LYTHRUM SALICARIA L. IN THE HUMID AREA VEGETATION

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Abstract *The paper discusses the Lythrum salicaria L. species systemic, biology, ecology and distribution, its ecologic impact, given by the quick ability to colonize new habitats, as well as current uses. The purple loosestrife is a common species in the Romanian flora, frequently occurring in the shoreline vegetation of humid areas, as well as in other biotypes (e.g. agricultural crops, road sides, ditches). A European native species, widely spread. The current research discuss not only control methods for areas where it is not native and where its spread is out of control (HIGHT, 1988, KNEZEVIC et al. 2004, RUSSELL-MERCIER & SARGENT 2015), but also its medicinal potential, in relation to the species possibilities (PIWOWARSKI et al., 2015) or its importance in apiculture, considering the large flower number on its inflorescence, the nectar quantity they produce and the long lasting plant bloom (BENVENUTI et al., 2016). The plant use in ameliorating the quality of eutrophic saline waters represents another option (ZHAO et al., 2014). Under certain prevention measures, it can be used ornamentally. In our country, the species is encountered in the vegetation of the following classes: Molinio-Arrhenatheretea Tx. 1937, Phragmitetea Tx. et Prsg. 1942, Salicetea purpureae Morr 1958, Alnetea glutinosae Br.-Bl. et Tx. ex Westhoff et al., 1946, Bidentetea Tx., Lohm. et Prsg. 1950. During the study of humid area vegetation, we identified Lythrum salicaria L. in 28 phytocoenoses of the following palustrine associations: Scirpo-Phragmitetum W. Koch 1926, Typhaetum angustifoliae Pignatti 1953, Typhaetum latifoliae G. Lang 1973, Glycerietum maximae Hueck 1931, Iretum pseudacori Eggler 1933, Eleocharidetum palustris Schennikow 1919, Phalaridetum arundinaceae (Horvatič 1931) Libbert 1931, Caricetum ripario-acutiformis Kobenza 1930, Bidentetum tripartiti W. Koch 1926, Salicetum albae Issler 1924 s.l., Rubo-Salicetum cinereae Sonasak 1963. The species does not pose invasion problems in the habitats where we discovered it, being considered in the context of the overall cormophyte flora diversity as a part of the above mentioned associations floral composition. As a result of our investigations, we believe a reconsideration of this species is in order, in the habitats where its presence may bring about beneficial implications.*

Key words: *Lythrum salicaria L., humid areas, Banat, invasive potential, usage possibilities*

INTRODUCTION

Lythrum salicaria will occur in most wetland types from river margins and banks, to low-lying seasonally inundated areas in rough pastures, the margins of wet woodland and even seasonal pools. Native throughout Europe and east North Africa through Turkey, Palestine and Lebanon to China, Japan and Korea. It has been introduced to North America and Australia where it can be extremely invasive (http://www.iucnredlist.org/details/164323/0, KAVAK, 2014).

In the Romanian flora, the species is cited in all regions, as a common plant, frequent in humid areas (SĂVULESCU, 1957). It is widely spread in Europe, only missing in high mountain areas and at northern latitudes (e.g. HRISTEVA *et al.*, 2015 signals the species among the most common hygrophytes in Bulgaria).

The current research analyzes aspects regarding invasion, control methods, species exploitation possibilities. Invasion problems occur in areas where it has been introduced (Australia, North America). The species can also be found on the *Invasive Species Compendium* portal (http://www.cabi.org/isc/datasheet/31890, PASIECZNIK, 2007).

The purple loosestrife negative impact on native species is often analysed. Comparing the growth methods of some native and invasive purple loosestrife species, CHUN *et al.*, 2010 observed that invasive populations show a greater expansion and that they were not visibly affected by the treatments they receives (water and nutrient level variations). Also discussing the species expansion, LINDGREN & WALKER (2012) consider that the species has not reached its full distribution potential in the Canadian prairies.

SHAMSI & WHITEHEAD's research, 1977 (*in* PASIECZNIK, 2007), show that when the nutrient supply is deficient, the plant side ramifications, and thus the bloom and fruition are negatively affected.

DENOTH & MYERS (2007) observation on the competition between *Lythrum salicaria* and *Sidalcea hendersonii*, an endemic species from the North-West Pacific swamp tides, do not indicate a strong impact of this invasive species on the reproduction and abundance of the endemic one.

The species is extremely invasive in North American humid areas, where it has been accidentally introduced, in 1800 (PASIECZNIK, 2007). It invades the swamps, negatively affecting native species and their diversity (WELSCH & YAVITT, 2002). In northern California and Wisconsin, U.S.A., it threatens the wild rice crops (*Zizania aquatica* - THOMPSON *et al.*, 1987, *in* PASIECZNIK, 2007). In north-east U.S.A., HIGHT (1988) studies the species' natural enemies and the biologic control possibilities with phytophagous insects. 59 phytophagous insects species were collected, 50 on leaves, 3 on stems, 6 on reproduction elements; no species were discovered on roots. Authors claim that none of these insect species diminish the populations or lead to significant damage to the plants. However, there are feeding niches available to exotic natural enemies.

Other studies show that biologic control methods are efficient, since there are coleoptera species which can completely defoliate the purple loosestrife plants, when introduced in invaded areas. Following observations undertaken in European countries, on *Lythrum salicaria* L. natural enemies, BATRA *et al.*, 1986 (*in* PASIECZNIK, 2007), found 120 de phytophagous insect species. Some of these (*Galerucella pusilla, G. calmariensis, Nanophyes marmoratus, Dasineura salicariae*) obviously affect the species development, trigger significant population defoliations, form galls in the apical and axillary meristems, with negative effects on the ramification and bloom.

RUSSELL-MERCIER & SARGENT (2015) observed that phytophagous insect indirectly influence species pollination agents, by delaying the anthesis, but it does not affect the plant reproduction capacity.

KNEZEVIC *et al.*, 2004, chemical control attempt, applying 16 herbicide treatments to *Lythrum salicaria* in Nebraska showed that with only one application, of more than half of these treatments, there is no satisfactory control, lasting no more than two seasons. They claim that it remains to be seen if multiannual applications lead to a long term effect, and that integrated herbiciding with mechanical methods or biocontrol might represent a valuable strategy.

THOMPSON *et al.*, 1987 (*in* PASIECZNIK, 2007) present the species impact on the environment. There is a great impact, with negative influences on the overall biodiversity, on the native flora, rare species, modifying succession models, preventing fishing and aquaculture,

hunting, reducing water debit in irrigation systems, reducing hay palatability, when contained, affecting agriculture (e.g. damages wild rice crops), navigation, tourism etc.

However, the species impact on the biodiversity is evaluated depending on considered criteria. *Lythrum salicaria* may obviously affect some species development, but it may have no influence whatsoever on other species. In areas where invasion problems occur, the species eradication is compulsory.

Mechanic control methods are limited (involving manual plant plucking, mowing, cutting, burning) and many of these methods must be avoided after blooming, so as not to facilitate the further spreading of the species (MALECKI & RAWINSKI, 1985, *in* PASIECZNIK, 2007). Chemical control with sole substance or substance mixture applications is also limited, effects becoming visible when these applications are repeated, otherwise the purple loosestrife regenerates from its seed banks. But repeated application leads to chemical environment contamination, thus chemical control is also limited. Biologic control means represent a option as well, the most accepted, although not the most efficient. Because of these drawbacks, WOO *et al.*, 2002 (*in* PASIECZNIK, 2007), recommends integrating physical, cultural, mechanical, chemical, biological control strategies.

Aside from the great problems regarding invasion and the negative impact on the environment raised by the *Lythrum salicaria* species in non-native areas, it must also be regarded ea from the point of view of some beneficial uses: it has ornamental value, it can be a solution in treating saline waters, it is an important food source for bees in areas, with reduced resources, it participates positively in the constitution of some water birds habitat, it is fodder for wild fauna species, presents multiple medical exploitation possibilities etc.

Analyzing the species from the usefulness point of view, it is among the most common plants used in traditional medicine. The pharmaceutical properties are of astringent, tonic, coagulation agent (THOMPSON *et al.*, 1987, *in* PASIECZNIK, 2007). In Asia, it used treat common colds, eczemas, varicosity, hemorrhoids (TURNALIER *et al.*, 2007, *in* PASIECZNIK, 2007). The species is also very appreciated for its ornamental value. When discussing introduced species, BARBIER & KNOWLER, 2006 (*in* PASIECZNIK, 2007) consider that a tax should be introduced for the commerce with invasive ornamental species.

ZHAO *et al.*, 2014 claim that treating eutrophic saline waters is difficult, because of the high nitrogen and phosphorus concentration, combined with frequent high salinity levels. They consider that planting macrophytes tolerant of salts, such as the purple loosestrife, may represent a cheap remedy solution in treating saline waters.

TAVERNIA & REED, 2012 have investigated the species influence on water bird abundance. The research inferred that *Lythrum salicaria* did not affect all bird species habitat, and that it is even possible to have had a positive influence for certain species. Given the species preference for particular habitats, the authors claim that there cannot be only one strategy in the *Lythrum salicaria* management.

This species is sometimes important for the wild fauna, as a food source for rabbits, some water birds, blackbirds, deer (RAWINSKI & MALECKI, 1984, *in* PASIECZNIK, 2007).

The study of BENVENUTI *et al.*, 2016, on the blooming particularities, diversity and pollination agent abundance, recommends the use of *Lythrum salicaria* as a food source for bees in Mediterranean humid areas. The investigation of its blooming showed that it is long term, from the middle of July to the end of September, with an average of 640 open flowers / plant. The

pollination agent number is remarkable: 476. The authors find its presence beneficial in humid agro-cultural areas and the immediate closeness of bee hives.

PIWOWARSKI *et al.*, 2015 mention the fact that the species is an exceptional remedy in traditional European medicine and that, from unknown reasons, its popularity decreased lately, contemporary pharmaceutical research being insufficient to support its usage.

MATERIAL AND METHODS

The botanic description, aspects regarding the species biology and ecology, problems regarding the invasive potential, exploitation possibilities where synthesized using Romanian flora, other current floras, invasive plant sites and investigating current scientific papers. We supplemented this information with our own field observations referring to the species. By analyzing our data, we observed that *Lythrum salicaria* occurs in 28 mappings carried out in the perimeter of some Banat humid areas. In this sense, we mention the vegetal associations (considered according to SANDA *et al.*, 1998) where we encountered the species, and we state the floral composition it can be found in. We also discuss other particular aspects.

RESULTS AND DISCUSSIONS

Botanic description, species biology and ecology aspects

Lythrum salicaria L., fam. *Lythraceae*

Vernacular names: purple loosestrife, spiked loosestrife, purple lythrum (Romanian: răchitan, răchițan, floarea zânelor, lemnic, călbășoară)

Perennial species, with a short rhizome. Erect stem, 30-150 cm (200 cm), rigid, simple or ramified, sometimes 4-sided, with short hair. Ovate-lanceolate leaves, with cordate or rounded base, acuminate tip, inferior ones opposing or in 3 verticilli each, the others alternating, triangular-lanceolate, evidently reticulate on the inferior side. Heterostyly flowers, red-purple, rarely punk or white, with short pedicels and 2 little caducous bracteoles, distributed in dense inflorescence, in spike-form or racemiform inflorescence. Tubulous receptacle, with 12 evident nervures, hairy. Tubulous chalice, pubescent, with 12 teeth, the exterior ones twice as long as the interior ones. Corolla with 6 elliptical or elongated-ovate petals, larger than the chalice segments. 12 stamina, bicarpellary ovary, syncarpous, presents heterostyly, oblong, septifragal capsule, with numerous brown-yellowish seeds, dispersed through hydrochory or anemochory. Blooming VI-IX. Species subunit delimitation is difficult with the Romanian flora, because of pilosity, bracteoles shape and dimension and overall plant outlook variability. The leaves contain tanning substances and are used for tea (SĂVULESCU, 1957, ANTONESCU, 1951, SÂRBU *et al.*, 2013), but the plant medicinal potential is high, due to antibiotic properties. It is also used in the cosmetics industry, being a tinctorial plant, and it is used to treat wood against humidity.

In the U.S.A., where it is an invasive species, it is frequently commercialized under false names, ornamentally for its inflorescence beauty.

In the flower calendar of baron REINSBERG-DÜRINGSFELD from 1870, the purple loosestrife is associated with the 27th July (****1001 de fotografii. Flori [1001 Photographs. Flowers]*, Ed. Allfa, 2008).

Frequent in humid places, near waters, in ditches. The typical form is semi-submersed, the dry land one is of lower height (ANTONESCU, 1951). Common on the lake and river shores, from plains to mountain regions, in the entire country (SĂVULESCU, 1957).

From plain to beech level, on water shores, swampy meadows, groves, humid ratchels, turf moors, rice plantations, crops. Mezotr., higr. L_7 T_6 $U_{8\ 7}$ N_X S_1. *Phragmiti-Magnocaricetea, Molinietalia, Potentillo-Polygonetalia, Magnocaricion elatae* (SÂRBU *et al.*, 2013).

Very variable species, with wide ecologic amplitude, being able to occupy numerous habitats und sublayers, except for dry places. In North America, as opposed to Europe, it can stand high water levels, of 40 cm or more (BASTLOVÁ-HANZÉLYOVÁ, 2001, *in* PASIECZNIK, 2007). The species distribution is due to the high seed number, the vigorous root system, rapid growth and high ecologic valence. It grows on varied soils, with neutral to slightly acid pH. The seeds are dispersed with the help of the wind, water and through birds and animals, they catch on to car tires, human clothing (THOMPSON *et al.*, 1987, *in* PASIECZNIK, 2007).

Its first mention in North America was in 1814 (STUCKEY, 1980, *in* PASIECZNIK, 2007). It was probably introduced through the ships' ballast or as a result of sheep wool importing European immigrants re-introduced it as a medicinal plant. Bee keepers participated in its distribution, deliberately spreading its seed along the waters. In Europe and North America, in apicultural and seed supplier catalogues, it is commercialized and counselling regarding its cultivation is insured, a fact that led to the distribution of the purple loosestrife in some regions. Horticulturists introduced it intentionally as an ornamental plant (THOMPSON *et al.*, 1987, *in* PASIECZNIK, 2007).

Distribution ways are numerous, such as: ship ballast, wool exports, seed commerce, floodings, fodder, animals, field equipment, human cloths and boots, car tires etc.

Main habitats are humid areas, but the species tolerates secondary habitats as well: agricultural land, road margins, railroads, forests, plantations, orchards, pastures, meadows etc.

The species role in humid area vegetation. The species is quoted in 1905, in TÖKES's list, comprising aquatic and palustrine plants around Timisoara. In exhaustive species lists and in Banat floristic syntheses, it is frequently signalled. It can also be mainly found in many vegetal association compositions in humid areas.

In Banat, the mezzo-hydrophilic *Lythro-Calamagrostidetum epigei* I. Pop 1968 is described by BOSCAIU, 1966, GRIGORE, 1971, VICOL, 1974; also mentioned in Crișana, Moldovia and Dobrogea (*in* BURESCU, 2003). These communities succeed reed beds, and, in humidity reduction conditions, they evolve to willow groves. This explains the presence of purple loosestrife in some of our associations (NEACȘU & ARSENE, 2011).

We encountered *Lythrum salicaria* L. in associations of the classes *Phragmitetea* Tx. et Prsg. 1942, *Bidentetea tripartiti* Tx., Lohm. et Prsg. 1950, *Salicetea purpureae* Morr 1958 and *Alnetea-glutinosae* Br.-Bl. et Tx. ex Westhoff *et al.*, 1946, as an accompanying species.

Cenotaxonomic references from the specialty literature:

BURESCU, 2003 considers it a species characteristic for the *Molinio-Arrhenatheretea* class.

SANDA *et al*., 2003 claim it occurs in the *Phragmitetea, Molinio-Arrhenatheretea, Salicetea, Alnetea* classes and is a species characteristic to the *Filipendulo-Petasition* association.

COLDEA *et al*., 2012 cite it among species characteristic for the *Filipendulion* association (cls. *Molinio-Arrhenatheretea* Tx. 1937).

We encountered *Lythrum salicaria* L. in the floristic composition of 11 humid area vegetal associations in Banat, after processing 83 mappings (the species being present in 28 of these mappings). In the following, we will present the associations according to SANDA *et al.* (1998), the accumulations in whose perimeter we identified and described them, and the A-D grades and local frequency, received by the *Lythrum salicaria* L. species:

Scirpo-Phragmitetum W. Koch 1926, Pișchia accumulation (grade +.1)
Typhaetum angustifoliae Pignatti 1953, Liebling accumulation (grade +)
Typhaetum latifoliae G. Lang 1973, Sânandrei și Surduc accumulations (grade +)
Glycerietum maximae Hueck 1931, Pișchia and Sânandrei accumulations (grades +, +.1)
Iretum pseudacori Eggler 1933, Liebling and Pișchia accumulation (grades +.1, 1.3)
Eleocharidetum palustris Schennikow 1919, Surduc accumulations (grade +)
Phalaridetum arundinaceae (Horvatič 1931) Libbert 1931, Liebling and Sânandrei accumulations (grades +, +.1, 1.4)
Caricetum ripario-acutiformis Kobenza 1930, Liebling, Pișchia and Sânandrei accumulations (grades +, +1, +2, +.3, 1.3, 1.5)
Bidentetum tripartiti W. Koch 1926, Surduc accumulation (grade +)
Salicetum albae Issler 1924 s.l., Sânandrei and Surduc accumulations (grade +.1)
Rubo-Salicetum cinereae Sonasak 1963, Sânandrei and Surduc accumulations (grade +).

At Surduc, the purple loosestrife occurs in *Typhaetum latifoliae* G. Lang 1973, *Eleocharidetum palustris* Schennikow 1919, *Bidentetum tripartiti* W. Koch 1926, *Salicetum albae* Issler 1924 s.l., *Rubo-Salicetum cinereae* Sonasak 1963. At Pișchia, it occurs in *Scirpo-Phragmitetum* W. Koch 1926, *Glycerietum maximae* Hueck 1931, *Iretum pseudacori* Eggler 1933, *Caricetum ripario-acutiformis* Kobenza 1930. At Liebling, it is part of the floristic composition of the following vegetal associations: *Typhaetum angustifoliae* Pignatti 1953, *Iretum pseudacori* Eggler 1933, *Phalaridetum arundinaceae* (Horvatič 1931) Libbert 1931, *Caricetum ripario-acutiformis* Kobenza 1930. At Sânandrei, it was discovered in *Typhaetum latifoliae* G. Lang 1973, *Glycerietum maximae* Hueck 1931, *Phalaridetum arundinaceae* (Horvatič 1931) Libbert 1931, *Caricetum ripario-acutiformis* Kobenza 1930, *Salicetum albae* Issler 1924 s.l., *Rubo-Salicetum cinereae* Sonasak 1963. One may observe that at Surduc was signalled in 5 vegetal associations, at Pișchia and Liebling, in 4 associations, and at Sânandrei, in 6.

In some phytocoenoses the species received high grades for the local frequency, since it came up in clusters, on many spots of the considered surfaces (e.g. Pișchia, Sânandrei). At Surduc, we found a more numerous population, distributed as a band, at the limit of the willow groves. In ecotone areas, at the limit between the shore and road side vegetation, isolated individuals occur.

Table 1.

Floristic composition of phytocoenoses including the *Lythrum salicaria* L. species

	Ass.	A	B	C	D	E	F	G	H	I	J	K
1.	*Abutilon theophrasti* Medik.	-	-	-	-	-	-	+	-	-	-	-
2.	*Achillea millefolium* L.	+	-	-	-	-	-	-	+	-	-	-
3.	*Alisma plantago-aquatica* L.	-	-	-	+	-	+	-	-	+	-	-
4.	*Alopecurus pratensis* L.	-	-	-	-	-	-	+	-	-	-	-
5.	*Agrostis stolonifera* L.	-	-	-	-	-	-	+	-	-	-	-
6.	*Artemisia vulgaris* L.	-	-	-	-	-	-	+	+	-	-	-
7.	*Bidens tripartita* L.	-	-	+	+	-	+	-	-	+	-	+
8.	*Bolboschoenus maritimus* (L.) Palla	-	-	-	+	-	-	-	-	-	-	-
9.	*Butomus umbellatus* L.	+	-	-	+	-	-	-	-	-	-	-
10.	*Calamagrostis arundinacea* (L.) Roth.	-	-	-	-	+	-	-	+	-	-	-
11.	*Calystegia sepium* (L.) R.Br.	+	+	+	+	-	-	+	+	+	-	-
12.	*Carex distans* L.	-	-	-	-	-	-	-	+	-	-	-
13.	*Carex hirta* L.	-	-	+	+	-	-	-	-	-	-	-

14.	*Carex riparia* Curtis	-	-	-	+	+	-	+	+	+	-	+
15.	*Carex vulpina* L.	-	-	-	-	-	-	+	-	-	-	-
16.	*Chenopodium album* L.	-	-	+	-	-	-	-	-	-	-	+
17.	*Cichorium intybus* L.	-	+	-	-	-	-	-	+	-	-	-
18.	*Daucus carota* L.	-	-	-	-	-	-	-	+	-	-	-
19.	*Dipsacus laciniatus* L.	-	-	-	-	-	-	-	+	-	-	-
20.	*Echinochloa crus-galli* (L.) Beauv.	-	-	-	-	-	+	-	-	-	+	-
21.	*Eleocharis palustris* (L.) Roemer et Schultes	-	-	-	-	-	+	-	-	-	+	+
22.	*Equisetum arvense* L.	-	-	-	-	-	-	-	+	-	-	-
23.	*Eupatorium cannabinum* L.	-	-	-	-	-	-	-	+	-	-	-
24.	*Galium uliginosum* L.	-	-	-	-	-	-	-	+	-	-	-
25.	*Galium verum* L.	-	-	-	-	+	-	+	-	-	-	-
26.	*Glyceria maxima* (Hartm.) Holmberg	-	+	+	+	+	-	+	-	-	-	-
27.	*Gnaphalium uliginosum* L.	-	-	-	-	-	-	-	-	+	-	-
28.	*Hypericum perforatum* L.	-	-	-	-	-	-	-	+	-	-	-
29.	*Impatiens noli-tangere* L.	-	-	-	-	-	-	-	-	+	-	-
30.	*Inula britannica* L.	-	-	-	+	-	-	-	+	-	-	-
31.	*Iris pseudacorus* L.	+	-	-	+	+	-	+	+	+	+	-
32.	*Juncus bufonius* L.	-	-	-	-	-	-	-	-	+	-	-
33.	*Lactuca serriola* L.	-	-	+	-	-	-	-	-	-	-	-
34.	*Lathyrus tuberosus* L.	-	-	-	-	-	-	-	+	-	-	-
35.	*Leersia oryzoides* (L.) Swartz	-	-	-	-	-	+	-	-	+	-	+
36.	*Leontodon autumnalis* L.	-	-	-	-	-	-	-	-	+	-	-
37.	*Linaria vulgaris* Miller	-	-	-	-	-	-	-	+	-	-	-
38.	*Lindernia procumbens* (Krocker) Philcox	-	-	-	-	-	+	-	-	-	-	-
39.	*Lycopus europaeus* L.	+	+	+	+	-	-	+	-	-	+	+
40.	*Lysimachia numularia* L.	-	-	-	-	+	-	+	+	-	-	-
41.	*Lysimachia vulgaris* L.	-	-	-	-	-	-	-	-	-	-	+
42.	*Matricaria perforata* Mérat	-	+	-	-	-	-	-	-	-	-	-
43.	*Mentha aquatica* L.	-	-	-	+	-	-	+	+	-	-	-
44.	*Mentha pulegium* L.	-	-	-	-	+	-	-	-	-	-	-
45.	*Oenanthe aquatica* (L.) Poiret	-	-	-	-	-	+	-	-	+	-	-
46.	*Phalaris arundinacea* L.	-	-	-	-	-	-	+	+	-	-	-
47.	*Phragmites australis* (Cav.) Steudel	+	-	-	-	-	-	-	+	-	-	-
48.	*Plantago major* L.	-	+	-	-	-	-	-	-	-	-	-
49.	*Poa palustris* L.	-	-	-	-	-	-	+	-	-	-	-
50.	*Polygonum aviculare* L.	-	-	+	-	-	-	-	-	-	-	-
51.	*Polygonum hydropiper* L.	-	-	-	-	-	-	-	+	+	-	-
52.	*Polygonum mite* Schrank	-	-	-	-	+	-	-	+	-	-	-
53.	*Polygonum persicaria* L.	-	-	-	-	-	-	-	+	-	-	-
54.	*Pulicaria vulgaris* Gaertner	-	-	-	-	-	-	-	+	-	-	-
55.	*Ranunculus repens* L.	-	-	-	-	-	-	-	+	+	-	-
56.	*Ranunculus sardous* Crantz.	+	-	-	-	-	-	-	-	-	-	-
57.	*Rorippa amphibia* L. (Besser)	-	-	-	-	-	+	+	-	-	-	-
58.	*Rubus caesius* L.	-	-	-	-	+	-	+	+	-	-	-
59.	*Rumex crispus* L.	-	-	-	-	-	-	+	-	-	-	-
60.	*Rumex obtusifolius* L.	+	-	-	-	-	-	-	-	-	-	-
61.	*Salix alba* L.	-	-	-	-	-	-	-	-	-	+	-
62.	*Salix cinerea* L.	-	-	-	-	-	-	+	-	-	+	+
63.	*Scutellaria hastifolia* L.	-	-	-	+	+	-	-	+	-	-	-
64.	*Sparganium erectum* L.	-	-	-	+	-	-	-	-	+	-	-
65.	*Stachys palustris* L.	-	+	-	-	-	-	-	-	-	-	-

66.	*Symphytum officinale* L.	+	-	+	+	+	-	-	+	-	-	-
67.	*Taraxacum officinale* Weber ex Wiggers	-	+	-	-	-	-	-	-	-	-	-
68.	*Typha angustifolia* L.	-	+	+	-	-	-	-	-	-	-	-
69.	*Typha latifolia* L.	-	-	+	-	+	-	+	-	-	+	-
70.	*Xanthium italicum* Moretti	-	+	-	-	-	-	-	-	-	-	-
71.	*Xanthium strumarium* L.	+	-	-	+	-	-	-	-	-	-	+

Note: A-K -plant associations, named after Sanda *et al.* (1998), above

In table 1, there appear 71 species alongside which the purple loosestrife was encountered. We specify that the species have been extracted from the synthetic tables of the above presented associations, and are cenotaxnomically considered according to BURESCU, 2003.

Lythrum salicaria L. occurs frequently, alongside the following species of *Phragmitetea*: *Calystegia sepium* (L.) R.Br., *Carex riparia* Curtis, *Glyceria maxima* (Hartm.) Holmberg, *Iris pseudacorus* L., *Lycopus europaeus* L., *Mentha aquatica* L., *Typha latifolia* L., *Phalaris arundinacea* L. Alte specii împreună cu care am semnalat-o sunt*: Symphytum officinale* L., *Lysimachia numularia* L., *Ranunculus repens* L., *Achillea millefolium* L., *Pulicaria vulgaris* Gaertner, *Carex hirta* L., *Inula britannica* L. (din *Molinio-Arrhenatheretea*). De asemenea, crește și alături de specii din *Bidentetea*: *Bidens tripartita* L., *Xanthium strumarium* L., *Polygonum hydropiper* L., *Echinochloa crus-galli* (L.) Beauv., *Chenopodium album* L. etc.

The purple loosestrife is also present in secondary habitats. FĂRCĂSESCU, 2009 finds the species participating in the weedness of corn crops on humid soils, alongside with *Lycopus europaeus, Bidens tripartita, Carex hirta, Juncus tenuis, Stachys palustris, Lythrum hyssopifolia, Epilobium adnatum, Symphythum officinale* and *Ranunculus sardous.*

CONCLUSIONS

In our country, the purple loosestrife is a common species, characteristic for humid area vegetation, but it is frequently signalled in other habitats as well.

In floras where it has been introduced (Australia, America de Nord), it raises great problems regarding invasion, integrated control being one of the frequently discussed options. On the other hand, current research indicates an under-exploitation of the species from a medicinal point of view, although its properties are known, and apicultural, although in some areas on the globe, it is the main, sometimes singular, nectar source. In some areas it is a food source for the wild fauna. The beauty of its inflorescences leads to appreciation from an ornamental point of view. Research shows that it can be an option for the eutrophic saline water quality remedy, without other costs.

We considered the species within the diversity of humid area cormophyte diversity and their characteristic vegetation, since its presence in Banat does not raise any problems.

The species occurs in the vegetation of the classes *Molinio-Arrhenatheretea* Tx. 1937, *Phragmitetea* Tx. et Prsg. 1942, *Salicetea purpureae* Morr 1958, *Alnetea glutinosae* Br.-Bl. et Tx. ex Westhoff *et al.*, 1946, *Bidentetea* Tx., Lohm. et Prsg. 1950.

In some humid areas we investigated, we found the purple loosestrife (ampng accompanying species) within some phytocoenoses pertaining to the following palustrine associations: *Scirpo-Phragmitetum* W. Koch 1926, *Typhaetum angustifoliae* Pignatti 1953, *Typhaetum latifoliae* G. Lang 1973, *Glycerietum maximae* Hueck 1931, *Iretum pseudacori* Eggler 1933, *Eleocharidetum palustris* Schennikow 1919, *Phalaridetum arundinaceae* (Horvatič 1931)

Libbert 1931, *Caricetum ripario-acutiformis* Kobenza 1930, *Bidentetum tripartiti* W. Koch 1926, *Salicetum albae* Issler 1924 s.l., *Rubo-Salicetum cinereae* Sonasak 1963.

We consider that the species should not be considered rashly, only from the point of view of its negative aspects which regard its invasion, but reconsidered in habitats where it can be useful.

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