

## **Genus *Ambrosia* L. (*Asteraceae*) in Lithuania**

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ABSTRACT: Ways of immigration, distribution and possibilities of reproduction and naturalization of two quarantine weeds, *Ambrosia artemisiifolia* and *A. trifida*, in Lithuania are discussed.

KEYWORDS: *Ambrosia artemisiifolia*, *A. trifida*, immigration, distribution, quarantine weeds, Lithuania.

### **Introduction**

The genus *Ambrosia* L. contains about 30 species distributed in North and South America. In Europe the genus is represented by 5 species (HANSEN 1976). In modern literature, the origin of *A. maritima* L. is being discussed. Some authors treat it as an autochthonous plant to Europe (HANSEN 1976, TRIEST et al. 1989, etc.), whereas the others - as an immigrated one to Europe from North America during its colonization period and naturalized in the Mediterranean region (KOVALEV 1989).

Most of *Ambrosia* species are weeds of cultivated lands, but most harmful representative of the genus is *A. artemisiifolia*. It is not only a malicious weed of cultivated fields; the plant produces pollen with one of the most serious aeroallergens.

*A. artemisiifolia* and *A. trifida* are widely distributed weeds of grain crops in the North America (BASSET and CROMPTON 1975) and are naturalized in southern regions of the European and Asian Russia and in the Ukraine (NIKITIN 1983, MARYUSHKINA 1986, KOVALEV 1989). From these countries, grain and other agricultural products are imported into Lithuania, and very often seeds of the *Ambrosia* species are found among grains. So, there is a danger of their invasion into Lithuania. Both these species are included into the list of quarantine weeds of Lithuania.

## Material and methods

Field investigations were carried out in 1987-1992 on the whole territory of Lithuania. Railway stations and adjacent areas, grain mill yards, dumps and other synanthropic habitats were investigated. Over 120 specimens of the two *Ambrosia* species were collected and investigations on their immigration and reproduction were carried out. The herbarium material deposited in the Herbarium of the Institute of Botany (Vilnius, BILAS) has been studied, too. All the specimens collected by the author are deposited in BILAS.

Distribution of *Ambrosia* species in Lithuania is mapped using grid system. Squares are arranged according to geographical coordinates with sides 6' latitude and 10' longitude (i.e. 11.2 x 10.4 km in the Northern part and 11.2 x 11.0 km in the Southern part of Lithuania). The area of squares vary from 116.5 to 123.2 km<sup>2</sup>. The Lithuanian territory is divided into 597 squares. Each square has a numeric code. It is compounded from latitudinal and longitudinal twodigit codes. All localities found in the same square are marked by one point.

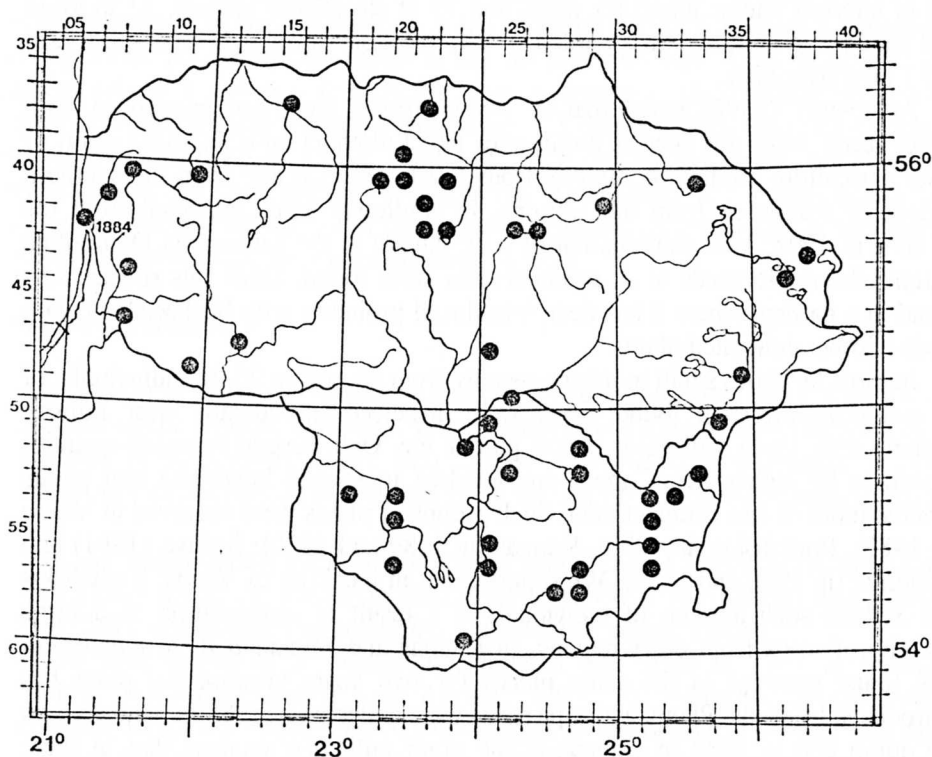
### *Ambrosia artemisiifolia* L.

*A. artemisiifolia* is native to North America and originates from the Southeast of the United States. It has spread widely in the North America as a result of land cultivation and increase of grain crops (GLEASON 1963, HANSEN 1976, KOVALEV 1989).

In Europe *A. artemisiifolia* first was found in 1846 in France (KOVALEV 1989); later - in 1863 - in Germany (HEGI 1928). Now it is known in most of the European countries and is naturalized in South and Central Europe (HANSEN 1976).

*A. artemisiifolia* was recorded in the neighbouring countries as well: in Latvia (first record in 1936) (TABAKA et al. 1988), Estonia (first record in 1954) (REMEL 1978), Byelorussia (VYNAYEV and TRETYAKOV 1979), Kaliningrad region (first it was found in 1988) (unpublished author's data) and in Poland (TACIK 1971). In all these territories *A. artemisiifolia* is known as a casual alien, except S. Poland, where it seems to be naturalized (TACIK 1971).

The first record of *A. artemisiifolia* in Lithuania was made in 1884 in Klaipėda (Memel, 1884, Abromeit) (ABROMEIT 1898). In the 20th century this species was first found in 1961 in Vilnius (Vilnius, railway station yard, on railway embankment, 3 October 1961, B. Kizienė (BILAS); later - in 1966 - in Vickšniai (Akmenė distr.). For a long time only these localities were known in Lithuania and reported in the literature (KIZIENĖ 1980). In addition, in 1963 it was found in Turmantas (Zarasai distr.), but the specimen was identified erroneously and this locality has not been mentioned until now. In 1979 this species was found in Kretinga (LEKAVIČIUS 1982).



**Fig. 1. Distribution of *Ambrosia artemisiifolia* L. in Lithuania. 1884 - the year of the first record.**

After investigations in 1987 - 1992, 85 records of *A. artemisiifolia* in 49 towns were revealed. Now this species in Lithuania is found in Alytus, Druskininkai (Varėna distr.), Dūkštas (Ignalina distr.), Gim bogala (Radviliškis distr.), Jašiūnai (Šalčininkai distr.), Jonava, Joniškis, Kaunas (railway station, Palemonas, Žemoji Freda), Kazokiškės (5 km N Vievis, Trakai distr.), Klaipėda, Kretinga, Kupiškis, Kūlpėnai (Kretinga distr.), Marijampolė, Matuizos (Varėna distr.), Meškuičiai (Šiauliai distr.), Mickūnai (Vilnius distr.), Migonys (2.5 km SW of Kruonis, Kaišiadorys distr.), Pakruojis, Panevėžys, Plungė, Radviliškis, Rokiškis, Slikiai (Kėdainiai distr.), Stasylos (Šalčininkai distr.), Šeduva (Radviliškis distr.), Šeštokai (Lazdijai distr.), Šiauliai, Šilutė, Švenčionėliai (Švenčionys distr.), Tauragė, Turmantas (Zarasai distr.), Vaidotai (Vilnius distr.), Valkininkai (Varėna distr.), Varėna, Vieکشniai (Akmenė distr.), Vievis (Trakai distr.), Vilkaviškis, Vilkyčiai (Šilutė distr.), Vilnius (Naujoji Vilnia, railway station, Kirtimai, Paneriai, Užupis), Vinčiai (Marijampolė distr.) (Fig. 1).

Among 85 records of this species, 65 have been found in railway station yards (52 in interrail and/or intertrack areas and 13 at storehouse ramps), 13 in grain mill yards, 3 in dumps, 1 in a garden, 1 at a live-stock farm, 1 in a sea-port yard and 1 on a river bank.

ABROMEIT (1898) noted that *A. artemisiifolia* has been introduced with clover seeds. Now this species immigrates into Lithuania with imported grain or other agriculture production directly from North America and from the southern regions of Russia or from the Ukraine. In sunflower seeds imported from the Ukraine in 1992, after examination of 1 kg sample at the Lithuanian Quarantine station, about 315 seeds of *A. artemisiifolia* were found. Once this species was found in a garden, where it has been introduced probably with bird-seeds or with seeds of other cultivated plants.

In most localities small numbers, usually from several to 20-30 individuals, of *A. artemisiifolia* were found. They were dispersed sporadically over railway station yards, grain mill yards, waste places, etc. Only several times its quantity proved to be higher (from about one hundred to several hundreds) and plants covered more or less compact area. Such groups of plants were observed in Vievis (in 1987), Radviliškis (in 1989), Kaunas (in 1989 and 1990), Šeduva (1991) and Mickūnai (in 1988 and 1989). We suppose that in localities of Vievis, Radviliškis and Šeduva such amount of individuals is a result of immigration of a large quantity of seeds from other regions. In Kaunas and Mickūnai *A. artemisiifolia* was found growing in the same places for two years because the plant has reproduced by seeds. Plants with ripe seeds were collected in 1988 in Mickūnai on the dump and in 1989 in Kaunas at the grain mill. We suppose that in these localities *A. artemisiifolia* reproduced itself by seeds for several years. Later on, after investigations at these localities it was not found. It is probably due to succession of vegetation.

Seeds of *A. artemisiifolia* in Lithuania germinate in May-June. Sometimes even later in summer or in autumn we can find juvenile individuals. Flowering begins in July-August or September and it is in progress till the end of the vegetative period. Plants with ripe seeds were found at the end of September.

At present, the closest area to Lithuania where *A. artemisiifolia* is naturalized is southwestern Ukraine and southern Poland (TACIK 1971; MARYUSHKINA 1986). According to SAFRA (1962) this species has an ability to naturalize up to 55° N. Further to the north its naturalization is impossible.

Investigations on experimentally cultivated *A. artemisiifolia* in Byelorussia (in surroundings of Minsk) showed that this species can give viable seeds and to become naturalized (KORZHENTZEVSAYA 1972). However, according to the references (VYNAYEV and TRETYAKOV 1979) *A. artemisiifolia* in Byelorussia is still an ephemerophyte.

In Lithuania *A. artemisiifolia* is treated now as a casual alien, but, as

mentioned above, sometimes it can reproduce. We suppose, that establishment of *A. artemisiifolia* in ruderal habitats in the southern part of Lithuania is possible. The greatest possibility to establish has an early ecotype most expansive in regions where *A. artemisiifolia* is the most widespread. These plants are lower and their flowering and fruiting begins about 1.5 month earlier than that of other forms (MARYUSHKINA 1986). Thus, it is necessary to carry out further investigations on this species immigration, distribution and reproduction in Lithuania. Quarantine control of the imported agricultural production is necessary to prevent immigration of *Ambrosia* seeds as well.

### *Ambrosia trifida* L.

*A. trifida* is native to North America. As a naturalized alien plant it grows in Czechoslovakia, France, Germany, Italy, Southeastern Russia, the Caucasus, etc. (HANSEN 1976, NIKITIN 1983). Into Europe *A. trifida* was introduced in 18<sup>th</sup> century, in Central Europe it is known since the last decade of 19<sup>th</sup> century (HEGI 1926).

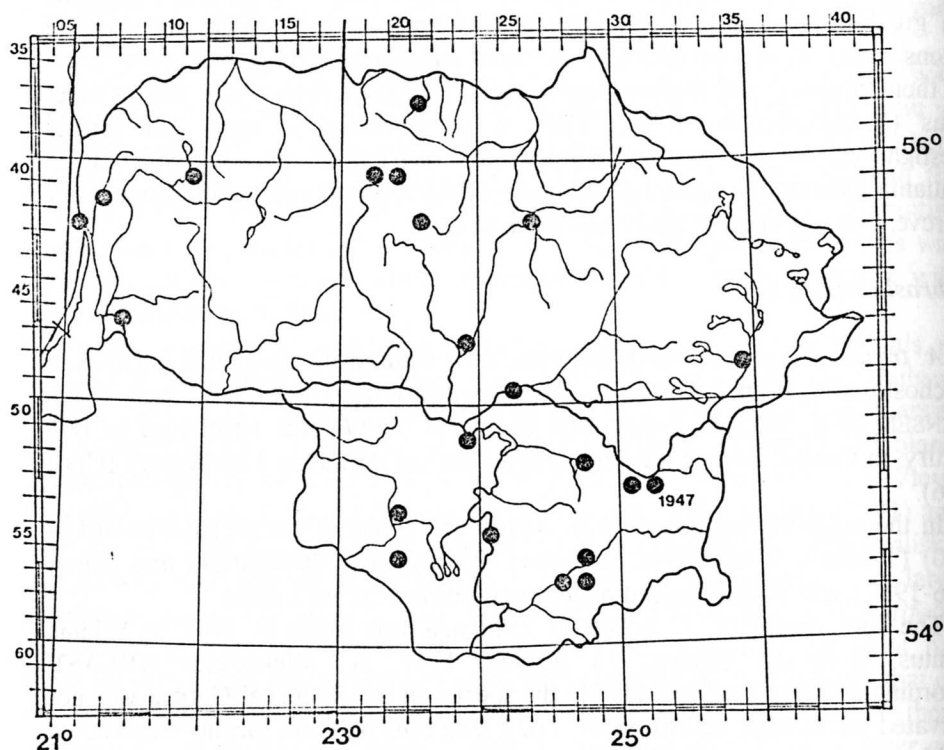
In the neighbouring countries *A. trifida* was found in Latvia (first record in 1900) (TABAKA at al. 1988), in Poland (TACIK 1971, ROSTANSKI and SOWA 1986-1987), and in Kaliningrad region (unpublished author's data).

The first record of *A. trifida* in Lithuania was made in 1947 in Vilnius (Vilnius, Botanical Garden, 18 August, 1947, A. Minkevičius (BILAS). According to NATKEVIČAITĖ (1951) the species in the Botanical Garden was not cultivated for, at least, several years. For a long time only this locality was known in Lithuania and reported in the literature (SNARSKIS 1954, KIZIENE 1980).

New records of *A. trifida* in Lithuania have been made only 40 years later (in 1987) by the author. After investigations carried out in 1987-1992, 26 records of *A. trifida* in 20 towns were revealed. Now this species is found in Alytus, Jonava, Joniškis, Kaunas, Kėdainiai, Klaipėda, Kretinga, Marijampolė, Matuizos (Varėna distr.), Panevėžys, Plungė, Radviliškis, Šeštokai (Lazdijai distr.), Šiauliai, Šilutė, Švenčionėliai (Švenčionys distr.), Valkininkai (Varėna distr.), Varėna, Vievis (Trakai distr.), Vilnius (Fig. 2).

At present, *A. trifida* occurs in Lithuania as a casual plant only in ruderal habitats closely connected with transport and processing of imported grain. Among 26 records of this species in Lithuania, 17 have been found in railway station yards (in interrail areas and at storehouse ramps), 8 in grain mill yards and 1 in Botanical garden as a weed.

In the first locality *A. trifida* was probably introduced with seeds of other cultivated plants. Now it is introduced, we suppose, with the imported North American grain (mostly with fodder maize). We had investigated several maize grain samples (2-3 kg each), collected on railways. Solitary *A. trifida* seeds were found in 2 samples (from Varėna and Vievis).



**Fig. 2. Distribution of *Ambrosia trifida* L. in Lithuania. 1947 - the year of the first record.**

In most cases a small number (1-5) of individuals was found. Rarely, mostly at grain mill yards its quantity proved to be higher (about 10 individuals), and only once at Valkininkai (Varena distr.) railway station over 50 individuals of *A. trifida* were found.

The majority of *A. trifida* plants found by the author, even in late autumn, were in vegetative or in early generative condition. Flowering plants were observed only twice: in Vilnius Botanical Garden (18 August 1947) and in Marijampolė (20 September 1992).

*A. trifida* is a naturalized plant now in sothern and southeastern Europe, the Caucasus and Asian part of Russia, and it has a tendency to distribute towards the north (NIKITIN 1983). In Lithuania this species grows as a casual alien only.

During our investigations seed reproduction of *A. trifida* was not observed; only two times it was found in flower. The climatic conditions are not favourable for its naturalization in our territory. At present it cannot spread freely without new introductions.

## Conclusions

The investigations of *A. artemisiifolia* and *A. trifida* indicate, that the present distribution of these species is a result of repeated introductions of their seeds into Lithuania. This process is most intensive during the last decade. Changes in economic relations can change frequency of these species. In spite of that these species occur as ephemerophytes in Lithuania, quarantine control of imported agriculture production and further investigations are necessary.

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