

Yellow goatsbeard *Tragopogon dubius* Scop. (Asteraceae): confirmation of its dubious occurrence in Central Slovenia

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Abstract. *Tragopogon dubius* is a species native to SW Slovenia and with several dubious records in central and eastern parts of the country. Its locus classicus is in SW Slovenia at Senožec, but there is a slight doubt about the type description as no herbarium material has been preserved. All records (and herbarium vouchers in University of Ljubljana's (LJU) collection) of the species from continental Slovenia have been critically assessed, but none of them has proved to be reliable. Three new recently discovered records linked to the railways in central and E Slovenia are presented and discussed.

Key words: *Tragopogon dubius*, Asteraceae, Slovenia

Izvleček. Velika kozja brada *Tragopogon dubius* Scop. (Asteraceae): potrditev dvomljivih navedb o uspevanju vrste v osrednji Sloveniji – *Tragopogon dubius* je v submediteranskem delu Slovenije avtohtona vrsta s peščico nezanesljivih navedb o njenem pojavljanju v osrednji in vzhodni Sloveniji. Njeno klasično nahajališče je pri Senožecah, a še vedno obstaja rahel dvom o ustreznosti imena, saj ni ohranjen Scopolijev herbarijski material. Vse starejše navedbe, skupaj s herbarijskim materialom v herbarijski zbirki Ljubljanske univerze (LJU), o pojavljanju vrste v kontinentalnem delu Slovenije so bile kritično pregledane in prav nobena izmed njih se ni pokazala kot zanesljiva. Dodane pa so tri nove nedavne najdbe ob železnici v osrednji in vzhodni Sloveniji.

Ključne besede: *Tragopogon dubius*, Asteraceae, Slovenija

Introduction

Taxa belonging to the genus *Tragopogon* are easily recognizable by grass-like leaves, big flower-heads and also huge blowballs after the fruits are ripe. For Slovenia, three yellow flowered taxa are reported, namely *T. pratensis* L. ssp. *orientalis* (L.) Čelak. as the only common widespread one and *T. tommassinii* Sch. Bip. and *T. dubius* Scop. mostly confined to the warmer parts of Slovenia under climatic influence of the Adriatic Sea (Wraber & Martinčič et al. 2007). So in the central and eastern parts of Slovenia the expected taxon in every meadow would be *T. pratensis*, but in addition to that, we have some scattered historical records of *T. dubius*, too.

T. dubius is a predominantly S European species reaching to Asia Minor to the East (Richardson 1976). In Central Europe, its occurrences are more or less casual and confined to ruderal places, as e.g. in Austria where it is specifically reported for road banks and railway dikes (Fischer 2005). In the territory of Slovenia, there is also a locus classicus of *T. dubius* around Senožeče (Scopoli 1772), the other locality mentioned by Scopoli is Trieste (Italy).

During floristic field mapping, sampling localities are chosen to get as representative sample of habitat-type diversity as possible, so besides natural or semi-natural habitat-types ruderal to completely man-made habitat types are sampled as well. Railway, when present within the mapping area, is particularly important as its traffic is a major vector of plant propagulae, frequent disturbances (trampling, herbicide use) form a specific dry ruderal habitat and especially in the area with predominantly siliceous soils of Eastern Slovenia, railway dikes offer also a niche for calcicolous species.

T. dubius was found during floristic mapping in 3 localities. The article discusses the new findings, and all the older published records of the species for Slovenian territory have been critically assessed.

Material and methods

Mapping of the flora of Slovenia follows the Central-European scheme using the so called MTB grid for stratified sampling (Niklfeld 1971). As the territory of Slovenia covers only about 20.000 km² and its geomorphology is quite diverse, a standard mapping unit is »the quadrant«, which represents one fourth of the so called base-field and covers about 35 km² in Slovenia. As the grid is based on geographical coordinates (one quadrant being 5' wide by 3' »tall«), base-fields and quadrants are tapering towards the north, but in the case of Slovenia the size of the mapping units between the extreme north and south differ only by about 2.5%, so the sampled area is well comparable among the quadrants. The quadrant grid is used also for production of standard raster distribution maps (Fig. 1).

Tragopogon dubius was recorded during field excursions in Štajerska, Posavje and Ljubljana in the summer 2013. For the preparation of the distribution map, all available data for Slovenia were compiled: published records, herbarium data after revision of material

deposited in LJU (abbreviation followed Index Herbariorum, Thiers 2013), and in addition to that partly unpublished data stored in »Flora Slovenije« database at the Centre for Cartography of Fauna and Flora (CKFF).

For determination, a wide spectrum of floristic works for Slovenia (Martinčič et al. 2007) and neighbouring countries (e.g. Fischer et al. 2005, Kubat 2002, Lauber & Wagner 1996) is used, as well as comparison with already deposited herbarium material in LJU (biggest collection in Slovenia with about 150.000 herbarium sheets).

As *T. dubius* is easily recognizable from other representatives of the genus by its distinctly inflated hollow capitula peduncle, no further determination was needed, but material was collected in the field for the herbarium vouchers, which are deposited in LJU.

Results and discussion

Among the old records of *T. dubius* for the territory of Slovenia, the majority of them are from the Submediterranean phytogeographical region (SW Slovenia with Adriatic coast and adjacent area) where *T. dubius* is native. Scattered records in other parts of Slovenia have been critically assessed and available herbarium material revised.

Oldest records are those of Maly (1864) for Celje (9757/4) and Reichardt (1860) for Dobrna (9657/3), both reported also by Hayek (1911-14) about half a century later, but never confirmed afterwards. Reichardt is known to be »inventive« in his floristic mapping, and several of his records are indeed totally beyond belief (as already clearly recognized by Pittoni 1877). After a century and a half, Reichardt's and Maly's records are of only historical value. So the record in Dobrna is definitely questionable, whereas the occurrence in Celje can be interpreted as an old and a probable one.

In the vicinity, there are three localities of *T. dubius* reported in graduation thesis of Gilčvert (1985; Breg pri Konjicah 9658/4, Špitalič pri Slovenskih Konjicah 9658/4, quadrant 9658/3). Anyway, the only herbarium voucher collected by her and deposited in LJU (Špitalič pri Slovenskih Konjicah) is a wrongly determined *T. pratensis*, so we assume that all three records of *T. dubius* reported by her are most probably erroneous.

Two easternmost localities along the Mura River (Kaligarič 1992; quadrants 9463/1 and 9463/3) are from a manuscript compilation of the E-Slovenian flora without any clear reference or known herbarium voucher, so we can recognize them as questionable. Furthermore, *T. dubius* is mentioned as a questionable taxon for Prekmurje (Bakan 2006) despite the fact that the first of the mentioned quadrants fits the discussed territory, and if the published record of Kaligarič (who was Bakan's supervisor) is reliable, the occurrence of the species would not be questionable at all.

Three localities in Central Slovenia are reported by Janežič (1983; Šenturška Gora, Cerklje na Gorenjskem 9753/1), Majdič (1973; Mrzla draga - Stanišče, Snežnik 0452/2) and student herbarium of Irena Horvat (1989; Turjak, Velike Lašče 0153/2). For a thermophilous species such as *T. dubius* the second reportedly cold locality at over 1,200 m a.s.l. is very unlikely and there is no herbarium voucher. The Šenturška Gora record is not reliable either, as the name »*T. dubius*« is mentioned

only as a host plant of a parasite producing gall, a group that was the main focus of the author. And, of course, student herbaria are generally not very reliable (cf. Jogan & Černač 1998); locality can be falsified or at least determination not very exact and, furthermore, checking of the student herbarium with 150 sheets for a score cannot be very precise either. So another three reported records can be recognized as erroneous or at least questionable.

Judging from the above assessment, the occurrence of *T. dubius* in continental Slovenia should not be very probable. In 2013, however, 3 localities of *T. dubius* were discovered during floristic mappings in some parts of continental Slovenia:

- 9954/2 Slovenija: Posavje, Litija, dry ruderal places at railway station. Leg. N. Jogan, 18. 7. 2013. [46° 3' 26.72" N, 14° 49' 19.35" E]
- 9659/2 Slovenija: Štajerska, dry ruderal places at railway station Slovenska Bistrica (together with a group of students at the Biology Students' Research Camp Rače 2013). Leg. N. Jogan, 23. 7. 2013 [46° 21' 47.86" N, 15° 35' 50.84" E]
- 9952/4 Slovenija: Ljubljana, Rožna dolina, Gregorinova, road bank not far from railway. Leg. N. Jogan, 24. 7. 2013 [46° 2' 40.41" N, 14° 28' 48.69" E]

Obviously all three newly discovered localities are linked to the railway dikes, but none of the plants grew directly on the railway, where several other ruderals such as *Ambrosia artemisiifolia* and cereals frequently occur as a result of direct spread by cereal grain or oil seeds transported in bulk. All three populations were small, having a couple of plants each, but in late July fructification was good and the blowballs with hundreds of achenes were already completely ripe and fruits spread by the wind. All three localities were dry ruderal, with weak vegetation cover and a lot of limestone stones with little soil in between. In none of the localities the occurrence of *T. dubius* could be linked directly to the railway transport, as the plants were 5 to 20 m away from the rails, but still on or near the railway dike.

As *T. dubius* has native populations in the warmer parts of Slovenia, it would not be impossible that the mentioned three populations appeared as a result of seed spread assisted by human (railway transport). But the dispersal of *Tragopogon* is indubitably assisted by wind and it is hard to imagine how such specialized diaspores would attach to some train composition.

So currently we can confirm that *T. dubius* does occur in dry ruderal places in the Prealpine and Subpannonian regions of Slovenia. It is still not clear, however, if it is only a casual there, or whether the populations will persist. Considering the global climatic changes, it is possible that *T. dubius*, too, is one of the thermophilous species widening its distribution from Southern Europe towards more continental parts.

A slight doubt also remains whether Scopoli's description of *T. dubius* really pertains to the species as recognized today, as he did not mention the inflated capitula peduncle (Fig. 1b) as the most prominent character (the only European yellow flowering species of the genus with this character; Richardson 1976). In fact, Scopoli (1772) explicitly distinguished *T. dubius* from *T. pratensis* by: 1) leaves not undulate nor their apex tendril-like, leaf base not inflated, 2) stem not branched, 3) involucre bracts longer than radial florets, and 4) capitula (not measuring involucre bracts) an inch wide. Length of involucre bracts is a character used also nowadays related to the capitula diameter, leaf structure is simply not mentioned anymore and branching of stem is variable and in both species the stem can be simple or branched. The problem is that no herbarium material collected by Scopoli has been preserved, so we must rely on distribution data, selected parts of description and the fact that only two species of the genus were mentioned by Scopoli for Carniola.

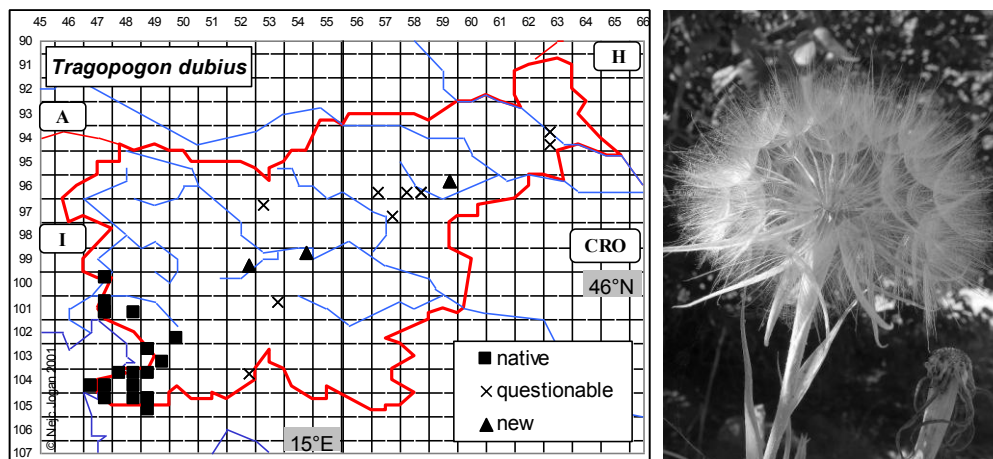


Figure 1. Left: distribution map representing native occurrence of *T. dubius* (black squares), questionable records discussed in the text (X), and three newly discovered localities (black triangle). Right: blowball with distinctly inflated peduncle in the locality at Slovenska Bistrica (foto: N. Jogan).

Slika 1. Levo: zemljevid razširjenosti *T. dubius* prikazuje naravno razširjenost (črni kvadratki), vprašljive navedbe, ki so podrobneje razložene v besedilu (x), in tri novoodkrita nahajališča (črni trikotniki). Desno: »lučka« z razločno razširjenim vrhom koškovega peclja, slikano na lokaliteti Slovenska Bistrica (foto: N. Jogan).

A neotypification of *T. dubius* is needed, but a clear relation between *T. major* Jacq., described just a year later by Jacquin (1773), with whom Scopoli was in good contacts, needs to be clarified. This is important also as a very detailed picture, which can easily serve as a type, was published by Jacquin (ibid., tabula 29), clearly depicting a plant that would currently be named *T. dubius*. Its locality is not mentioned, but the habitat type described as »ad margines sylvarum, ad vias ...« clearly shows ruderal tendency. The possibility that the description of Scopoli (1772) simply pertains to another taxon (e.g. *T. tommasinii* with distribution range covering Senožče and Trieste as loci classici mentioned by Scopoli) is still high and in this case »*T. major*« would be the oldest available name for the taxon discussed herewith.

Povzetek

Tragopogon dubius je ena od treh rumencvetočih vrst kozje brade, ki jih navajajo za Slovenijo. Sam rod je v nasprotju s številnimi drugimi radičevkami zlahka prepoznaven po »travastih« listih, enoredno nameščenih listih ovojka in orjaških »lučkah«, ki jih ob zrelosti oblikujejo rožke z dolgim kljuncem in razprostrto kodeljico peresastih laskov. *T. dubius* se pojavlja predvsem v južni Evropi in vse do Male Azije, v Sloveniji velja za avtohtono vrsto na Primorskem, kjer se pojavlja tudi na traviščih, v notranjosti Slovenije pa se zdi pojavljanje sekundarno in vezano na motena rastišča. Tri novoodkrita najdbe, ki jih obravnava članek, so bile vse vezane na železnico, vendar se same populacije niso pojavljale neposredno na progi, ampak na območju železniških nasipov, tako da je težko reči, kako se je vrsta tod pojavila. Po odkritju treh novih lokalitet so bili kritično pregledani tudi vsi starejši podatki o pojavljanju te vrste v notranjosti Slovenije in izkazalo se je, da najverjetneje ni nobene zanesljive najdbe iz preteklosti. Najstarejša podatka iz srede 19. stoletja s Štajerske imata seveda le še zgodovinsko vrednost, nikdar

kasneje ni bilo pojavljanje vrste tam potrjeno. Podatki iz okolice Slovenskih Konjic so rezultat diplomske naloge Gilčvert (1985), vendar pa je edini dokazni herbarijski primerek napačno določen, torej so vsi trije podatki nezanesljivi. Prav tako so nezanesljivi podatki iz Pomurja (Kaligarič 1992), kar posredno nakazuje tudi Bakan (2006). Nadalje je podatek s Turjaka iz študentskega herbarija in kot tak načeloma nezanesljiv, edini podatek z Gorenjske se nanaša le na gostiteljsko rastlino rastlinske šiške (Janežič 1983) in ob drugam usmerjenem poudarku raziskave prav tako ni zanesljiv, mraziščna lokaliteta pod Snežnikom (Majdič 1973) pa je že po ekoloških razmerah popolnoma neverjetna. Tako lahko sklenemo, da se obravnavana vrsta na območju osrednje Slovenije sicer zanesljivo pojavlja, vendar pa so vse stare navedbe nezanesljive ali napačne. Trenutno ni jasen status novoodkritih populacij, utegnile bi se pojavljati le prehodno, a v povezavi z globalnim spreminjanjem klime ni izključeno tudi trajno širjenje vrste v notranjost.

Še vedno pa ostaja odprto vprašanje, ali se Scopolijev (1772) opis dejansko nanaša na takson, ki mu danes pravimo *T. dubius*, saj so trije od navedenih štirih razlikovalnih znakov pri kozjih bradah znotrajvrstno variabilni, in tudi ovojek, ki po dolžini presega cvetove, se lahko pojavlja pri skupini travniške kozje brade, npr. pri *T. tommasinii*.

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