

## ***Dittrichia graveolens* (L.) Greuter – a new alien species in Poland**

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**Abstract:** The paper reports on a find of the invasive Mediterranean species *Dittrichia graveolens* on the S1 expressway in S Poland, which is the first record in Poland.

**Key words:** *Dittrichia graveolens*, motorways, floristics, neophyte, first record, Poland.

### **Introduction**

In the past four decades new tendencies of plant invasions connected to road transport in Central Europe have been observed. Dense motorway networks, especially in Germany, have been used by several alien species (e.g. *Senecio inaequidens*, *Atriplex micrantha*, *Dittrichia graveolens*) for their rapid spreading over long distances (Griese 1998, Brandes 2009). After successful invasion of German motorways, some of these alien species have also been invading motorways in other parts of Central Europe (cf. among others Hohla 2001, Raabe 2009, Kocián 2014). *Dittrichia graveolens*, which is now reported from Poland for the first time, is one of the best examples of such fast spreading species.

### **Materials and methods**

Mapping grids correspond to the ATPOL grid system. Capital letters indicate 100-km squares, while the numbers indicate 10-km squares (Zajac 1978). Coordinates are in WGS-84. Collected herbarium specimens are deposited in the Herbarium of the Institute of Botany, Jagiellonian University, Kraków (KRA), the Herbarium of the Department of Botany and Zoology, Faculty of Science, Masaryk University, Brno (BRNU) and the Herbarium of Muzeum Novojičínska, Nový Jičín (NJM).

### **Short description of the species and its distribution**

*Dittrichia graveolens* (L.) Greuter (Fig. 1a) is an annual, viscid, strongly aromatic, 20–50 cm tall plant. The stem is branched from the base and the longest branches grow from the middle of the stem. Leaf blades are linear to lanceolate-linear. Flower heads (Fig. 1c) are small and consist of short yellow ray flowers on the outer edge and yellow to reddish disk flowers in the centre (Brownsey *et al.* 2013, personal observation; for more detailed description, see Brullo & de Marco 2000). In Central Europe, it flowers from September to October (personal observation).

*Dittrichia graveolens* is native and widespread in the Mediterranean region extending marginally into the Western Atlantic coast of Europe and to the Middle East. It prefers cultivated land, abandoned fields, roadsides, ruderal places and other anthropic habitats (Brullo & de Marco 2000). It was introduced to the USA, South Africa, Australia and New Zealand. In Australia, it is now widespread in all southern states and it is common along railway lines in Auckland, New Zealand (Csurhes & Zhou 2008). In the USA, it has been spreading rapidly along roadsides in California (Brownsey *et al.* 2013).

To date, *Dittrichia graveolens* has been recorded as an alien invasive species in several Central European countries. It is found mainly along motorways in Germany (Radkowitzsch 2003), Switzerland (Anonymus 2015), Austria (Hohla 2001, Stöhr *et al.* 2012), Slovenia (Frajman & Kaligarič 2009), the Czech Republic (Raabe 2009, Kocián 2014) and Slovakia

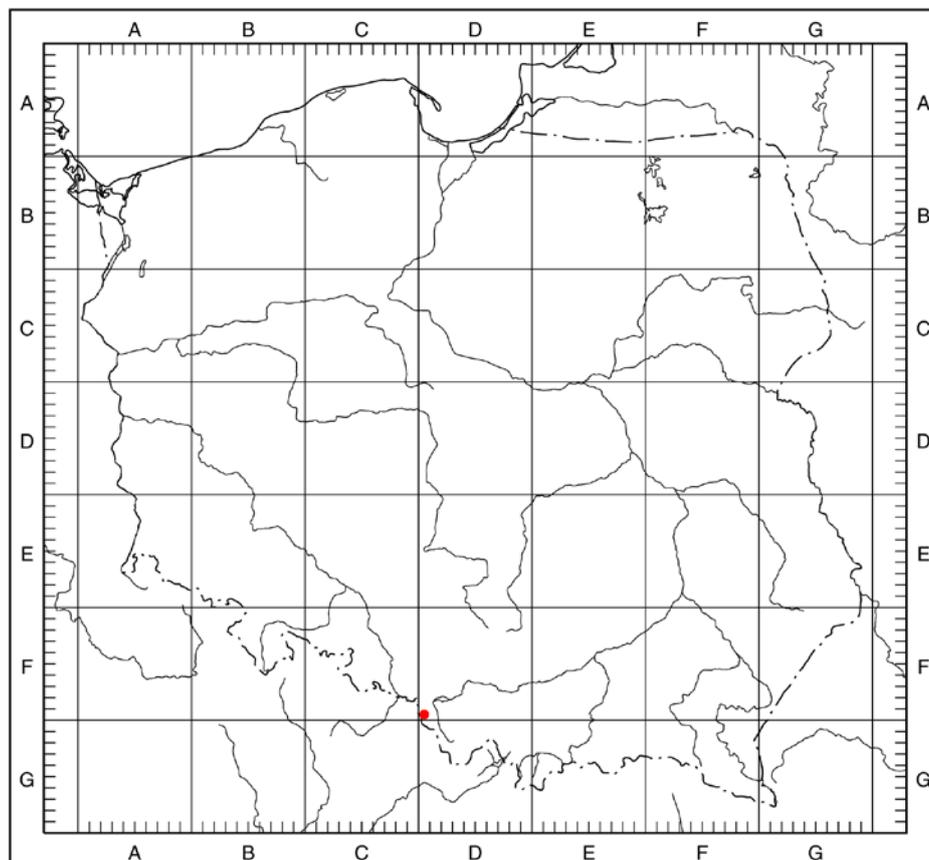


**Fig 1:** *Dittrichia graveolens*: a – plant, b – inflorescence (detail), c – flower head (detail), d – habitat, road verge on the S1 expressway in the direction of Bielsko-Biała (19. IX. 2015). Photo by Petr Kocián.

(Kocián unpubl., Király *et al.* 2014). Its invasion and long-distance spreading in Central Europe is almost exclusively connected to motorways and road transport.

### Locality in Poland

In Poland, *Dittrichia graveolens* was found on the S1 expressway between the 627.0 km and 628.0 km distance markers in the direction of Cieszyn (GPS 49°46'00.019"N, 18°42'32.180"E) not far from the village of Ogradzona (Cieszyn County) in the Silesian Voivodeship on 2. XI. 2013. Around 60 fruiting individuals were found growing along the verge of the expressway in a 100-metre long strip (leg. P. Kocián, herb. KRA, BRNU, NJM). Two years later (on 19. IX. 2015) it was confirmed on this site. Also around 200 flowering individuals were registered on the opposite side of the expressway in the direction of Bielsko-Biała along the road verge (GPS 49°46'00.084"N, 18°42'35.716"E, Fig. 1d, leg. P. Kocián, herb. KRA, BRNU, NJM) in a 150-metre long strip and around 40 individuals were registered along the central reservation (GPS 49°46'01.153"N, 18°42'38.070"E). All sites are located in ATPOL square DF-90 (Fig. 2).



**Fig 2:** Record of *Dittrichia graveolens* in Poland – red dot (in ATPOL grid system –10 km x 10 km squares).

### Discussion

*Dittrichia graveolens* is sometimes characterized in German speaking countries as a motorway plant („Autobahn-pflanze“). Some authors (Hohla 2001, Brandes 2007, Hohla & Raabe 2012) use this term for alien and some native species which use the road network and mainly road transport for their successful spreading along roads. Nowadays, *D. graveolens* is widely distributed along motorways in Germany (*cf.* among others Smettan 2002, Radkowitzsch 2003), from where it started its successful invasion into neighbouring countries at about the beginning of the millennium. In Austria, it was first recorded in 2000 on the A3 and A8 motorways (Hohla 2001) and since then numerous new localities on the main Austrian motorways have been discovered (Hohla & Melzer 2003, Stöhr *et al.* 2012). In Slovenia,

the first records were reported in 2008, but at that time it was already present on most of the Slovenian motorways (Frajman & Kaligarič 2009). In the Czech Republic, *D. graveolens* was found at several locations on the D1 motorway in 2008 (Raabe 2008, 2009). From 2012 to 2014, an in-depth survey was conducted along the motorway network in the eastern part of the Czech Republic (Moravia and Silesia), which resulted in numerous new finds. It also showed that *D. graveolens* is locally naturalized along Czech motorways and that its invasion has been very rapid and unnoticed (Kocián 2014).

*Dittrichia graveolens* had not been reported from Poland so far (*cf.* Tokarska-Guzik 2012). However due to its fast spreading ability and its invasion history in Central Europe it was immanent that it would sooner or later be introduced into Poland, either from Germany or the Czech Republic by intense road transport. It was presumably introduced to the present site on the Polish S1 expressway by road transport using the Czech R48 expressway (Frýdek-Místek to Český Těšín) which together with the Polish S1 expressway (Cieszyn to Bielsko-Biała) is part of the European E-class road E462 connecting the cities Brno and Kraków. *Dittrichia graveolens* is present in most sections of the roads making up the E462 in the Czech Republic (the D1, the R46, the R35, the I/48 and the R48; locally very abundantly). The Czech locality closest to the Polish one is just 13 km away, situated on the R48 expressway near Český Těšín. Moreover, there are several localities of *D. graveolens* on the R48 expressway, so the diaspores might have come from this nearby source. However, they could also have been transported from farther sources where the species is present (e.g. Czech motorways more inland). No other localities have been found along the S1 expressway (it was investigated only from Cieszyn to Skoczów and back), but a thorough investigation should be made.

It is also quite possible that *Dittrichia graveolens* is already present at some places along main roads (motorways or expressways) in western parts of Poland, especially near the border with Germany, because of intense road transport and the relative closeness of the German populations, and has remained unnoticed by botanists, as happened in the Czech Republic. Further spread of *D. graveolens* along main roads (motorways or expressways) especially in western and southern Poland is to be expected. According to the data from the Czech Republic (*cf.* Kocián 2014), the species is able to abridge long distances in a very short time and road transport might not be the only vector of its fast spreading. It is very likely that the rapid spreading of the species along the motorway network is also promoted by the management of the roadside vegetation (mowing).

## Conclusion

The find of the invasive “motorway plant” *Dittrichia graveolens* on the S1 expressway near Cieszyn is the first record of this species in Poland. *Dittrichia graveolens* should currently be classified as a casual in the flora of Poland, but considering its Central European invasion history so far, it might become (at least in some parts of the Polish motorway network) invasive and fast-spreading.

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