

## RESEARCH INTO FLORA OF THE SOUTHERN PART OF THE TISA BASIN

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### Abstract

In the present paper particular attention is devoted to the distribution, immigration and naturalization of alien species.

*Asclepias syriaca* L. has been known to be cultivated and to live in wild state in the region investigated since the beginning of this century. It is naturalized, common species in the whole region of the southern part of the Tisa Basin.

*Echinocystis lobata* (MICHX.) TORR. et GRAY had not been recorded for this region until 70's. Nowadays it is very common in the natural vegetation. These two North American species mentioned above escaped from the cultures.

*Typha Laxmannii* LEPECH. belongs to the group of the adventive plant species from the East. This plant species was recorded for the first time for the southern part of Vojvodina Province around the middle of this decade. It is characterized by evident distribution, in the central parts of the Tisa Basin particularly. In the Cattail vegetation it probably forms sparse independent subassociation.

*Phacelia tanacetifolia* BENTH. This Californian species was recorded for the southern part of the Tisa Basin (nearby Stari Bečej) in 1929. It is melliferous, cultivated plant which lives in wild state in ruderal vegetation. Recently we have found this beautiful adventive ephemerophyte in the surroundings of Zrenjanin and Djala.

*Nicandra physaloides* (L.) GÄRTN., garden species from Peru, recorded for the region of Banat by Heffel in 1858. In 1929 this species was found in wild state in ruderal vegetation nearby Stari Bečej. We have found this plant species on the similar habitat between Čoka and Ostojićevo since last year, where it is uncommon.

### Introduction

Flora of Pannonia and therefore that of the southern part of the Tisa Basin have been investigated relatively in detail since the last century. However, more attention has been devoted to the important topics of phytogeography, i.e. importation, distribution and naturalization of alien species beginning with 30's of this century. Among the pioneer works on this problem there are SLAVNIC's communications (1943, 1953, 1960 and 1961) concerning Vojvodina Province and adjacent regions. Later, a number of botanists mainly from Vojvodina Province worked in the same field.

Our nonpretentious contribution deals with results of research into alien species, in the southern part of the Tisa Basin and its surroundings, during last three decades. We analyse in detail the five adventive plant species: *Asclepias syriaca* L., *Echinocystis lobata* (MICHX.) TORR. et GRAY and *Typha Laxmannii* LEPECH, are naturalized in the region investigated and they are in the process of spreading nowadays, whereas *Phacelia tanacetifolia* Benth. and *Nicandra physaloides* (L.) GÄRTN. are sparsed.

*Asclepias syriaca* L. was found as cultivated and in wild state in flora of the tribal state of Bač-Bodrog (PROĐAN 1916) at the beginning of this century. This species was recorded for the first time from the southern part of the Tisa Basin as cultivated in gardens in the surroundings of Stari Bečej (KOVÁCS 1929). The same species was recorded for natural vegetation in the forests of White Willow and Almondleaved Willow in the region of the Tisa Basin (SLAVNIĆ 1952). This North American species is widespread in the False Acacia forests as well on sandy soils in the surroundings of Subotica and Kelebija, whereas it occurs sparsely nearby Kanjiža (OBRADOVIĆ 1976). In the Serbian flora it occurs in Vojvodina Province along embankments and at the edges of flooded forests (JOSIFOVIĆ 1973) (Fig. 1).

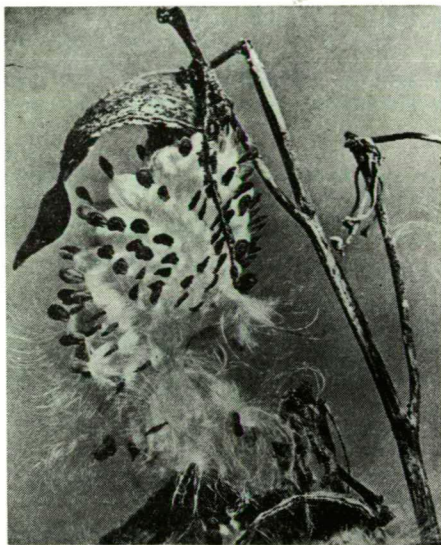


Fig. 1. *Asclepias syriaca* L. — Autumn aspect of opened capsule and seeds.

Recently we have recorded this adventive meliferous species which lives in wild state, this resistant weed (Soó 1966) for both sides of the Tisa near the bridge which connects Žabalja and Aradac, namely Zrenjanin. It grows in big populations nearby Žabalj on sandy soils, in depressions covered with the forests of White Poplar, in the vegetation *Fraxino pannonicæ-Ulmetum pannonicum* Soó subass. *populetosum* Soó (Soó 1964). In the Banat region we found this species sparsely by the embankments and along the road towards Aradac. We have recorded it nearby Hajdukovo in the surroundings of Horgoš and between Budisava and Šajkaš from similar habitats as well. This species is accompanied by another, more common, neophyte from North America *Echinocystis lobata* (MICHX.) TORR. et GRAY at the locality along the road between Zrenjanin and Čenta.

*Echinocystis lobata* (MICHX.) TORR. et GRAY

*Echinocystis lobata* (MICHX.) TORR. et GRAY, annual liana, neophyte, cultivated, in wild state and naturalized was recorded for the first time in Yugoslavia for Slovenia (PETKOVŠEK 1950), and then for Croatia (DEVIDÉ 1956 and DUBRAVEC 1972). Accord-

ing to SLAVNIC's personal communication and our findings, this species is widespread in Sarajevsko Polje in Bosnia. We published data on its occurrence in flora of Vojvodina Province (OBRADOVIC 1976) (Fig. 2); we found this plant species by the Tisa river nearby Kneževac, in the surroundings of zabalj, Aradac and Senta where it is common member of the vegetation *Calystegion sepium* Tx. (Soó 1964).



Fig. 2. *Echinocystis lobata* (MICHX.) TORR. et GRAY — Late autumn aspect of fruits.

This species is widespread in the area between the Tisa and the Tamiš rivers as well as along the right tributaries of the Tamiš by the road Zrenjanin–Perlez–Čenta and further in a southward direction. New habitats reveals that this plant species is naturalized in the vegetation *Fraxino pannonicae-Ulmetum* Soó and *Salicion triandrae* MÜLLER–GÖRS (Soó 1964). Its occurrence in Vojvodina Province is cited in “Flora of SR Serbia” (JOSIFOVIC 1977), whereas there is no record in “The Illustrated Weed Flora of Yugoslavia” (ČANAK *et al.* 1978).

#### *Typha Laxmannii* LEPECH

This plant species has been recorded recently for Vojvodina Province (BUDAK 1975). It represents the eastern species from rice fields (Fig. 3) which grows in the western and central regions of Asia, in the northern China and in the southeastern Europe (UJVÁROSI 1973). According to the data this adventive plant species occurs in Alföld by the Tisa between Szolnok and Szeged, while it is in the process of spreading in the southern parts (Soó 1973).

All these findings induced us to pay considerable attention to the distribution of *Typha Laxmannii* LEPECH. in the southern part of the Tisa Basin where we recorded

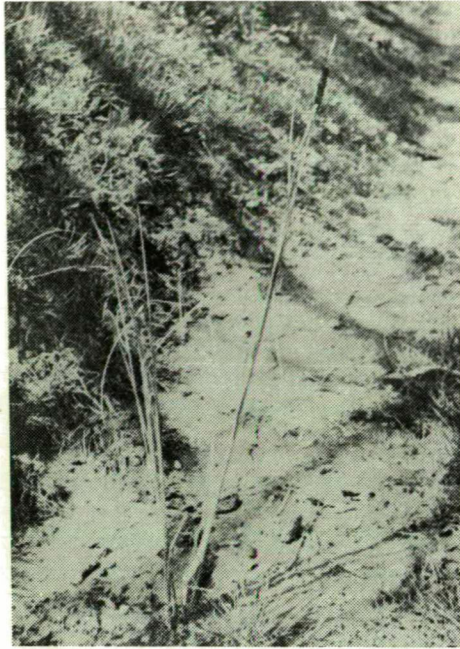


Fig. 3. *Typha Laxmannii* LEPECH. — Plant species from the surroundings of Djala.

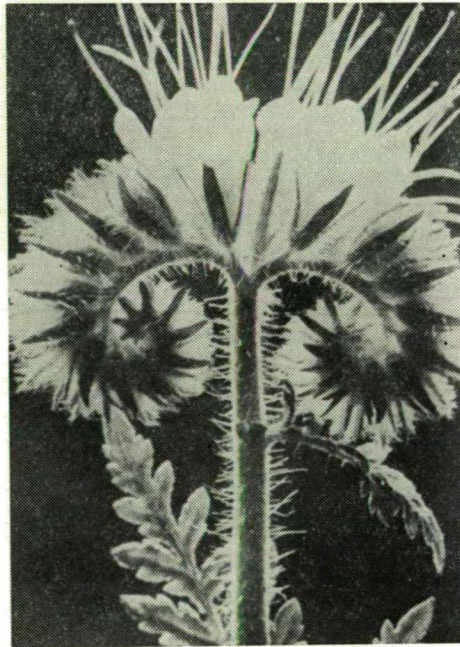


Fig. 4. *Phacelia tanacetifolia* BENTH. — Upper part of stem.

it for the following localities: nearby Bačko Gradište towards Biserno Ostrvo and Bečej it was very common in ditches on sandy soil, on salina nearby Zabalj towards Čurug, in the surroundings of Mol and Ada in canals, nearby Stari Bečej at the ocality towards the new bridge, and according to the information of N. Andrejević\* nearby Horgoždand Velebit. The localities mentioned above are situated in the region of Bačka by the Tisa river. Among the northernmost localities in the region of Banat there is a record from the surroundings of Djala by BÓZSA.\*\* We have recorded it for the area from Kneževac towards Filić to the Romanian border, in depressions from the Senta bridge to Čoka, between Melenci-Kumane-Novi Bečej.

According to the findings this plant species is spreading nowadays, particularly in the central part of the Tisa Basin in Vojvodina Province. It occurs in the vegetation *Phragmitetum communis* W. KOCH and probably it forms special subassociation *typhetosum laxmannii* UBRIZSY. At the salina nearby Zabalj it is the member of the vegetation *Balboschoenetum maritimi continentale* SOÓ g. *agrostidetum* BODROGK. (*Scirpetum maritimi* subass. cum "*Aster pannonicus*" SLAVNIC 48). In low and drier canals and in ditches by the roads in the surroundings of Veliko Gradište where this plant species is very common it grows in the vegetation *Pulicaria vulgaris-Mentha pulegium* ass. SLANIĆ (SOÓ 1964). There are no records of this species either in "Flora of SR Serbia" (JOSIFOVIĆ 1976, 1977) or in "The Illustrated Weed Flora of Yugoslavia" (ČANAK et al. 1978).

#### *Phacelia tanacetifolia* BENTH

First data on the occurrence of this species as cultivated garden plant in Vojvodina Province was related to flora of Stari Bečej (KOVÁCS 1929), whereas it was recorded for the first time, as the plant species which lives in wild state in Vojvodina Province, for the surroundings of Rimski Šančevi nearby Novi Sad (SLAVNIĆ 1960). This species from California was cited as a new record from Fruška Gora and the Srem region (OBRADOVIĆ 1961, 1976): there it occurs at fallow on ruderal habitats and by the edge of forest, maybe it is imborn. We had not recorded this species for the region of the Tisa Basin until last year where it was in culture and in wild state in the surroundings of Zrenjanin. According to BÓZSA's information it occurred at the northernmost locality nearby Djala where it was sparsed and in wild state by road and on stubble field. There are no records of this species either in "Flora of SR Serbia" (JOSIFOVIĆ 1974, 1977) or in "The Illustrated Weed Flora of Yugoslavia" (ČANAK et al. 1978) (Fig. 4).

This North American melliferous plant which is used as feed as well (SOÓ 1968) belongs to uncommon inhabitants of the region of the Tisa Basin; it has been recorded for the three localities only so far. Taking into consideration that this species is fructiferous under the conditions of this country, more attention to the process of naturalization of this adventive interesting ephemerophyte is of interest.

#### *Nicandra physaloides* (L.) GÄRTN

This plant species belongs to the group of neophytes from South America-Peru (SOÓ 1968). The data from literature are showing that this species is characterized by dispersal growth and that it lives in wild state (JÁVORKA 1925). According to the data on the surroundings of Timisoara in the Banat region, it is cultivated in gardens

\* M. S. work by NADA ANDREJEVI

\*\* BÓZSA's personal communication and photograph of *Typha Laxmannii* LEPECH.

whereas it is characterized by spontaneous growth along fields (HEUFFEL 1858). The data from the tribal state of Bač-Bodrog shows that this species was cultivated in wild state in the surroundings of farmsteads (PTODÁN 1916). The first record from the locality in the Tisa Basin (Stari Bečej) was by KOVÁCS (1929); it grows there in gardens and often in wild state. This species may occur in the selfsame region with *Galinsoga parviflora*, *Silybum Marianum*, *Artemisia annua* and *Melissa officinalis* as the member of ruderal vegetation. Recently we have found a locality of this species in the Tisa Basin between Čoka and Ostojićevo. It grows by settlements in ruderal vegetation as well; such a vegetation nearby Szeged was described by TIMÁR where *Sisymbrium looselii* and *Erodium ciconium* occur (SOÓ 1964).

*Nicandra physaloides* (L.) GÄRTN. is uncommon species in the region of the Tisa Basin and judging by the facts it represents adventive ephemerophyte. In the southern part of Vojvodina Province in the Danube Basin where it was found in the vegetation of maize fields and row crop, this species could be classified as epecophyte. There are no records of this species either in "Flora of SR Serbia" (JOSIFOVIĆ 1974, 1977) or in "The Illustrated Weed Flora of Yugoslavia" (ČANAK et al. 1978).

### Conclusion

Flora of the southern part of the Tisa Basin and that of others parts of the Pannonian Plain is characterized by expansion and acclimatization of a considerable number of adventive plant species.

We analyzed the five alien species from different world regions. *Asclepias syriaca* L., *Echinocystis lobata* (MICHX.) TORR. et GRAY and *Phacelia tanacetifolia* BENTH. are the North American species; the latter is restricted to the region of California. *Nicandra physaloides* (L.) GÄRTN. is the resident of South America (Peru), while *Typha Laxmannii* LEPECH. represents the eastern species which is widespread in Asia from the western parts to China and in the southeastern Europe.

*Asclepias syriaca* L. and *Phacelia tanacetifolia* BENTH. are cultivated as melliferous plants. Both live in wild state but their behaviour is different. The former has been known in this region since the beginning of this century; it is common in natural vegetation on wet habitats and it is characterized by spreading phase. The latter was found in 30's as a cultural plant or in wild state in ruderal vegetation. The same is true of this species nowadays; it is uncommon adventive ephemerophyte recorded for three localities in the southern part of the Tisa Basin.

*Echinocystis lobata* (MICHX.) TORR. et GRAY and *Nicandra physaloides* (L.) GÄRTN. escaped from gardens. The former had not been recorded for the southern region of the Tisa Basin until 70's as the species in wild state; nowadays it is widespread and it is the member of the natural vegetation by the Tisa, the Timiš and its tributaries. This adventive species is spreading along watercourses. Contrarily, *Nicandra physaloides* (L.) GÄRTN. was cited for the region of Banat in last century as garden subsponaneous species. This species, however nowadays is very uncommon one in the southern region of the Tisa Basin because the two localities only have been recorded in ruderal vegetation.

*Typha Laxmannii* LEPECH., the eastern species from rice fields has been cited for Vojvodina Province recently (1975) where it is very common. This species is characterized by marked expansion in the central part of the southern region of the Tisa Basin where it occurs in the Reed vegetation, and probably it forms a special subassociation in a marsh vegetation.

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## Florisztikai kutatások a Tisza déli szakaszán

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### Kivonat

A „Florisztikai kutatások a Tisza déli szakaszán” című dolgozatban külön figyelmet szentelünk az idegen növények betelepülésének, terjedésének és meghonosodásának.

*Asclepias syriaca* L. mint termesztett és elvadult növény a kutatott területen már a század elejétől ismert volt. A Tisza déli részén meghonosodott és elég gyakori.

*Echinocystis lobata* (MICHX.) TORR. et GRAY-t az említett területen csak a hetvenes években találták, ma már azonban a természetes vegetáció nagyon gyakori tagja. Mindkét faj a kultúrából szökött ki, észak-amerikai származásúak.

A *Typha Laxmannii* LEPECH. keleti származású adventív növény. Először Vajdaság déli részén észlelték az évtized közepén. Rohamosan terjed főképpen a kutatott terület középső szakaszán. Valószínű, hogy helyenként a gyékényvegetációban szubasszociációt alkot.

*Phacelia tanacetifolia* BENTH. Kaliforniából származik. A Tisza déli szakaszán először Óbecsénél 1929 találták, mint mézelő kultúrnövényt és elvadultan ruderalis növénytársulásokban. Csak újabban gyűjtöttük mi is ezt a szép efemerofita adventív fajt Zrenyanin és Gyála környékén.

## Floristička istraživanja u južnom delu Potisja

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### Abstract

U radu: „Floristička istraživanja u južnom delu Potisja” posebnu pažnju posvetili smo rasprostranjenju, procesu useljivanja i odomaćivanja biljaka stranog porekla.

*Asclepias syriaca* L. je kao gajena i podivljala bi.- ka u ispitivanom području poznata od početka ovog veka. U celom južnom Potisju odomaćena je i dosta česta.

*Echinocystis lobata* (MICHX.) TORR. et GRAY zabeležena je u istom regionu tek sedamdesetih godina, ali je ona danas vrlo čest član prirodne vegetacije. Obe su vrste odbeglice iz kultura i severno američkog porekla.

*Typha Laxmannii* LEPECH. spada u grupu adventivnih biljaka istočnog porekla. Opisana je prvi put u južnoj Vojvodini polovinom ove decenije. U naglom je širenju naročito u srednjem Potisju ispitivanog područja. U vegetaciji rogoza verovatno izgrađuje mestimično i samostalnu subasocijaciju.

*Phacelia tanacetifolia* BENTH., poreklom iz Kalifornije, tridesetih godina prvi put je u južnom Potisju kod Starog Bečeja jabeležena 1929 kao medonosna kulturna i podivljala vrsta u ruderalnoj vegetaciji. Tek u novije vreme našli smo i mi ovu lepu efemerofitnu adventivnu biljku u okolini Zrenjanina i Djale.

*Nicandra physaloides* (L.) GÄRTN., baštensku biljku iz Perua 1858 pominje Heffel za banatsku floru. Kod Starog Bečeja nadjena je 1929 kao podivljala vrsta u ruderalnoj vegetaciji. Na sličnom taništu i mi smo je zabeležili u poslednje dve godine kao retku biljku između Čoke i Ostojičeva