



## *Artemisia verlotiorum* (Asteraceae) in the continental part of Ukraine: now in Kyiv

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**Abstract.** Colonies of *Artemisia verlotiorum* (Asteraceae), an alien species of East Asian origin now widespread in many countries of the world, were found in 2018 in Kyiv in the Syrets Arboretum (Syretskiy Dendropark) and in a nearby abandoned plant nursery and greenhouses. At present, three clonal colonies have been revealed. Most probably rhizomes of that species were initially introduced to Kyiv with soil and/or imported trees and/or shrubs. However, one colony (along the wall of the administrative building of the arboretum) most probably emerged from seeds dispersed by wind from the main (supposedly initial) colony in the abandoned nursery. Before our find in Kyiv, *A. verlotiorum* was reliably known in Ukraine in Crimea (reported since the 1920s), Transcarpathia, and from Lviv (recent records, to be discussed in detail in a forthcoming article). Most probably *A. verlotiorum* is spreading in Eastern Europe mainly by rhizome fragments with soil and plant material. Other alien taxa of the *Artemisia vulgaris* group (especially *A. umbrosa* and *A. argyi*) occur in Ukraine mainly as "railroad" plants.

**Keywords:** alien species, *Artemisia verlotiorum*, Asteraceae, Ukraine

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**Реферат.** Колонії *Artemisia verlotiorum* (Asteraceae), виду східноазійського походження, нині натуралізованого у багатьох країнах світу, були знайдені у 2018 році в Києві у Сирецькому дендропарку, а також неподалік нього на території покинутого розплідника рослин і біля теплиць. Виявлені три клональні колонії. Найімовірніше кореневища рослин цього виду спочатку були завезені у Київ з ґрунтом або імпортованими деревами та кущами. Одна колонія (уздовж стіни адміністративної будівлі дендропарку), вірогідно, виникла з насіння, занесеного вітром з головної (ймовірно первинної) колонії у розпліднику. До нашої знахідки у Києві вид *A. verlotiorum* був достовірно відомий в Україні з Криму (наводився з 1920-х рр.), Закарпаття та Львова (дані детальніше обговорюватимуться у наступній статті). Найбільш ймовірно, що *A. verlotiorum* поширюється у Східній Європі переважно фрагментами кореневищ та/або столонів з ґрунтом і рослинним матеріалом. Інші адвентивні види групи *Artemisia vulgaris* (особливо *A. umbrosa* і *A. argyi*) трапляються в Україні переважно як "залізничні" рослини.

**Ключові слова:** чужорідні види, Україна, *Artemisia verlotiorum*, Asteraceae

### Introduction

*Artemisia verlotiorum* Lamotte (Asteraceae), a species described from Europe (see Verlot, 1875, 1876; Lamotte, 1877) but native to East Asia (China), is currently known as an alien and/or invasive species naturalized in many

regions of Europe, North and South Africa, western Asia, South America, Australia, and New Zealand (Pampanini, 1923, 1933; Brenan, 1950; Bangerter, 1978; Esler, 1987; Webb et al., 1988; Leonova, 1994; Ariza Espinar, 1997; Thompson, 2007; Ling et al., 2011; Verloove, 2013–onward; Kurşat, Civelek, 2011; Mosyakin et al., 2018, and references therein). It is

also definitely present in North America (Mosyakin, unpublished data and an article in preparation), where its cryptic invasion was totally overlooked until recently because of its confusion with Eurasian *A. vulgaris* L. s. str. (also introduced in North America), and probably also with some native North American taxa of the *A. vulgaris* group (*Artemisia* sect. *Artemisia*).

In our earlier articles (Mosyakin, 1990, 1991, 1992, 2006; Dubovik, Mosyakin, 1991; Boiko, 2009, 2012, 2013; Mosyakin et al., 2017, 2018) we already discussed various issues of distribution, morphology, taxonomy and nomenclature of *Artemisia verlotiorum*, *A. umbrosa* (Turcz. ex Besser) Turcz. ex Verlot and some other alien species of the *A. vulgaris* species aggregate occurring in Ukraine and other countries of Eastern Europe, in particular, Russia, Belarus, Lithuania, Latvia, etc.

As we already commented (Mosyakin, 1990, 2006; Mosyakin et al., 2018), many earlier records of "*A. verlotiorum*" from Eastern Europe in fact belong to other related species of the *A. vulgaris* aggregate, especially *A. umbrosa* and sometimes *A. argyi* H.Lév. & Vaniot (see discussion and references in Mosyakin et al., 2018).

The specimens of *A. verlotiorum* collected in Kyiv in 2018 (see below) are deposited in the National Herbarium of Ukraine (KW). Herbarium acronyms mentioned in the article follow Thiers (2008—onward).

### Earlier records of *Artemisia verlotiorum* in the territory of Ukraine

The first known occurrence of *A. verlotiorum* in Ukraine, and in Eastern Europe in general, was reported by Gams (1929) in the 1920s, who mentioned, although with some doubt, that he observed this species as a weed in the Nikita Botanical Garden: "... der Bearbeiter (Gams) konnte sie hier nur im Garten von Nikita auf der Krim als Unkraut feststellen" (Gams, 1929: 631). However, that record was neglected and the species has not been reported in floras and other publications covering the territory of Crimea. This record was confirmed later, first based on observations by Dubovik (see Mosyakin, 1990; Dubovik, Mosyakin, 1991) and then by Mosyakin (2006), who indicated the continued presence of *A. verlotiorum* in Nikita (Yalta area) in and near the Nikita Botanical Garden. Our analysis (by Boiko) of herbarium specimens of the Nikita Botanical Garden — National Science Center (YALT) demonstrated that the species was often collected in this area for many years, but it was misidentified as *A. vulgaris* (see Boiko, 2009). Special surveys (by Mosyakin and Boiko, before 2014) also demonstrated that *A. verlotiorum* is now widespread

in the Crimean South Coast. In particular, we registered this species in Yalta, Gurzuf, Partenit, Koreiz, where in some localities the plants formed dense and large stands (Mosyakin, 2006; Boiko, 2009). At present the species should be considered as fully naturalized in Crimea (at least in the South Coast area).

*Artemisia umbrosa* (also known under misapplied names "*A. codonocephala*" auct. non Diels, "*A. dubia*" auct. non Wall. ex Besser, and "*A. lavandulifolia*" auct. non DC.; see Mosyakin et al., 2018) is also reported in Crimea (Yena, 2005, 2012; Seregin et al., 2015), but it seems to be much rarer there than *A. verlotiorum* s. str. However, at least some (or most probably all?) records of "*A. dubia*" by Seregin et al. (2015) in fact belong to *A. verlotiorum* s. str.; in particular, the following specimens from MW: MW0628959, MW0628960, MW0628961, MW0628962 (images available from Moscow Digital Herbarium: Seregin, 2019). These specimens from Sevastopol and Balaklava correspond to records in the article by Seregin et al. (2015) and because of that the occurrence of *A. umbrosa* ("*A. dubia*" sensu auct.) in that area is in need of confirmation.

Cultivation of *A. verlotiorum* by Boiko in the Donetsk Botanical Garden of the National Academy of Sciences of Ukraine in 2005–2014 demonstrated that the plants in this region normally develop numerous vegetative shoots and under favorable conditions reach the flowering and fruiting stages. Because of that it has been suggested that further dispersal of the species in the continental part of Ukraine is quite possible (Boiko, 2009).

Probably the first mention of *A. verlotiorum* for the continental part of Ukraine was made in the editorial note to the article by Boiko (2009: 834): "*A. verlotiorum* також знайдена, за даними В.В. Протопопової, в м. Ужгороді в палісаднику біля вокзалу; в Чернівецькій обл. поряд із залізницею, поблизу кордону" ("*A. verlotiorum* was also found, according to V.V. Protopopova, in Uzhgorod in a flower bed [or small garden] near the railway station; in Chernivtsi Region near the railway not far from the [state] border"). That note was added in proof by the editorial team of the *Ukrainian Botanical Journal* following the personal communication of Prof. Vera V. Protopopova based on observations by and specimens of Protopopova and Myroslav V. Shevera (both from the M.G. Kholodny Institute of Botany). The studied specimens from Transcarpathian Region deposited in KW evidently belong to *A. verlotiorum* s. str.; however, *A. umbrosa* was also recently found in Transcarpathia by Shevera (personal communication;



Fig. 1. *Artemisia verlotiorum* along the wall of the administrative building (left) and in a lilac garden (right, young shoots), Syrets Arboretum, Kyiv (May 2018, all photographs by S. Mosyakin).

Boiko et al., article in preparation). In our opinion, the specimens from Chernivtsi Region available in KW belong to *A. umbrosa* and because of that the presence of *A. verlotiorum* s. str. in that region cannot be confirmed yet. However, considering the occurrence of the latter in adjacent countries of Eastern Central Europe, finds of *A. verlotiorum* in Chernivtsi Region cannot be excluded in the future. In addition to that, *A. verlotiorum* s. str. is now also reported from Lviv (Mamchur et al., 2017), which is also confirmed by some specimens deposited in KW. However, the morphologically similar species *A. umbrosa* is also known in Lviv Region (Kuzyarín, 2012) and because of that critical revision of specimens and records of *A. verlotiorum* and *A. umbrosa* from the western part of Ukraine is needed, and will be provided in a forthcoming article (Boiko et al., in preparation).

### ***Artemisia verlotiorum* in Kyiv**

A colony of *A. verlotiorum* was discovered in Kyiv by Mosyakin on 12 May 2018. The plants were growing in shady places in a lilac garden (syringarium) not

far from the entrance of the Syrets Arboretum (Syretskiy Dendropark, *Сирецький дендропарк*) in the northwestern part of the city. This species was not mentioned in the recent checklists of plants of the arboretum (Glukhova et al., 2016; Shynder et al., 2018).

Another clonal stand of *A. verlotiorum* was found on 28 May 2018 along the back wall of the administrative building of the arboretum (Fig. 1), where plants were growing in the cracks of asphalt (tarmac) and between the asphalt surface and the brick wall. Growing conditions of this colony suggested that it emerged not from rhizomes/stolons or rhizome fragments but from seeds brought by wind from some other nearby colony. Special surveys in the territory of a nearby abandoned plant nursery revealed a larger colony near destroyed greenhouses and along the road (Fig. 2, 3). Most probably that colony was the source of seeds that produced the two smaller colonies in the Syrets Arboretum, especially the stands along the wall (see above).

Our observations in August–October of 2018 confirmed that in climatic conditions of Kyiv (as



Fig. 2. Dense stands of *Artemisia verlotiorum* in an abandoned plant nursery near the Syrets Arboretum, Kyiv (October 2018)



Fig. 3. *Artemisia verlotiorum* growing along the road in an abandoned plant nursery near the Syrets Arboretum, Kyiv (October, 2018)

well as elsewhere within its native and introduced range) *A. verlotiorum* is a very late-flowering species, especially if compared to *A. vulgaris* s. str. The shoots of *A. verlotiorum* were rather well developed already in mid-May (see Fig. 1); however, first inflorescences were observed in the Syrets Arboretum in late August, and only in October the plants started to produce seeds. At that time the plants of *A. vulgaris* growing nearby were fully developed and already abundantly produced ripe seeds since mid-summer.

The plants were growing in ruderal plant communities together with the following common associated species: *Artemisia vulgaris*, *Ballota nigra* L. aggr. (incl. *B. ruderalis* Sw.), *Elytrigia repens* (L.) Nevsky (*Elymus repens* (L.) Gould), *Erigeron canadensis* L. (*Conyza canadensis* (L.) Cronquist), *Humulus lupulus* L., *Parthenocissus inserta* (A.Kern.) Fritsch, *Solidago canadensis* L., *Urtica dioica* L., with lesser participation of *Atriplex sagittata* Borkh., *Chelidonium majus* L., *Chenopodium album* L. aggr., *C. betaceum* Andr. (*C. strictum* auct. non Roth), *Fallopia convolvulus* (L.) Á.Löve, *Lactuca serriola* L., *Oenothera biennis* L. aggr., etc.

### Concluding remarks

The actual distribution patterns of *Artemisia verlotiorum* in Eastern Europe are obscured by earlier misidentifications because that species is morphologically similar to and so easily confused with other taxa of the *A. vulgaris* aggregate, especially *A. umbrosa*. As we discussed above, there were also some cases of misidentification of Ukrainian specimens from the continental and peninsular (Crimea) parts of the country.

We expect that *A. verlotiorum* s. str. will be found in the future in some other regions of Ukraine, especially in parks, botanical gardens, and other similar habitats to which the rhizomes of this species can be brought with soil or plant material. However, occurrence and dispersal of *A. verlotiorum* along railroads, roads, river valleys, etc., is also possible.

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