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Datura wrightii Regel. INVASIVE PLANT IN OLTENIA, ROMANIA

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Abstract

The heavy anthropic activity has as a result the invasion of allochtones in the natural damaged ecosystems from Romania and the whole Europe. This fact has a negative impact over the genuine evolution and development of natural biocenosis. Invasive species are the real main threats for the agro-biodiversity. Datura is a genus of nine species of poisonous vespertine flowering plants belonging to the family Solanaceae. All species of Datura are poisonous, especially their seeds and flowers. Datura wrightii is an invasive species whose range has expanded greatly in recent years in Romania. According to studies in our country, the species Datura wrightii was identified for the first time in Romania from the Galati County - Folteşti, Tg. Bujor, Umbrareşti. This species has an aggressive character on biodiversity and we found it in ruderal areas, garbage storage on land, vacant lots, edges of the road. The species has an important anthropogenic impact on herbaceous and woody plant communities and therefore on some types of community interest habitats. D. wrightii has also been used to induce hallucination for recreational purposes. Ingestion of plant material can induce auditory and visual hallucinations similar to those of Datura stramonium.

Key words*: Datura wrightii, invasive species, ecology, corology, plant communities.*

INTRODUCTION

The genus *Datura* belongs to the family Solanaceae and includes nine species for Europe: *D. ceratocaula* Ortega, *D. ferox* L., *D. innoxia* Miller, *D. discolor* Bernh., *D. metel* L., *D. quercifolia* Humboldt et al., *D. leichhardtii* F. Muell. ex Benth. (syn. *D. pruinosa*), *D. wrightii* Regel and *D. stramonium* L. The species name of this plant is for Charles Wright, 1811-1885, world-wide botanical collector but mainly in Texas (1837-1852), Cuba and his native Connecticut. Extracts from this plant and its relatives are narcotic and, when improperly prepared, lethal. The narcotic properties of species have been known since before recorded history.

They once figured importantly in religious ceremonies of south-western Indians (http://www.wildflower.org/).

Datura wrightii is native species in the south-western United States and Mexico. It much resembles *Datura innoxia* in general habit and is best distinguished on the basis of stem indumentum. *Datura wrightii* is characterized by: stem indumentums dense, of very short apressed or retrorse englandular hairs (occasionally intermixed with some longer erect glandular hairs). Stigma usually exceeding anthers. Seeds with a single marginal furrow. Corolla - 14-26 cm long (Verloove, 2008).

Following field studies conducted in Oltenia I found that *Datura wrightii* is an invasive species whose range has expanded greatly in recent years in Romania. According to studies in our country, the species *Datura wrightii* was identified for the first time in Romania from the Galați County (Folteşti, Târgu Bujor, Umbrăreşti). Also, the species was cited by Oprea, Sîrbu and Dorofteu from the Danube Delta (Crişan, Caraorman, Letea) in 2011. This species has an aggressive character on biodiversity and we found it in ruderal areas, garbage storage on land, vacant lots, edges of the road.

The species has an important anthropogenic impact on herbaceous and woody plant communities and therefore on some types of community interest habitats.

D. wrightii has also been used to induce hallucination for recreational purposes. Ingestion of plant material can induce auditory and visual hallucinations similar to those of *Datura stramonium*.

MATERIALS AND METHODS

The studies on the field involved a good bibliographic documentation regarding the physical-geographical frame: the relief, the geology-lithology, the hydrographic network, the soils and the general and local climate. The plant species nomenclature follows the Flora of Romania. For the study of the vegetation, we have used the methods of phyto-sociologic research characteristic to the Central European phyto-sociologic School. For the classification of the plant communities, we have used the synthesis of Rodwell et al. (2002). Field data were collected in the period 2018-2021.
The sample areas were chosen according to the presence of the species and its abundance-dominance. Floristic and phytosociological studies have been carried out on this invasive species in several localities in Dolj, Mehedinți and Vâlcea Counties.

RESULTS AND DISCUSSIONS

In terms of spreading, the species can be found in meadows, bushes, in weed plant communities, on the edge of meadow woodland plant communities, in agricultural crops, roadside, forest roads, trails. In urban areas this species forms population with a huge number of specimens in parks, green spaces, gardens, private courtyards, raw land (Figures 1-4). It settles very well on the roadsides, successfully managing the seeds of this species to germinate in the concrete cracks and to form well-developed bushes that produce a large number of seeds.

Figure 1. *Datura wrightii* in the ruderal plant community

Thus, in the cities of Oltenia the species is quite common. The species was identified in Râmnicu Vâlcea, Băile Govora, Bălcești, Nicolae Bălcescu, Craiova, Segarcea, Giurgița, Măceșu de Sus, Cârna.
In the thematic area this species grows in the floristic composition of the following ruderal plant communities: *Hordeetum murini* Libbert 1932 em. Pass. 1964; *Polygonetum avicularis* Gams 1927 (Rodwell et al., 2002; Sanda et al., 2001), *Cardarietum drabae* Timar 1950 (Rodwell et al., 2002; Sanda et al., 2001); *Digitario sanguinalis-Galinsogetum* Beck 1941, *Echinochloo - Polygonetum lapathifolii* Soó et Csürös, 1947.
The species has been identified at the border of the following woody plant communities: *Stellario nemori-Alnetum glutinosae* (Kärstner, 1938) Lohm, 1957; *Prunus spinosa-Crataegus monogyna* (Soó, 1927) Hueck, 1931.

Figure 2. *Datura wrightii* in the Cotmeana Valley

Figure 3. *Datura wrightii* in the urban area

Between the localities of Segarcea and Giurgița, the species is frequently found in the *Polygonetum avicularis* Gams 1927 plant community, which is installed in front of the yards or on the edge of the ditches.
This plant community is very widespread in all localities in the researched territory. Knotweed phytocoenoses grow on trampled land, along roads, alleys, in yards and on roadsides. The stations where the phytocoenoses of this plant comminity are installed, have a pronounced mesophilic, euriterm and euriionic character.
From a phytosociological point of view, together with the edifying species, the following species also frequently participate in the composition of the vegetal carpet: *Capsella bursa-pastoris, Poa annua, Matricaria recutita, Hordeum murinum, Potentilla argentea, Lolium perenne* and *Datura wrightii*. The vegetation cover is between 85-95%.
In Giurgița locality, well-developed shrubs of *Datura wrightii* were found in the concrete ditches. It has spread rapidly from the yards or gardens where it was grown as an ornamental plant. It prefers anthropogenic, ruderal plant communities with low soils and nitrogen-rich soils.
In Măcești de Sus, the species was also identified in the floristic composition of the *Polygonetum avicularis* Gams 1927 plant community (Table 1).
In Vâlcea County in the Cotmeana River Basin, the species was identified in the floristic composition of the *Echinochloo - Polygonetum lapathifolii* Soó et Csürös 1947 plant community.
The *Echinochloo - Polygonetum lapathifolii* Soó et Csürös 1947 (Syn.: *Echinochloo crus-galli - Galinsogetum parviflorae* Burduja et Florita Diaconescu, 1976, *Panico - Galinsogetum* Tx. et Becker, 1942) (Table 2) plant community vegetates on low ground or in shady places, especially on excessively moist soils.
This plant community is usually found in corn, soybean, sunflower, straw, and even vine plantations, where mechanical control could not be applied.
The floristic composition of this plant community is dominated by mesophytic species, followed by xeromesophytes, mesothermophyte and subtermophyte species, as well as euriionic and weakly acidophilic species.
From a phytosociological point of view, most of the species recorded in the surveys belong to the Chenopodietea class, the Panico - Setarion alliance and the order *Chenopodietalia albi* and *Plataginetalia majoris*.
The terophytes represent the majority of species in the floristic composition, many of which are cosmopolitan and adventitious, and almost half of all species are of Eurasian origin.
In the researched territory from the Cotmeana river basin, this vegetal community also forms weeds on the bank of the Cotmeana river.
The species *Datura wrightii* was found in these weeds, in the immediate vicinity of the households in the localities, from where it probably spread after being cultivated as an ornamental plant.
Locals usually plant this species in front of households, from where it spreads very easily.

Figure 4. In the ruderal plant community

Five test areas were chosen, the species being found in only five of them. The abundance-dominance of the species within the phytocoenoses is relatively low.

Table 1. *Polygonetum avicularis* Gams, 1927

Number of relevées	1	2	3	4	5
Coverage (%)	90	95	85	95	90
Area (m^2)	30	25	10	30	25
Char. ass.					
Polygonum aviculare	4-5	5	4-5	5	5
Polygonion avicularis et Plantaginetalia majoris					
Plantago major	+	-	+	-	-
Poa annua	+	-	+	-	-
Cichorium intybus	-	+	-	+	-
Potentilla reptans	+	-	-	+	-
Rumex crispus	-	+	-	+	-
Matricaria recutita	+	+	-	+	+
Potentilla anserina	-	+	-	+	+
Lolium perenne	1	1	+	+	-
Chenopodietea					
Capsella bursa-pastoris	+	+	+	-	-
Malva pusilla	+	-	+	-	-
Cardaria draba	-	+	+	-	+
Hordeum murinum	+	-	+	-	+
Veronica persica	-	-	+	+	+
Festuco-Brometea					
Lotus corniculatus	-	+	-	+	-
Plantago lanceolata	-	-	-	+	+
Potentlla argentea	-	+	+	+	-
Molinio-Arrhenetheretea					
Festuca pratensis	-	+	-	+	-
Trifolium repens	-	+	-	-	+
Poa pratensis	-	-	-	+	+
Ranunculus repens	-	-	+	-	+
Leontodon autumnalis	-	-	-	-	-
Taraxacum officinale	-	+	+	-	-
Variae Syntaxa					
Cynodon dactylon	+	-	-	+	-
Arenaria serpyllifolia	-	+	-	+	+
Trifolium campestre	-	+	-	+	+
Utica urens	-	+	-	-	+
Potentilla reptans	+	+	-	-	-
Medicago lupulina	-	-	-	+	+
Datura wrightii	+	+	-	-	+

Place and data of relevés: 1-5, Giurgița (Dolj County), 20.09.2020

CONCLUSIONS

This species is mainly in the invasion of ruderal areas, the dense networks eliminating other herbaceous plants.

Regarding the woody habitat, the species was found only at their limit, but given the large number of seeds they produce, the vitality of the species and its ability to germinate it can spread very quickly and can conquer new territories entering the floristic composition of these plant communities.

Taking into account these considerations, it is very important that this species is constantly monitored and that the best control methods are found, without affecting the biodiversity and phytocenoses in which it develops.

Given its presence in urban areas, it is necessary that the bushes developed on the side of the streets, through parks gardens, garbage, be cleaned and burned before fruiting and seeding.

Table 2. *Echinochloo - Polygonetum lapathifolii* Soó et Csürös, 1947

Number of relevées	1	2	3	4	5
Coverage (%)	100	90	100	90	100
Area (m²)	30	30	25	25	25
Char. ass.					
Galinsoga parviflora	2-3	2	2	2	2
Echinochloa crus-galli	3	1-2	1	1-2	2
Polygonum lapathifolium	1	2	2-3	2	1
Panico - Setarion					
Amaranthus retroflexus	+	-	+	-	+
Setaria pumila	-	+	-	+	+
Stachys annua	-	+	-	-	-
Lathyrus tuberosum	-	-	-	-	+
Polygonum convolvulus	-	-	-	+	-
Polygono - Chenopodion polyspermi et Chenopodietalia albi					
Chenopodium album	+	+	1	1	+
Thlaspi arvense	+	+	+	-	-
Euphorbia heliosopia	-	-	-	-	+
Senecio vernalis	-	-	+	-	-
Stellarietea mediae					
Hibiscus trionum	+	+	-	+	+
Matricaria perforata	+	-	-	+	+
Veronica persica	-	+	-	-	+
Anagallis arvensis	-	-	-	+	+
Brassica nigra	-	+	+	-	-
Stellaria media	+	+	-	-	-
Solanum nigrum	-	-	-	+	+
Artemisia annua	-	-	-	+	+
Lamium amplexicaule	-	-	+	+	+
Chenopodium hybridum	+	-	-	+	+
Artemisietea vulgaris					
Equisetum arvense	-	+	-	-	+
Xanthium strumarium	+	-	-	-	-
Molinio - Arrhenatheretea					
Taraxacum officinale	-	-	-	+	+
Ranunculus sardous	-	-	-	-	+
Medicago lupulina	-	-	-	-	+
Plataginetalia majoris et Polygonion avicularis					
Plantago major	-	-	-	+	+
Malva pusilla	+	-	-	-	-
Matricaria recutita	+	-	-	-	-
Variae Syntaxa					
Rorippa sylvestris	-	-	-	-	+
Datura wrightii	+	-	-	+	-
Sambucus ebulus	+	-	-	+	-
Utica dioica	+	-	-	+	-
Saponaria officinalis	+	-	-	+	+

Place and data of relevés: 1-5, Galicea (Vâlcea County), 14.07.2019

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