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NEW AND RARE PLANTS FROM THE FLORA OF MOLDAVIA (ROMANIA)

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ABSTRACT - In this scientific paper, some vascular plants (*Aster lanceolatus* Willd., *Aster novi-belgii* L., *Fraxinus pennsylvanica* Marshall, *Picris echioides* L. and *Festuca tenuifolia* Sibth.) were shown as new species from the spontaneous flora of Moldavia. We have also analysed new data on some rare vascular species found in the flora of this region (*Coreopsis tinctoria* Nutt., *Ulmus pumila* L., *Rudbeckia triloba* L., *Rudbeckia hirta* L., *Lupinus polyphyllus* Lindl., *Oenothera glazioviana* Micheli and *Rhus typhina* L.). One of these species is native (*Festuca tenuifolia* Sibth.), while the others are alien plants. Among the alien species, *Picris echioides* L. is xenophyte (accidentally introduced) and the others are hemerophytes (intentionally introduced for different uses and, subsequently, escaped in the wild). Given the number of localities in which these species were found, we may consider that the following alien plants had an invasive tendency in Moldavia: *Fraxinus pennsylvanica* Marshall, *Ulmus pumila* L., *Oenothera glazioviana* Micheli, *Rhus typhina* L. and *Lupinus polyphyllus* Lindl. The other species may be considered naturalized (most of them), being able to form populations without human help. Except *Festuca tenuifolia* Sibth., which grew in natural grasslands, all the other identified species were integrated in anthropic habitats. *Aster lanceolatus* Willd., *Rudbeckia triloba* L., *Rudbeckia hirta* L., *Lupinus polyphyllus* Lindl. and *Rhus typhina* L. also penetrated into semi-natural habitats: forest edges, river banks and river meadows. As concerns *Festuca tenuifolia* Sibth., a very rare species in the flora of Romania, included in the Romanian Red List of Vascular Plants, its presence in Moldavia, to the South-Eastern limit of its natural area, is very interesting and encouraging.

Key words: alien plants, vascular flora of Romania

REZUMAT - Plante noi sau rare în flora Moldovei (România). În lucrare sunt prezentate câteva plante vasculare (*Aster lanceolatus* Willd., *Aster novi-belgii* L.,

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Fraxinus pennsylvanica Marshall, *Picris echioides* L. şi *Festuca tenuifolia* Sibth.), ca specii noi în flora spontană a Moldovei. De asemenea, sunt analizate date noi cu privire la alte câteva specii vasculare în flora acestei provincii (*Coreopsis tinctoria* Nutt., *Ulmus pumila* L., *Rudbeckia triloba* L., *Rudbeckia hirta* L., *Lupinus polyphyllus* Lindl., *Oenothera glazioviana* Micheli, *Rhus typhina* L.). Una dintre aceste specii este indigenă (*Festuca tenuifolia* Sibth.), iar celelalte sunt adventive. Printre speciile adventive, *Picris echioides* L. este xenofită (introdusă accidental), iar celelalte sunt hemerofite (introduse intenţionat, pentru diferite utilizări şi ulterior evadate din cultură). Având în vedere numărul de localităţi în care au fost identificate, putem considera că dintre speciile adventive menţionate în lucrare, următoarele manifestă în prezent o tendinţă de invazie în Moldova: *Fraxinus pennsylvanica* Marshall, *Ulmus pumila* L., *Oenothera glazioviana* Micheli, *Rhus typhina* L. şi *Lupinus polyphyllus* Lindl. Celelalte specii pot fi considerate naturalizate (în cea mai mare parte), fiind capabile să formeze populaţii fără ajutorul omului. Cu excepţia speciei *Festuca tenuifolia* Sibth., care creşte în pajişti naturale, toate celelalte specii identificate sunt integrate în habitate antropice. *Aster lanceolatus* Willd., *Rudbeckia triloba* L., *Rudbeckia hirta* L., *Lupinus polyphyllus* Lindl. şi *Rhus typhina* L. pătrund şi în habitate seminaturale: margini de păduri, malurile râurilor, pajişti de luncă. Cu privire la *Festuca tenuifolia* Sibth., o specie foarte rară în flora României, inclusă în Lista Roşie a plantelor vasculare din România, prezenţa sa în Moldova, spre limita sud-estică a arealului natural, este foarte interesantă şi îmbucurătoare.

Cuvinte cheie: flora vasculară a României, plante adventive

INTRODUCTION

In the last decades, there is a continuous enrichment of flora with new elements, which are generally alien species, due to a better coverage of the Romanian territory with floristic studies and especially, because of the intensification of human pressure on habitat and the increase of the internal and international movement of people and goods. Therefore, new alien species have been reported in recent years, both in Moldavia (Sîrbu, 2006; Sîrbu & Oprea, 2008a, etc.) and in other historical provinces of Romania (Anastasiu & Negrean, 2007; Ciocârlan & Sike, 2006; Sîrbu & Oprea, 2008b, etc.).

This scientific paper shows information on occurrence, ways of introduction and ecology of some new or rare plant species in the flora of Moldavia (e.g. *Aster lanceolatus, Aster novi-belgii, Fraxinus pennsylvanica, Picris echioides, Festuca tenuifolia,* etc.).

MATERIALS AND METHODS

The floristic and chorological data are based on our recent field investigations, conducted in different localities of Moldavia. For each species identified by us, we show information concerning its previously reported occurrence in Romania, in Moldavia and their current distribution in the investigated area.

Herbarium specimens have been deposited in the general herbarium of the University of Agricultural Sciences and Veterinary Medicine of Iaşi. The species

nomenclature is done according to *Flora Europaea* (Tutin & al., 1964–1980 and Oprea, 2005). Terminology and definitions, recommended by Richardson & al. (2000) and Pyšek & al. (2004), were used for establishing the status of alien plants.

RESULTS AND DISCUSSION

During our field surveys in the recent years, we have identified five new species of vascular plants for the flora of Moldavia and other seven less known species in the spontaneous flora of this territory (*Table 1*).

One of these species is native (*Festuca tenuifolia*) and 11 are alien species (most of them originating from North America, one originating from South and Central Europe and one from Central and East Asia). Among the alien species, one is xenophyte, being introduced accidentally (*Picris echioides*), while the others were intentionally introduced by humans, for different uses (mainly as ornamental plants) and, subsequently, escaped from cultivation in the wild (hemerophyte species).

Given the number of localities in which these species were identified in Moldavia, the following species show an invasive tendency: *Fraxinus pennsylvanica* (eight localities), *Ulmus pumila* (eight localities), *Oenothera glazioviana* (seven localities), *Rhus typhina* (six localities) and *Lupinus polyphyllus* (five localities). The other species may be naturalized, because they form fertile seeds (most of them) or show a great capacity for the vegetative propagation (e.g. *Aster lanceolatus, A. novi-belgii*), being able to form stable populations, without human help.

Except *Festuca tenuifolia*, which grows in natural grasslands, all the other identified species are integrated into human habitats. *Aster lanceolatus*, *Rudbeckia triloba, Rudbeckia hirta, Lupinus polyphyllus* and *Rhus typhina* also penetrate into the semi-natural habitats: forest edges, riverbanks and river meadows (*Table 1*).

a) New Species in the Flora of Moldavia

Aster lanceolatus Willd. (*Symphyotrichum lanceolatum* (Willd.) G.L. Nesom)

This species originating from North America (Britton & Brown, 1970) was introduced in Europe as ornamental plant, in the early XIX-th Century (Wittemberg (ed), 2005). It is now naturalized almost throughout the continent (Yeo, 1976). It is recorded as an invasive species in Austria (Essl & Rabitsch (eds), 2002) and as a potentially invasive species in France and Portugal (Wittemberg (ed), 2005). The invaded habitats are wet meadows, riverbanks, openings and edges of floodplain forests, damp thickets and fields and roadside ditches. In addition, it grows in mesic to humid neglected fields and poorly managed pastures (Wittemberg (ed), 2005).

Table 1- New and rare plants in the flora of Moldavia (Romania) (H-hemerophyte, X-xenophyte, N-native)

Species	Geographic origin	Category	Introduction way	Habitat type	Reproduction		Spreading in Moldavia (no. of localities)	
					by seeds	vegetative	Bibliographic data	New data
Picris echioides L.	C&S Eur	X	accidental	anthropic	+	-	0	1
Aster lanceolatus Willd.	N Am	H	ornamental	anthropic, semi-natural	+	+	0	2
Aster novi-belgii L.	N Am	H	ornamental	anthropic	-	+	0	1
Fraxinus pennsylvanica Marshall	N Am	H	ornamental, forestry and anti-erosion	anthropic	+	-	0	8
Festuca tenuifolia Sibth.	C&W Eur	N	-	natural	+	-	0	1
Coreopsis tinctoria Nutt.	N Am	H	ornamental	anthropic	+	-	2	2
Ulmus pumila L.	C&E Asia	H	ornamental	anthropic	+	-	6	2
Rudbeckia triloba L.	N Am	H	ornamental	anthropic, semi-natural	+	-	1	2
Rudbeckia hirta L.	N Am	H	ornamental	anthropic, semi-natural	+	-	1	1
Lupinus polyphyllus Lindl.	N Am	H	ornamental and fodder	anthropic, semi-natural	+	-	4	1
Oenothera glazioviana Micheli	N Am	H	ornamental	anthropic	+	-	2	5
Rhus typhina L.	N Am	H	ornamental	anthropic, semi-natural	+	+	5	1

In Romania, this species was known only in Transylvania (Drăgulescu, 2003; Leocov & Ţopa, 1986; Morariu & Nyárády, 1964; Oprea, 2005; Soó, 1940, quoted by Kovács, 2006), Banat (Morariu et al., 1969) and Maramureş (Oprea & Sîrbu, 2006).

This plant is easily escaped from gardens (Morariu & Nyárády, 1964), invading the river meadows, where it can form monodominant communities, like in Eastern Transylvania, for example (Kovács, 2006). In Sibiu County, it is increasingly met in the hilly regions (400-450 m altitudine) (Drăgulescu, 2003). In addition, along the Tisa River, *A. lanceolatus* is one of the most frequent alien species (Oprea & Sîrbu, 2006).

In Moldavia, we have first identified a small population of *A. lanceolatus* naturalized in Valea Lupului (Iaşi County) near the railway, on a relatively wet ground (leg. Sîrbu, 5 September 2008). Later, we have found this species at Borniş (Neamţ County) (leg. Sîrbu & Operas, 21 September 2008). In the second locality, the plant forms large, monodominant, mesophyllous communities, with other species, like *Rubus caesius, Lapsana communis, Inula helenium, Eupatorium cannabinum, Angelica sylvestris, Filipendula ulmaria, Agrostis stolonifera, Agrimonia eupatoria, Clinopodium vulgare, Artemisia vulgaris, Senecio erucifolius,* etc. In such places, *A. lanceolatus* successfully multiplies in a vegetative way by stolons.

Aster novi-belgii L. (*Symphyotrichum novi-belgii* (L.) G.L.Nesom)

This species originating from the Eastern coast of North America (Britton & Brown, 1970) was widely introduced and naturalised in Europe (Yeo, 1976). The plant was probably introduced in the XIX-th Century in the UK as an ornamental plant, but the earliest possible date of its introduction could be around 1710 (Wittemberg (ed), 2005).

In Austria, this invasive plant threatens natural habitats and vegetal communities (Essl & Rabitsch (eds), 2002).

In Romania, *A. novi-belgii* is cultivated as an ornamental plant, with late flowering and sometimes, it is sub-spontaneous, especially in Transylvania (Drăgulescu, 2003; Morariu & Nyárády, 1964; Oprea, 2005; Schneider-Binder, 1979; Schur, 1866) and Maramureş (Karácsonyi, 1995; Morariu & Nyárády, 1964; Resmeriţă et al., 1971). It is also known as sub-spontaneous species in the Dubova Depression (Mehedinţi County) (Dihoru et al., 1970) and along the Ialomiţa river meadow (Prahova County) (Negrean, 1972).

We have identified this plant on the neglected and relatively wet fields along the Bahlui River meadows, in Iaşi, close to the Nicolina Hospital (leg. Sîrbu, 6 September 2008) and along the C.A. Rosetti Street (leg. Sîrbu & Oprea, 26 September 2009). There, it forms relatively small but vigorous populations, with an obvious

tendency of vegetative spread, through stolons.

Fraxinus pennsylvanica Marshall (*F. pubescens* Lam.)

It is a native species from Eastern North America, which was introduced in Europe for ornamental, forestry or anti-erosion uses (Dumitriu-Tătăranu, 1960), in 1780 (Csiszár & Bartha, 2008). It is met as an alien plant in numerous countries from Central Europe (Daisie, 2009; do Amaral & da Rocha Afonso, 1972). In Austria, *F. pennsylvanica* is an invasive plant, threatening native habitats and vegetal communities (Essl & Rabitsch (eds), 2002). In Hungary, it is also considered as one of the most invasive alien plants, being common everywhere (Csiszár & Bartha, 2008).

In Romania, the number of localities in which *F. pennsylvanica* is met (as a sub-spontaneous tree) has increased lately and therefore, it was recorded on the list of the invasive species from the country (Anastasiu & Negrean, 2007). It grows well on light, wet but well drained soils; it tolerates well the floods and the frost (Dumitriu-Tătăranu, 1960).

The authors have found more frequently this species in Moldavia in recent years, especially along the roads, railways, railway stations, as well as on the ruderal lands: Hanu Ancuței (Neamț County) (leg. Sîrbu, 5 September 2009), Miclăușeni (leg. Oprea & Sîrbu, 15 August 2009), Iași-Socola railway station (leg. Sîrbu & Oprea, 27 August 2009), and along the C.A. Rosetti Street (leg. Sîrbu & Oprea, 26 September 2009) (Iași County), Vaslui, Munteni de Jos, Bârlad (leg. Sîrbu & Oprea, 2 August 2009) and Sălcioara (leg. Oprea, 15 August 2009) (Vaslui County). In almost all these places, the plant produces many fruits that are easily spread by wind.

Picris echioides L. (*Helminthia echioides* (L.) Gaertn.; *Helminthoteca echioides* (L.) Holub)

This species is originating from Central and South Europe and became naturalised (alien) in the other regions of the continent (including Romania), but with an inconstant occurrence (Sell, 1976). It is also an alien plant in North America (Britton & Brown, 1970). The tendency of increasing its area in Europe was noticed especially since the decades V and VI of the last century, in France, Hungary, former Yugoslavia, as well as in Romania and former USSR (where it was declared a quarantine weed) (Anghel *et al*., 1972).

In Romania, the plant was initially identified in Transylvania, at the middle of the XIX Century, in Cluj-Napoca (Landoz, in Simonkai, 1866). Later, it was rediscovered by Timuş (1940), who found the seeds of this species in samples of alfalfa from Sânicolaul Mare (Timiş County).

Today, *P. echioides* is known in Transylvania (rare plant) (Nyárády, 1965; Landoz, 1844, Simonkai, 1866), Banat (sporadic plant) (Anghel et al., 1960; Popescu & Bujoreanu, 1957; Timuş, 1940), Crişana (sporadic plant) (Anghel et al., 1960; Borza, 1947; Pop, 1962; Pop, 1968), Maramureş

(sporadic plant) (Anghel et al., 1960; Kovács, 2006; Nyárády, 1965), Muntenia (rare plant) (Negrean, 1968; Negrean, 1972; Nyárády, 1965) and Dobrogea (rare plant) (Oprea, 2005).

As concerns the altitude, it grows from forest steppe to the floor of sessile oak forests (Ciocârlan et al., 2004). According to Anghel et al. (1972), the plant is more frequent in clover and alfalfa crops from Banat, but it grows also on tilled fields or ruderal places. *P. echioides* is a xeromesophyllous-mesophyllous, (sub-) termophyllous plant (Ciocârlan *et al.,* 2004), less resistant to frost, which hinders its spread northward (Anghel et al., 1960).

The authors have identified this plant in Codăeşti (Vaslui County) (leg. Sîrbu & Oprea, 22 August 2009), where it grows on fallows, as an accompanying species within the phytocenoses of *Conyza canadensis* and *Lactuca serriola* (*Erigeronto - Lactucetum serriolae* Lohmeyer in Oberd. 1957 em. Mucina, 1978). There, *P. echioides* produces many seeds that spread easily in the anemochorous way. Therefore, it is expected that in the future this species will spread more in this region.

Festuca tenuifolia Sibth. (*F. capillata* Lam.)

This species has the main habitat in Central West Europe (Beldie, 1972; Ciocârlan, 2000) and is spread in Spain, Britain, Belgium, Netherlands, France, Germany, Switzerland, Italy, former Yugoslavia, Austria, former Czechoslovakia, Poland, Hungary, Romania, former USSR (Central and West regions), Denmark and Sweden (Markgraf-Dannenberg, 1980).

It is a very rare species in Romania, which is included in *Romanian Red List of Vascular Plants* (Oltean et al., 1994). So far, it is known only in Eastern Transylvania and Maramureş: Poiana-Braşov, at the base of the Piatra Mare Mountain, Prejmer (Braşov County) (Beldie, 1972; Schur, 1866), Bistriţa-Năsăud County (Porcius, 1885), Crăciuneşti (Maramureş County) (Resmeriţă et al., 1975-1987, in Oprea, 2005), Ocna Şugatag (Maramureş County) (Oprea, 2006, personal observations). Only data from Maramureş are recent, while the indications for Eastern Transylvania are very old (of the nineteenth century). It grows on meadows, forest edges and glades, on poor, sandy or peaty soils (Beldie, 1972).

The authors have also identified this plant in Moldavia, near the northern border of Romania, in Suceava County, at Poiana Străjii (Straja) ($47^0$54'50.00" N; $25^0$30'55.25" E; alt. 529 m) and Poiana Cerbului (Straja) ($47^0$55'24.50" N; $25^0$29'14.925" E; alt. 782 m), in mesophyll meadows, on the slope of the left side of the Suceava River (leg. Sîrbu & Chidoveţ, 30 June 2008). In the first location, this species is represented by sporadic individuals, spread in a phytocenosis of *Festuco rubrae-Agrostietum capillaris* Horvat 1951, while in the second location, populations of *F. tenuifolia* have coverage of about 60% on areas of 30-40 m^2.

b) Alien Species (Hemerophytes) Identified in New Localities

Coreopsis tinctoria Nutt. (originating from North America, it was introduced as an ornamental plant). Previously reported in Viile (Galaţi County) (Mititelu et al., 1993) and Piatra Neamţ-Cuejdi river meadow (Sîrbu & Oprea, 2008c), it has also been identified in Ciric-Iaşi in waste ground (Iaşi County) (leg. Sîrbu, 17 August 2008), and Agapia - on the riverside of the homonymous river (Neamţ County) (leg. Oprea & Sîrbu, 23 August 2009).

Ulmus pumila L. (originating from Central and Eastern Asia, it was introduced as an ornamental tree). The species was previously known in Moldavia, only in Galaţi County (Borza, 1958; Mititelu et al., 1993; Popa & Chifu, 2006) and it was also found in Iaşi (near the railway station, leg. Sîrbu, 22 August 2008) and Socola (railway embankments, leg. Sîrbu & Oprea, 27 August 2009) (Iaşi County).

Rudbeckia triloba L. (originating from North America, it was introduced as an ornamental plant) was recently identified in the meadow of the Agapia River (Sîrbu & Oprea, 2009, unpublished) and it is also found in Iaşi (waste ground on Uzinei and Bucur streets, leg. Sîrbu, 1 August 2009), as well as in Ruginoasa (Iaşi County, leg. Sîrbu, 23 August2009).

Rudbeckia hirta L. (originating from North America, it was introduced as an ornamental plant) was previously reported in the Cuejdi river meadow, upstream of Piatra Neamţ (Sîrbu & Oprea, 2008c), it is also found on upstream of Agapia, on the riverside of homonymous river (Neamţ County) (leg. Sîrbu & Oprea, 23.VIII.09).

Lupinus polyphyllus Lindl. (originating from North America, it was introduced as an ornamental and fodder plant). It was collected in 1952, in Fundu Moldovei locality (Suceava County) (IASI Herbarium, leg. anonymous) and then cited in several other localities of the same county: Moldoviţa-Ferăstrău (Morariu et al., 1969), Şarul Dornei (Mititelu et al., 1988) and Vama (Mititelu et al., 1989). We have found it in Vadu Negrilesei on the banks of a tributary of the Negrileasa River (Suceava County) (leg. Oprea & Sîrbu, 27 July 2009), where it grows abundantly and produces many fruits and fertile seeds.

Oenothera glazioviana Micheli (Syn.: *Oenothera erythrosepala* Borbás) (originating from North America, it was introduced as an ornamental plant). It was previously reported in Agapia and Piatra Neamţ (Neamţ County) (Sîrbu & Oprea, 2008c). We have also found it in Adjud (on the roadside), Urecheşti (roadside ditches) (Vrancea County) (leg. Sîrbu, 25.VII.09), Berheci (Galaţi County) (on the roadside, leg. Oprea & Sîrbu, 2 August 2009), Poieni (Iaşi County) (fallow, leg. Sîrbu & Oprea, 2 August 2009), Borşeni-Războieni (Neamţ County) (roadside, leg. Sîrbu & Oprea, 2 June 2009).

Rhus typhina L. (*R. hirta* (L.) Sudw.) (originating from North America, it was introduced as an ornamental tree). It was first mentioned as cultivated plant in Moldavia (Szabo, 1841), then as a sub-spontaneous species in Larga-Movileni (Grecescu, 1909), Botanic Garden of Iaşi (Leocov & Ţopa, 1986), Ciric, Zagavia-Scobinţi (Mititelu et al., 1995) (Iaşi County), as well as in Huşi (Vaslui County) (Sîrbu, 2008). Recently, we have identified this species in Borniş (Neamţ County) (leg. Sîrbu & Oprea, 2 June 2009). There, it forms some dense and large populations, at the edge of hazelnut trees.

CONCLUSIONS

All the species shown in this scientific paper, except *Festuca tenuifolia*, are alien plants (neophytes and hemerophytes). Some species are new for the flora of Moldavia, while others are quite rare for this region of Romania, but their exotic nature and because they can reproduce without human help are a warning as concerns their future evolution in this territory.

Regarding *Festuca tenuifolia*, a very rare species in the flora of Romania, included in the *Romanian Red List of Vascular Plants*, its presence in Moldavia, towards the south-eastern limit of its natural area, is very interesting and encouraging.

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REFERENCES

Anastasiu P., Negrean G., 2007 - *Invadatori vegetali în România (Plant invaders in Romania)*. Edit. Universităţii Bucureşti, p. 81

Anastasiu P., Negrean G., 2008 - *New alien plants in Romania.* Analele Universităţii din Craiova. Seria Agricultură, Montanologie, Cadastru. 38/B: 1-10

Anghel Gh., Raianu M., Bucurescu N., 1960 - *Helminthia echioides (L.) Gaertn., ca plantă indicatoare de proveniență în controlul semințelor (Helminthia echioides (L.) Gaertn., a provenance indicator plant in seed control).* Comunicări de Botanică (1957-1959), Bucureşti 323-332

Anghel Gh., Chirilă C., Ciocârlan V., Ulinici A., 1972 - *Buruienile din culturile agricole şi combaterea lor (Weeds from crops and their control)*. Edit. Ceres, Bucureşti, pp. 355

Beldie Al., 1972 - *Genul Festuca L.(Festuca L. Genus),* in Săvulescu *et al.* (red.) 1952-1976 - *Flora R.S.România*, XII, Edit. Academiei Române, Bucureşti, 459-558

Borza Al., 1947 - *Conspectus Florae Romaniae, Regionumque affinum*, Tipografia Cartea Românească, Cluj-Napoca, pp. 360

Borza Al., 1958 - *Contribuţii la flora şi vegetaţia din răsăritul României (Contribution on the flora and vegetation from eastern Romania). Contribuţii Botanice*, Cluj: 127-158

Britton N.L., Brown A., 1970 - *An Illustrated Flora of the Northern United States, Canada and the British Possessions*. I-III., New York

Ciocârlan V., 2000 - *Flora ilustrată a României. Pteridophyta et Spermatophyta (Illustrated flora of Romania. Pteridophyta* and

Spermatophyta). Edit. Ceres, Bucureşti, pp. 1138

Ciocârlan V., Berca M., Chirilă C., Coste I., Popescu Gh., 2004 - *Flora segetală a României (Segetal flora of Romania)*. Edit. Ceres, Bucureşti, pp. 351

Ciocârlan V., Sike M., 2006 - *Eriochloa villosa (Thunb.) Kunth. (Poaceae) in the Romanian flora. Buletinul Grădinii Botanice* Iaşi, 13: 105-108

Csiszár Á., Bartha D., 2008 - *Green ash (Fraxinus pennsylvanica Marsh.),* in Zoltan-Botta, D., Balogh, L., 2008 - *The most important invasive plants in Hungary*, Institute of Ecology and Botany, Hungarian Academy of Sciences, Vácrátót, 161-166

DAISIE European Invasive Alien Species Gateway, **2009** - *Fraxinus pennsylvanica*. Available from: http://www.europe-aliens.org/speciesFactsheet.do?speciesId=19475# (Accessed 1st September 2009)

Dihoru Gh., Andrei M., Cristurean I., 1968/1970 - *Date preliminare despre flora şi vegetaţia ierboasă dintre Valea Mraconiei şi Cazanele Mari ale Dunării (Preliminary data on grass flora and vegetation between Valea Mraconiei and Cazanele Mari of the Danube). Acta Botanica Horti Bucurestiensis* (1968), Bucureşti, 207-214

do Amaral Franco J., da Rocha Afonso M.L., 1972 - *Fraxinus* L., in Tutin, T.G. et al., eds. *Flora Europaea*, vol. 3. *Diapensiaceae* to *Myoporaceae*, pp. 53-54. Cambridge University Press

Drăgulescu C., 2003 - *Cormoflora judeţului Sibiu (Chormoflora of the Sibiu County)*. Edit. Pelecanus Braşov, pp. 533

Dumitriu-Tătăranu I., 1960 - *Arbori, arbuşti forestieri şi ornamentali cultivaţi în R.P.R.* (*Trees, forestry and ornamental shrubs cultivated in Romania*), Bucureşti, Edit. Agro-Silvică, pp. 810

Essl F., Rabitsch W. (eds.), 2002 - *Neobiota in Österreich*. Umweltbundesamt GmbH, Wien, pp. 432

Grecescu D., 1909 - *Suplement la Conspectul florei României (Supplement to the Conspectus of the Romanian flora).* Inst. Arte Grafice Bucureşti, pp. 220

Karácsonyi C., 1995 - *Flora şi vegetaţia judeţului Satu Mare (Flora and vegetation in Satu Mare County).* Edit. Muzeului Sătmărean, Satu Mare

Kovács J.A., 2006 - *Distribution of invasive alien plant species stands in Eastern Transylvania. Kanitzia*, Szombathely, 14: 109-136

Leocov M., Ţopa E. 1986 - *Unele plante lemnoase mai deosebite, care s-au adaptat la condiţiile pedoclimatice ale Grădinii Botanice din Iaşi (Special wood plants adapted to soil and climatic conditions of the Botanic Garden of Iaşi).* Analele Ştiinţifice ale Universităţii "Al. I. Cuza" Iaşi, ser. II-a. Biologie, 32 (supl. - 139-140

Markgraf-Dannenberg I., 1980 – Festuca *L., in: Tutin T.G. et al. (eds.),* Flora Europaea, 5, Alismataceae to Orchidaceae, pp. 125-153, Cambridge University Press, London

Mititelu D., Sârbu I., Pătraşc A., Gociu Z., Oprea A., 1993 – *Flora şi vegetaţia judeţului Galaţi (Flora and vegetation in Galaţi County). Buletinul Grădinii Botanice* Iaşi, 4: 69-101

Mititelu D., Haja S., Odochianu V., Paţa M., Venţel M., 1988 - *La flore et la vegetation des environ de Vatra Dornei.* Analele Ştiinţifice ale Universităţii "Al. I. Cuza" Iaşi, ser. II-a. Biologie, 34 (suplim. - 26-30

Mititelu D., Chifu T., Pascal P., 1989 - *Flora şi vegetaţia judeţului Suceava (Flora and vegetation in Suceava County). Anuarul Muzeului Judeţean Suceava*, Ştiinţe Naturale, Suceava 10: 93-120

Mititelu D., Chifu T., Scarlat A., Aniței L., 1995 - *Flora şi vegetația județului Iaşi (Flora and vegetation in Iaşi County). Buletinul Grădinii Botanic*e Iaşi, 5: 99-124

Morariu I., Nyárády E.I., 1964 - *Genul Aster* L. (*Aster* L. *Genus),* in Săvulescu, T., et al. (red.), 1952-1976 - *Flora R.S. România*, IX, Bucureşti, Edit. Academiei Române, 187-212

Morariu I., Danciu M., Ularu P., 1969 - *Date noi din flora Porților de Fier (New data on the flora of Porțile de Fier).* Studii şi Cercetări de Biologie, ser. Botanică, Bucureşti 21(1): 17-22

Morariu I., 1972 - *Semnificația unor date corologice noi la plante (Significance of some new chorological data in plants).* Studii şi Comunicări de Ocrotirea Naturii, Muz. Suceava, 2: 191-200, Suceava

Negrean G., 1968 - *Contribuții la flora României (Contribution on the Romanian flora),* Studii şi Cercetări de Biologie, Ser. Bot. Bucureşti, 20, 4: 333-336

Negrean G., 1972 - *Câteva plante adventive din flora jud. Prahova (Some alien plants from the flora of the Prahova County),* Comunicări şi Referate, Muzeul de Ştiințele Naturii Ploieşti: 77-80, Ploieşti

Nyárády E.I., 1965 - *Fam. Compositae*, *subfam. Liguliflorae* DC., in Săvulescu, T. *et al*. (red.), 1952-1976 - *Flora R.S.România*, X, Bucureşti, Edit. Academiei Române, pp. 751

Oltean M., Negrean G., Popescu A., Roman N., Dihoru Gh., Sanda V., Mihăilescu S., 1994 - *Lista roşie a plantelor superioare din România (Romanian red list of superior plants).* Studii, Sinteze, Documentații de Ecologie, 1/1994, pp. 52, Bucureşti

Oprea A., 2005 - *Lista critică a plantelor vasculare din România (Critical Romanian list of vascular plants)*. Edit. Univ. "Al. I. Cuza" Iaşi, pp. 668

Oprea A., Sîrbu C., 2006 - *Research regarding alien flora from the left bank of the Tisa River, between Valea Viseului and Piatra (Romania). Kanitzia*, Szombately, Hungary, 14: 45-56

Popa D., Chifu T., 2006 - *The vascular flora from the Covurlui Plateau and Plain.* Anuarul Complexului Muzeal Bucovina, 17-19/2004-2006: 115-136, Suceava

Pop I., 1962 - *Flora şi vegetația zonei apusene a raionului Salonta (Regiunea Crişana) (Flora and vegetation in the western area of Salonta County (Region of Crişana).* Probleme de Biologie, Bucureşti, Edit. Academiei, 123-202

Pop I., 1968 - *Flora şi vegetația Câmpiei Crişurilor, Interfluviul Crişul Negru-Crişul Repede (Flora and vegetation of the Criş Plain, Crişul Negru-Crişul Repede Interfluve).* Bucureşti, Edit. Academiei, pp. 280

Popescu P.C., Bujoreanu G., 1957 - *Picris echioides în Flora Banatului şi Crişanei (Picris echioides in the Banat and Crişana flora).* Studii şi Cercetări Ştiințifice ale Academiei R.P.R., Baza Timişoara, 4 (1-2 - 167- 171

Porcius F., 1885 - *Flora din fostul district românesc al Năsăudului (Flora in former Romanian district of Năsăud).* Analele Academiei Române, ser. II, VII, Secț. II. Memorii şi Notițe, pp. 133, Bucureşti

Pyšek P., Richardson D.M., Rejmánek M., Webster G.L., Williamson M. & Kirschner J., 2004 - *Alien plants in checklists and floras: towards better communication between taxonomists and ecologists. Taxon*, 51(1) - 131-143

Resmeriță I., Spârchez Z., Csuros Şt., Moldovan I., 1971 - *Flora şi vegetația nisipurilor din Nord-Vestul României (Flora and vegetation from sands of northeastern Romania).* Comunicări de Botanică, a VII-a Consfătuire Națională de

Geobotanică (Satu Mare, Maramureş), 17-26 VII 1969 - 39-75

Richardson D.M., Pyšek P., Rejmánek M., Barbour M.G., Panetta F.D., West C.J., 2000 - *Naturalization and invasion of alien plants: concepts and definitions.* – Diversity & Distributions, Blackwell Publishing Ltd., 6: 93-107

Schneider-Binder E., 1979 - *Analiza florei din Depresiunea Sibiului şi dealurile marginale (Analysis of flora from Sibiu Depression and edge hills).* Studii şi Comunicări ale Muzeului de Ştiinţe Naturale Brukenthal, Sibiu, 23: 99-119

Schur J.F., 1866 - *Enumeratio Plantarum Transsilvaniae*, Vindobonae, Wien, pp. 984

Sell P. D., 1976 - *Picris* L., in Tutin, T. G. *et al.* (eds.), *Flora Europaea*, vol 4. *Plantaginaceae* to *Compositae* (and *Rubiaceae*), pp. 159-160, London: Cambridge University Press

Simonkai L., 1886 - *Enumeratio Florae Transsilvanicae vesiculosae critica*, Budapest

Sîrbu C., 2006 - *Floristic and chorological contributions from Moldavia and Muntenia (Romania).* Analele Ştiinţifice ale Universităţii "Al. I. Cuza" Iaşi, ser. II-a. Biologie vegetală, 52: 92-98

Sîrbu C., 2008 - *Research regarding the alien plant species in the surroundings of Huşi town (Vaslui County, Romania).* Proceedings of the 1st International Conference Environment, Natural Science, Food Industry, Baia Mare, Romania: 306-311

Sîrbu C., Oprea A., 2008a - *Two alien species in process of spreading in Romania: Reynoutria x bohemica Chrtek & Chrtková and Grindelia squarrosa (Pursh) Dunal).* Cercetari Agronomice in Moldova, 41(2/134 - 41-50)

Sîrbu C., Oprea A., 2008b - *New alien species for the flora of Romania: Bidens bipinnata* L. (*Asteraceae*). Turkish Journal of Botany, Ankara, 32: 255-258

Sîrbu C., Oprea A., 2008c - *Alien plant species from Stânişoara Mountains (Eastern Carpathians – Romania).* Journal of Plant Development, Iaşi, 15: 33–45

Szabo J., 1841 - *Flora Principatului Moldovei, pentru cunoaşterea plantelor crescătoare în Moldova (Flora in the Principality of Moldavia, for the knowledge of plants, cultivated in Moldavia)*. Manuscris, Bibl. Centr. Univ. Iaşi

Timuş A., 1940 - *Buruienile din lucernierele româneşti. Studiu fitosociologic, oecologic şi agricol(Weeds from Romanian alfalfa crops)*. Imprimeria Naţională Bucureşti, pp. 235

Tutin T.G. et al., 1964–1980 - *Flora Europaea*, vol. I-V. Cambridge University Press

Yeo P.F., 1976 - *Aster* L., in: Tutin, T.G. et al. (eds), *Flora Europaea*, vol 4. *Plantaginaceae* to *Compositae* (and *Rubiaceae*), pp. 112-115, Cambridge University Press

Wittenberg R. (ed.), 2005 - *An inventory of alien species and their threat to biodiversity and economy in Switzerland*. CABI Bioscience Switzerland Centre report to the Swiss Agency for Environment, Forests and Landscape, Delémont, pp. 416