, has brought about the invasion of allochtone (non-native) species in the natural and semi-natural degraded ecosystems in our country (M. Niculescu, 2011).

Ailanthus altissima (Miller) Swingle, coming from China, is cultivated for decorative purposes in our country, but it also grows subspontaneously in the degraded and sunny fields.

We can see it in the in the study area or this paper, in the South-Western of Romania.

This species edified the plant community Balloto nigrae-Ailanthetum altissime Sîrbu and Oprea 2011 described first time in Moldova and identified in this area but with a slightly different floristic composition. Areas of Ailanthus altissima have greatly expanded in recent years across the country. This species grows explosively edifying plant community well defined and stable. Ailanthus altissima is adaptable to a very wide range of soil conditions and pH values and we found it within a wide range of climatic conditions. Species installs very quickly, is very lively and has a very high growth rate. We find this invasive species in the forest habitats and in the meadows, but also in the public parks, gardens, besides buildings and and roadsides.
This species influence the succesional dynamics and the floristic composition of the forest plant communities, occupying increasingly more and more space.

INTRODUCTION

Ailanthus altissima (Miller) Swingle, coming from China, is cultivated for decorative purposes in our country, but it also grows subspontaneously in the degraded and sunny fields. Species installs very quickly, is very lively and has a very high growth rate. We find this invasive species in the forest habitats and in the meadows, but also in the public parks, gardens, besides buildings and and roadsides. In this paper also are referenced of the corology, ecology, phytocoenologie of plant community with *Ailanthus altissima* (Miller) Swingle invasive species in the South-Western of Romania.

Some researches carried out by Sams C.E. et al. (1982), point out that during the growing season of trees, the photosynthesis process is intensified with the growth of the leaves. This process decreases with the transition to the senescence phase. Manganaris G.A. et al. (2010), studied the causes of redness of pulp in stone fruits, including plum species. The authors conclude that the redness of the pulp is not due to refrigeration but due to some aspects of fruit.

MATERIAL AND METHODS

The field research on the field was carried out between 2007-2018, during all seasons and having clearly defined itineraries. In order to identify the species we looked into: *Romanian Flora*, vol. I-XII (1952-1976); *Flora Europaea*, vol. I-V (Tutin, T. G. et al., 1964-1980). For the study of the plant community, we have used methods of phyto-sociologic European School. The plant community have been analyzed and characterized from the chorological, ecological point of views.

RESULTS AND DISCUSSIONS

During our study, we identified the phytocoenoses of this plant community in meet at the edge of forests**,** on the slopes with varying exposure, but also within the forestand at the edge of rangelands.

According to the geobotanical research in the in the South-Western of Romania, it has been noted that in the *Balloto nigrae-Ailanthetum altissime* Sîrbu and Oprea 2011 plant community (fig. 1).

Ailanthus altissima it is characterized by a big abundance-dominance and high constancy (Table 1).

This plant community is characterized by a large number of species among which we can mention: *Parietaria officinalis, Urtica dioica, Rubus hirtus, Stachys sylvatica, Scutellaria altissima, Chelidonium majus, Glechoma hederacea, Brachypodium sylvaticum, Carex sylvatica, Geranium sylvaticum, Geum urbanum, Lycopus europaeus, Lysimachia numularia, Rumex sanguineus, Stellaria nemorum.*

In the phytocoenosis identified in Runcu, Sasca Montana, Eselnita and Baita-Craciunesti we meet the species *Ceterach officinarum* (fig. 2), missing in other phytocoenosis due the presence of the limestone substrate. The tree layer, with a height of 4-10 (12) m, and 70-90% coverage, is dominated almost exclusively by *Ailanthus altissima*. In the Runcu area (fig. 3). The middle layer, with a coverage between 2-40% is represented by the folow species: *Rosa canina, Rubus caesius, Lycium barbarum, Prunus spinosa, Sambucus nigra, Cornus sanguinea, Ligustrum vulgare etc.* The herbaceous layer shows a different coverage and it is between 20-70%.

Synecology. In the analysed phytocoenoses was observed the predominance of the *xero*-mesophilous elements followed by the mesophilous species, which finds in this area favourable ecological conditions. to the temperature factor, the mesotherm species are the most abundant, followed by the xero-mesotherm ones. Taking into account the soil reaction one can notice the predominance of the euri-ionic species, followed by the weak neutrophils. In Runcu area Ailanthus altissima populations are highly-developed, and the trees have a diameter greater strenght (fig. 3). The great dominating abundance of this species of perennial grass in some phytocoenoses indicates an increase of the anthropogenic pressures in certain sectors of the research area.

The anthropogenic disorders favors the invasion of other opportunistic species such as *Phytolacca amearicana, Amorpha fruticosa, Erigeron annuus* and *Reynoutria japonica* which conquer territories more and more extended in the area of study.

Synchorology. Phytocoenoses of this plant community have been studied in various localities: Calafat (Doj County), Eselnita (Mehedinti Count), Balcesti, Horezu (Valcea County), Sasca Montana (Caras-Severin County), Runcu (Gorj County), Baita-Craciunesti ((Table 1).

Table 1- Ass. *Balloto nigrae- Ailanthetum altissimae* Sirbu & Oprea 2010

L.f.	Phyt.el.	No.of relevée		1	2	3	4	5	6	7	8	9	10	K
		Altitude(m)		35	35	190	550	86	86	480	160	300	310	
		Surface(m^2)		400	400	400	400	400	400	400	400	400	400	
		Aspect		-	-	E	SE	S	SE	SV	E	SE	SE	
		Slope (degrees)		-	-	5	7	10	15	7	10	5	10	
		Coverage (%)	Tree layer	70	80	80	80	80	80	80	80	70	80	
			Herbaceous layer	40	40	40	30	30	30	30	40	40	30	
Char. ass.														
MPh	Alien:E.As	*Ailanthus altissima*		4	5	5	5	5	5	5	5	4	5	V
MPh.	Alien:E.As	*Ailanthus altissima (juv.)*		1	2-3	2	2	3	3	1	2	2	1	V
H	C Eur	*Ballota nigra*		2	2	2	3	1	1	1	1	2	1	V
Chelidonio-Robinietalia&Robinietea														
H	Cosm	*Urtica dioica subs.dioica*		1	+	1	1	1	+	1	1	1	1	V
T	Circ	*Galium aparine*		+	+	+	+	+	+	+	+	+	+	V
MPh	Alien:N Am	*Robinia pseudacacia*		1	1	1	+	+	+	+	+	1	+	V
H	Eua	*Chelidonium majus*		+	+	+	+	+	+	+	+	+	+	V
MPh	Alien:N Am	*Gleditsia triacanthos*		-	+	+	-	-	-	-	-	-	-	I
T	Pont-Medit	*Anthriscus cerefolium subsp.trichosperma*		-	+	-	-	+	-	+	-	+	+	II
Galio-Urticetea														
H	Eua	*Sambucus ebulus*		+	-	-	+	+	+	-	+	+	-	IV
H	Circ	*Geum urbanum*		-	-	+	+	-	-	-	+	+	+	III
H	Eua	*Glechoma hederacea*		+-1	1	1	1	1	1	1	+-1	+-1	1	V
Ht	Eua	*Silene alba*		-	+	+	-	+	+	+	-	+	+	IV
H	Eua	*Humulus lupus*		-	+	+	-	+	+	+	-	+	+	IV
T	Circ	Polygonum dumetorum		-	+	-	-	+	+	+	-	-	-	III
H	Eua	Saponaria officinalis		+	-	+	+	-	-	+	+	-	-	III
Artemisietea														
H	Eua	*Artemisia absinthium*		-	+	+	-	-	-	-	-	-	-	I
H	Circ	*Artemisia vulgaris*		-	+	-	-	+	-	+	-	+	-	III
Ht	Eua	*Conium maculatum*		+	+	-	-	+	+	-	-	-	+	III
Ht	Eua	*Arctium lappa*		+	+	+	+	+	+	+	+	+	+	V
G	Eua-Medit	*Cardaria draba*		+	-	-	-	+	+	-	-	-	+	II
H	Eua	*Tanacetum vulgare*		-	+	-	-	+	+	+	-	+	+	III
H	Eua	*Leonurus cardiaca*		-	+	-	-	+	+	+	-	+	+	III
Ht	Eua	*Cirsium vulgare*		+	+	+	+	+	+	+	+	+	+	V
Ht	Eua	*Melilotus officinalis*		+	+	+	+	+	+	+	+	+	+	V
Ht	Eua	*Berteroa incana*		+	+	+	+	+	+	+	+	+	+	V
Ht	Alien: N Am	*Erigeron annuus subsp. annuus*		+	+	+	+	+	+	+	+	+	+	V
Stellarietea mediae														
T	Cosm	*Chenopodium album*		-	-	-	-	-	+	-	+	+	+	II
T	Alien: N Am	*Conyza canadensis*		+	+	+	+	+	+	+	+	+	+	V
T	Cosm	*Polygonum aviculare*		+	-	+	-	+	-	-	+	-	-	II
T	Alien: N Am	*Ambrosia artemisiifolia*		+	+	-	+	+	+	-	-	-	-	III
T	Cosm	*Capsella bursa pastoris*		+	+	+	+	+	+	+	+	+	+	V
T	Eua	*Hordeum murinum*		+	-	-	+	+	-	-	-	-	-	II
Festuco – Brometea														
H	Eua	*Hypericum perforatum*		+	-	-	+	+	+	-	-	-	-	II
H	Pont – Medit	*Salvia nemorosa*		+	-	-	+	+	-	-	-	-	-	II
Molinio – Arrhenatheretea														
H	Medit	*Dactylis glomerata*		+	+	+	+	+	+	+	+	+	+	V
H	Eua	*Vicia cracca*		+	+	+	+	+	+	+	+	+	+	V
H	Eua	*Achillea millefolium*		+	+	+	+	+	+	+	+	+	+	V
H	Cosm	*Lolium perenne*		+	+	+	+	+	+	+	+	+	+	V
H	Cosm	*Poa pratensis*		+	+	+	+	+	+	+	+	+	+	V
Rhamno – Prunetea														
nPh	Eur	*Prunus spinosa*		+	+	+	+	+	+	+	+	+	+	V
nPh	C Eur	*Clementis vitalba*		+	+	+	+	+	+	+	+	+	+	V
nPh	Eur	*Rosa canina*		+	+	+	+	+	+	+	+	+	+	V
Variae syntaxa														
H	Eua	*Agrimonia eupatoria*		+	+	+	+	+	+	+	+	+	+	V
H	Eua	*Galium mollugo*		+	+	+	+	+	+	+	+	+	+	V
H	Circ	*Clinopodium vulgare*		+	+	+	+	+	+	+	+	+	+	V
G	Cosm	*Convolvulus arvensis*		+	+	+	+	+	+	+	+	+	+	V
H	CEur	*Coronilla varia*		+	+	+	+	+	+	+	+	+	+	V
G	Cosm	*Pteridium aquilinum*		+	+	+	+	+	+	+	+	+	+	IV
H		*Ceterach offixinarum*		-	-	-	-	+	-	+	+	+	+	III

Place and data of relevés: ***1, 2 – Calafat, 10.V.2017; 3 – Balcesti, 20.VI. 2017, 4 – Horezu, 7.VIII.2012, 5, 6 – Eselnita, 12:V. 2018, 7- Băița-Crăciunești Quarry, 18.V.2014, 8 – Sasca Montană, 18.VIII.2014, 9, 10 – Runcu, 19.IX.2011***

Fig. 1. Ass. *Balloto nigrae- Ailanthetum altissimae* Sirbu & Oprea 2010 in Baita-Craciunesti area (*Ailanthus altissima (juv.;* foto M. Niculescu)

Fig. 2. Ass. *Balloto nigrae- Ailanthetum altissimae* Sirbu & Oprea 2010, Runcu, Sohodol Gorges (foto M. Niculescu)

Fig. 3. *Ailanthus altissima* in the Sohodol Gorges (foto M. Niculescu)

CONCLUSIONS

In the present research work, is presented a study on the *Balloto nigrae-Ailanthetum altissime* Sîrbu and Oprea 2011 plant community in the South-Western of Romania. In this plant community the floristic composition and community structure is mainly determined by geological and pedo-climatic condition, and additionally by the human influence. This plant community influence the succesional dynamics and the floristic composition of the forest plant communities, occupying increasingly more and more space. In some areas populations are found highly developed, and trees can have very large diameters and heights. Ecological factors, especially the substrate on which species develop greatly influences the development of individuals in the population.

Following research it was found that limestone substrate has a positive role in the development of individuals, for example in Runcu and Baita-Craciunesti areas.

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