

First records of *Vincetoxicum nigrum* and *Avena byzantina* in Bulgaria

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Abstract. *Vincetoxicum nigrum*, native to Southwest Europe and spread as an alien species in other regions of the world, is recorded for the first time in Bulgaria. An established population was found along the Okolovrasten Pat Road around Sofia. *Avena byzantina* was found as a casual species, with a single individual, along the same road.

Key words: alien species, *Avena byzantina*, Bulgaria, *Vincetoxicum nigrum*

Introduction

At the age of world globalization, a wide spread of alien species resulting from human activity is an important phenomenon. Biological invasion brings about changes in the environment and biodiversity, and economic losses (e.g. Lambdon & al. 2008). Until recently, studies on alien plants in Bulgaria were quite limited. In recent years a number of new aliens, some of them potentially invasive, was discovered (Šumberova & al. 2004; Tzonev 2005, 2007; Vladimirov 2003, 2009; Grozeva 2007; Petrova & Vladimirov 2009; Vladimirov & Petrova 2009a, b), and many new data on the distribution and spread of some alien species were recorded.

In the summer of 2009, along the Okolovrasten Pat Road, *Vincetoxicum nigrum* and *Avena byzantina* were recorded for the first time for Bulgaria. The short morphological description of *V. nigrum* given here is based on Markgraf (1972), as well as on material from the Bulgarian population. Identification of *A. byzantina* is based on Rocha Afonso (1980) and Stace (1997).

Results and discussion

***Vincetoxicum nigrum* (L.) Moench.,**
Meth. Suppl. 313 (1802) (Fig. 1)
(Syn. *Asclepias nigra* L.; *Cynanchum nigrum*
(L.) Pers. non Cav.; *C. louiseae* Kartesz & Gandhi.).

A perennial, twining herbaceous vine. Stems 40–100 (150) cm, puberulent. Leaves opposite, shortly petiole, 5–7(9) × 2–4(5) cm, ovate (to wide-lanceolate), pointed, veins and margins pubescent. Inflorescences axillary, 3–10 flowered cymes, flowers with peduncles 5–10 mm. Calyx with five short, ovate lobes. Corolla dark purple-black, lobes deltoid, fleshy, with straight white hairs on the upper surface. Fruits in pairs, fusiform, smooth, 5–7 × 0.7–0.8 cm.

Vincetoxicum nigrum differs from the three native for Bulgaria species, *V. fuscatum*, *V. hirundinaria* and *V. speciosum* (Kuzmanov 1982), by the twinning habit and very dark flowers.

Distribution in Bulgaria. Sofia region: Sofia, along the Okolovrasten Pat Road (= Sofia Ring Road), near the crossing with the Cherni Vrah Blvd., 42°33'38.2" N,

23°18'22.4"E, ca. 730 m, 21.07.2009 & 14.09.2009, coll. A.S. Petrova (SOM 165338 & 165262).

General distribution. Native area includes Spain, Balearic Islands, Portugal, France, Italy (Markgraf 1972). As an alien, the species is known for the Netherlands (established) and Belgium (unestablished) in Europe (<http://www.europe-aliens.org/species-factsheet>) and for a part of the North America (USDA, NRCS 2009).

Habitat and population data. The population was found in a tree belt (of *Populus hybrida*, *Quercus pedunculata*, *Prunus cerassifera*) along the road, about 10 m wide. The belt was planted some 40 years ago. Now a second floor of shrubs (*Ligustrum vulgare*, *Lonicera* ssp. and single *Cornus sanguinea*, *Crataegus monogyna*) is formed. *Vincetoxicum nigrum* participates in this floor and most of its individuals climb on the shrubs. About 50 generative plants, with 1–4 stems each, were counted on an area of ca. 160 sq. m. A lot of small, unflow-

ering plants were also observed, both of offspring and seedling origin. During the first observation in July, only one individual was seen along the pavement and a search in the surrounding area proved unsuccessful. The rest of the population was discovered in September, when a larger area was searched and the ripe fruits were better visible from some distance. In July, the plant was with flowers and unripe fruits. The flowering season continued until mid-September, when most of the plants were dispersing seeds. Some of the unripe seedpods were damaged by insects. A rust infection was observed on the leaves (seen at Fig. 1b).

***Avena byzantina* K. Koch**, Linnaea 21: 392 (1848) (Fig. 2)

This species is similar to *A. sativa* L. and was derived from it by selection under cultivation (Rocha Afonso 1980). The differences are: breaking of the rachilla (which does not disarticulate at maturity) happens

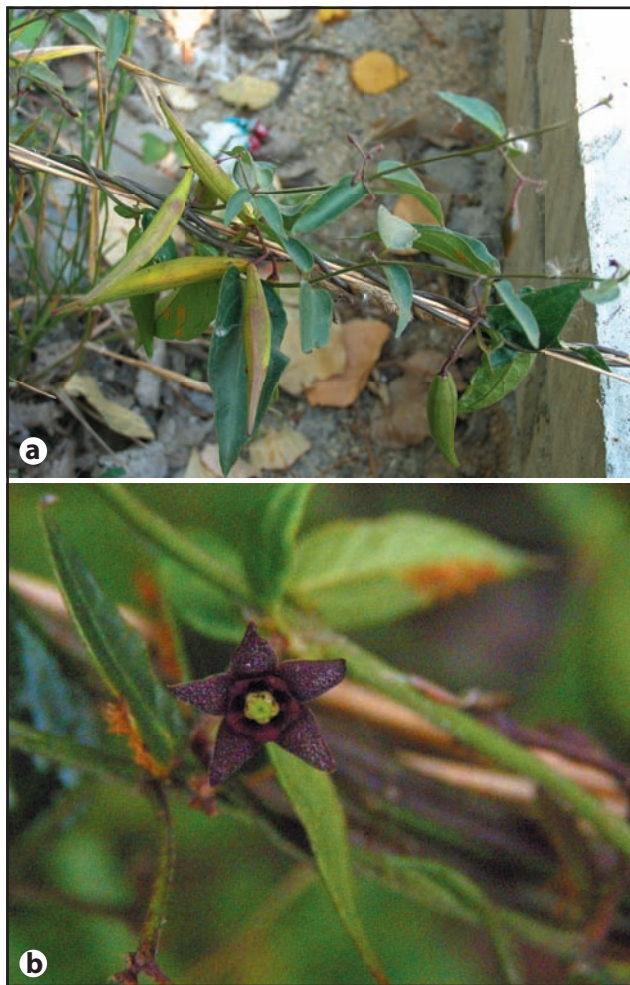


Fig. 1. *Vincetoxicum nigrum*. a – habit (July, 24-th); b – flower and rust infection on leaves (September, 9-th).



Fig. 2. *Avena byzantina* – inflorescence.

at the base of the segment below each floret (breaking immediately below each floret in *A. sativa*) and awn (when present), without a column (with a distinct column in *A. sativa*). It is occasionally cultivated as a cereal in some Mediterranean countries and is registered as alien in many countries across the world, on different continents (Clayton & al. 2006 onwards; Valdés & al. 2009).

Distribution in Bulgaria. Sofia region: Sofia, along the Okolovrasten Pat Road around Sofia (= Sofia Ring Road), between the crossroads with Simeonovsko Shose and Cherni Vrah Blvd., 42°33'12.8" N, 23°19'28.7" E, ca. 730 m, 18.11.2009, coll. A.S. Petrova (SOM 165573).

A single individual with unripe seeds was observed and collected before the autumn frosts.

Conclusion

It is difficult to decide how *V. nigrum* was introduced in Bulgaria. The Sofia Ring Road, along which the population is developed, is internationally used by an intensive traffic. The traffic is one possibility. The place is not far from the Botanical Garden of BAS (although there is no data for its cultivation in the existing documentation) and at about 500 m distance from a place where 25 years ago an experimental field of the Faculty of Pharmacy used to exist. Thus, dispersing of seeds from cultivated plants is another possibility. Irrespective of the way of introduction, data show that the observed population of the species is viable. The author's suggestion is that the species may be considered naturalized in the sense of Richardson & al. (2000).

Vincetoxicum nigrum has effective wind-dispersal of pappose seeds; its seeds are polyembryonic, an adaptation that increases the probability of seed survival and establishment (Lumer & Yost 1995). It also spreads by rhizomes and is tolerant to a range of light and moisture conditions (PCA-APWG 2010). Both in the USA and Canada it is considered invasive (Sheeley & Raynal 1996; DiTommaso & al. 2005), although less than the similar East-European *V. rossicum* (Kleopov) Barbarich. The following actions can be recommended: detailed search in a wider surrounding area for other populations and if there are no others, eradication of this population (with monitoring and repeated treatments for several years). The problem is

that there are no regulations, responsible institutions, nor mechanisms for such actions in Bulgaria.

The annual *Avena byzantina*, the single individual of which was collected before seed dispersal, has to be considered a casual for Bulgaria for the moment.

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