AMBROSIA ARTEMISIIFOLIA L.: A SEGETAL SPECIES WITH A TENDENCY TO EXPANSION IN THE TIMIS COUNTY

AMBROSIA ARTEMISIIFOLIA L. – SPECIE SEGETALĂ CU TENDINȚĂ DE EXPANSIUNE ÎN JUDEȚUL TIMIȘ

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Abstract: *The anthropic activity determines the expansion or reduction of the habitats of plant species. The commercial exchanges of seeds and the acclimatization ability of the segetal species to various pedoclimatic conditions, may determine the exceeding of adventive species level and move towards species with a wider habitat, often cosmopolite species. Under this aspect, it is chronologically and ecologically analyzed the species Ambrosia artemisiifolia which can become problematic in the Western Plains of Romania in the years to come, considering its tendency to develop from a ruderal into a segetal species.*

Rezumat: *Activitatea antropică determină extinderea sau restrângerea arealelor speciilor de plante. Schimburile comerciale de seminţe şi capacitatea de adaptare a speciilor segetale la diferite condiţii pedoclimatice, pot determina depăşirea stadiului de specii adventive, spre specii cu areale mai largi, uneori cosmopolite. În acest context, este discutată sub aspect chorologic şi ecologic specia Ambrosia artemisiifolia care poate deveni problematică în Câmpia de Vest a României în următorii ani, având în vedere tendinţa de transformare a acesteia din specie ruderală în specie segetală.*

Key words**:** *Ambrosia artemisiifolia, invasive plants, allergies, Banat*
Cuvinte cheie: *Ambrosia artemisiifolia, plante invazive, alergii, Banat*

INTRODUCTION

Ambrosia artemisiifolia is a species original from North America, where it was first found as weed in 1838. Together with the intensification of intercontinental commercial relations, it got to Europe. In 1863 it was clandestinely introduced in France, together with the red clover seed, a fact to which it was then added the accidental contamination caused by American airplanes which carried cereals during the Second World War [20]. From France and Germany it spread all over Europe (Portugal, Great Britain, Austria, Luxembourg, Belgium, Holland, Switzerland, Sweden, Croatia, Italy, Czech Republic, Poland, Serbia, Romania, Moldavia, Ukraine, all the way to Lithuania, Russia and Turkey [4, 5]. It appears that the most invaded areas are Rhônes-Alpes (France) and Krasnodar district (Russia). During the war in Yugoslavia many lands were left untilled, where the weed started to grow, and, because of the territorial arrangements in Hungary, this country became the 4th in what the distribution of this species is concerned, taking up to 90 % of the fields [15].

In Romania, the first information on "fallow grass" or "steppe flower" dates from 1910, when it was registered in Orsova [20], being later on identified – only in small populations or as isolated individuals – in other locations in Banat, Sighet, Moldavia and Muntenia [14, 19]. During the period 1960 - 1985, *Ambrosia* was encountered only sporadically in Banat, on the waste lands in the vicinity of the towns [9]. After 1990, the total of abandoned lands increased very much, large areas were cleared, and there was no control of the ruderal weeds. These are probably the main reasons for which *Ambrosia artemisiifolia* spread in Romania, becoming a weed encountered in the growing of corn, sunflower, beet,

tobacco, but also in recreation areas. At present, the plant is in the process of acclimatization and naturalization in our country [17, 18]. The studies developed in Banat between 1985-2000 show the rapid expansion of the species in many towns from the Banat Plain, both among the ruderal weeds and over the abandoned lands [9], moving towards the Mehedinti County and Oltenia [16]. The hypothesis by which it was claimed in 1999 that Timisoara is less polluted with ambrosia pollen than Szeged and Novi Sad, was refuted by the results of some research concluded in the year 2000 [12]. The populations of larger numbers were encountered in periurban area and the areas around the stations in Timisoara [9].

Although it may cause damages in agriculture (30 % in potatoes, 70 % beet) [5], the quality of *quarantine weed* was assigned mainly due to the fact that it represents the first source of allergy in Europe. Its pollen presents a high degree of allergic symptoms, which determines the apparition in pollinosics of allergic rhinitis – cause for the severe exacerbation of bronchial asthma which appears more often at the end of summer. The plant is indeed problematic if we consider that an individual produces more than 20g of pollen, that is more than all the other anemophilous herbaceous plants, together [12], the quantity of pollen in the air reaching 6-10 grains/m^3 [4]. For this reason, see a true danger in the spreading of *Ambrosia* – a lot of money is spent annually on the treatment of allergic people [4, 5, and 21].

Annual weeds are less competitive, but *Ambrosia artemisiifolia* is an opportunist species which benefits of biological characteristics which allow it to become an invasive species under certain circumstances. The fact that it can efficiently exploit the environmental resources and it survives some extreme plain conditions, to which it is added the great genetic and morphologic adaptability (there are many ecotypes), its germinative behaviour and the ecophysiological characteristics make it become a successful pioneer species. An individual can produce up to 60 000 seeds whose viability in the soil is of 10-35 years (according to various authors) and which have a great germination rate. It settles at the beginning of spring on agricultural fields prepared from autumn – the germination temperature being comprised within wide limits (7-28^oC) [2]. It presents a great capacity of regeneration (it manages to redevelop from the buds at the bottom of the stem after the weeding or the unnecessary chemical treatments) and a very rapid growth in the young phase [3, 5]. To all these there can also be added its alelopatic characteristics, becoming a good competitor for the culture plant. Ambrosia stands very well drought (it only loses its lower leaves), photosynthesis is quickly resumed after watering [3]. It tolerates the great ozone concentrations from the urban areas much better than other weeds, it resists quite well some herbicides (Linuron, Triazin) and concentrates lead [5], and the seeds from the ruderal regions, along the roads, can germinate even in an environment with a high degree of salinity, (the salt results from the spreading as nonskiding material) – an adaptation which allows it to germinate before other ruderal species [11]. The autochorous dissemination does not justify the great spreading of the species, humans also intervening in this (agricultural machines, railway and naval transportation etc), as well as animals (the achenes are thorny) and birds [6].

MATERIAL AND METHOD

The study of flora and vegetation from the abandoned fields was carried on during the period July 2004 – July 2005, when fallows belonging to 23 localities from the Timis County were classified [1]. The phytocoenological surveys were performed according to the methodology of the Central-European and Romanian Phytocoenological School [9], each species being given grades for quantity – spreading, according to the Braun-Blanquet scale.

The work of mapping of segetal flora was carried out in the year 2006, over the territory of 39 localities in Timis County, studying the weeding over 127 crop parcels, whose location was marked using the GPS system. Fixing the degree of weeding was realized in the

months of April, June and August, using the numerical quantitative mapping method [7], with the sample surface of 0.1m^2. Thus, on a field there were performed 10 measurements with a 33.3 x 33.3 cm frame, its sum representing the average number of weeds/m^2. The determination of species was accomplished according to [8]. Based on the data from the primary charts, each parcel was arranged a weeding chart. All the weeding charts were comprised in synthetic tables, on types of cultures, analyzing the presence and participation of *Ambrosia artemisiifolia.* At the end, there were represented, on the map of Timis County, the classified localities where the weed was encountered.

RESULTS AND DISCUSSIONS

Table no.1

Distribution of *Ambrosia artemisiifolia* in crops (Timis County, 2005 - 2006)

No.	Locality	Altitude(m)	Crop	No. plants/m^2	p%	Cover degree	Dominance
1	BEBA VECHE	88	wheat	56	13.46	-	-
2		88	sunflower	present	-	-	-
3	BEREGSĂU	85	abandon field after cereals			+	2
4	BUZIAŞ	154	soybean	present	-	-	-
5	CRUCENI	81	wheat	present	-	-	-
6	GĂTAIA	138	soybean	2	0.76	-	-
7		138	maize	present	-	-	-
8	GIERA	89	wheat	present	-	-	-
9	GIARMATA	106	wheat	34	6.22	-	-
10	GIULVĂZ	92	maize	present	-	-	-
11	GLADNA MONTANĂ	290	maize	6	1.98	-	-
12		290	potatoes	4	2.94	-	-
13	IONEL	76	wheat	present	-	-	-
14	LOVRIN	93	barley	49	26.06	-	-
15		93	wheat	19	10.05	-	-
16		121	celery	2	1.42	-	-
17		92	tomatoes	2	1.03	-	-
18		89	hemp	1	1.07	-	-
19	MARGINA	166	abandon field after maize			+	2
20	MÎTNIC	212	maize	present	-	-	-
21	OTELEC	82	wheat	1	-	-	-
22	PIŞCHIA	120	wheat	present	-	-	-
			lake	present	-	-	-
23	SÂNNICOLAU MARE		abandon field			+	1
24	SURDUC	228	abandon field after maize			4 - 5	2
25	ŞAG	88	sunflower	present	-	-	-
26	TIMIŞOARA	84	cabbage	23	8.68	-	-
27		91	potatoes	15	5.95	-	-
28		95	barley	11	7.74	-	-
29		93	sunflower	3	3.29	-	-
30		91	maize	2	1.62	-	-
31		86	wheat	1	0.34	-	-
32		97	orchard	present	-	-	-

The weed was encountered in almost all cultures: stalk cereals, potatoes, vegetables (cabbage, celery, tomatoes) corn, sunflower, soybean and orchards, on abandoned lands of 1-3 years [1] and around the accumulation Pischia (table no. 1).

In figure no. 1 it is represented the spreading of *Ambrosia* in Timis county, within 16 communal territories located at various heights (from 75 to 290 m) and on various types of soil (chernozem, marshes and grey luvisols), thus acknowledging the ecological adaptability of the species, which can vegetate on soils with a pH between 5-7.5.

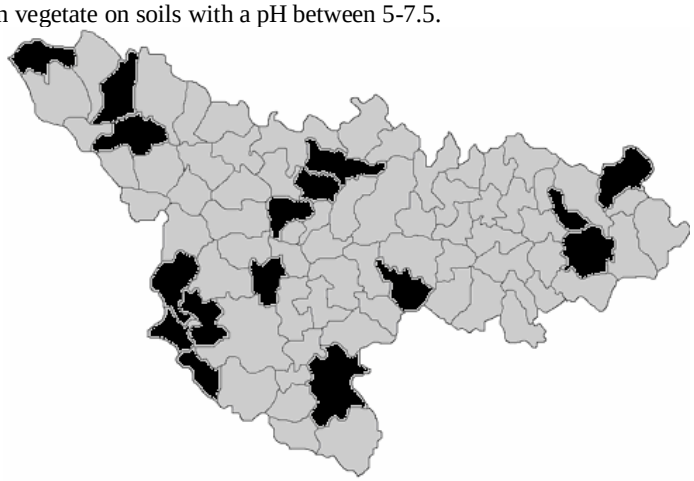

Fig. 1 The Timis County map with *Ambrosia artemisiifolia* (2005 – 2006)

Even in the areas affected by the floods of 2005, where the soil presented an excess of humidity at the time of the filing (Otelec, Ionel, Cruceni and Ghiera), it was present both in cultures and in abandoned lands along the road due to its ability to germinate on lands liable to floods. It is thus explained the fact that it can vegetate around the accumulation Pischia, occasionally resisting floods.

Most of the locations where the weed was encountered are around the border with Hungary (where it presented the greatest participation) and Serbia, thus explaining the route of the species from Europe to Romania. In the stalk cultures from these localities, it is part of the dominant weeds, together with *Setaria glauca, Chenopodium album* and *Cirsium arvense* (Lovrin) or *Echinochloa crus-galli, Polygonum persicaria, Chenopodium polyspermum* and *Xanthium strumarium* (Beba Veche).

Present in Timisoara as ruderal weed ever since 1985, it is noticed the entrance in most cultures around the city, sometimes with a participation of up to 8.68%.

Ambrosia artemisiifolia presents a spreading potential much greater than most species of dicotyledonous weeds. We thus notice the migration of the species in a record time (of a few years) towards the East of the county, whose border it has already reached (Făget, Margina, Buziaş, Gătaia), being found both in cultures and on abandoned lands. We can analyze the presence of the species at greater and greater heights (290 m), in the context of global warming [22, 23], which might present as consequence the spreading of the area of *Ambrosia* towards bigger altitudes and latitudes.

CONCLUSIONS

- In the Western Plain, the weed is a segetal and ruderal species, encountered on waste lands, fallow grounds, along roads and in the majority of cultures;
- The largest populations of *Ambrosia* are encounters in the localities towards the Hungarian border;
- *Ambrosia artemisiifolia* is a dangerous weed due to the production of a large quantity of allergenic pollen, reason for which it should be classified in Romania, too, as quarantine weeds;
- The growth of the populations of *Ambrosia* on agricultural lands is a result of the great number of abandoned lands, clearings, the lack of a ruderal weeds control, but also of the practicing over the last years of intensive agriculture on certain areas – which allows the survival of those species which endure stress, with a great ecological adaptability, a category in which the weed is found;
- Without serious intervention on a national scale in the following period, the spreading of the species shall expand also in Romania because of: intensive commerce and transportation (consequence of globalization), the practice of ecological agriculture at a larger and larger scale (which excludes the intensive control of weeds) and the increase in average global temperature (which increases the habitat of the species towards greater altitudes and latitudes);
- It is imperative the monitoring of the species all over the territory of the country, together with control measures on the cultures and the ruderal areas;
- *Ambrosia artemisiifolia* is an invasive species which, under the condition of an uncontrolled expansion, shall influence negatively the biodiversity of the segetal flora in Romania.

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