

Article

Additions and amendments in the genus *Hieracium* L. (Asteraceae) of the Ryazan and Vladimir Regions of European Russia

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Received: 18 March 2015 | Accepted by D.J. Nicholas Hind: 27 May 2015 | Published on line: 2 June 2015

Abstract

The collections of *Hieracium* from the Ryazan Region kept at MW and RSU were examined. The records of *H. murorum* s.l. or *H. gentile* from the Ryazan Region were found to belong to *H. lepidoides* (native), *H. sylvularum* (established alien, new to the Ryazan Region) and an unidentified species of *Hieracium* (alien). The records of *H. vulgatum* or *H. jaccardii* from the Ryazan Region belong to another unidentified alien species. *Hieracium lepidoides* is reported as new to the Vladimir Region, restricted to the Meshchera Lowlands. *Hieracium robustum* (new to the Ryazan Region) was found sympatric with *H. virosum*.

Keywords: alien plants, apomictic species, Cichorieae, Compositae, distribution, established aliens, Lactuceae, new records, ornamental cultivation, park introduction

Introduction

The Ryazan and Vladimir Regions of European Russia occupy a special position in Central Russia because of the Meshchera Lowlands, an extensive territory that is delimited by the Oka and Klyazma Rivers and also continues to the Moscow Region. These lowlands are still largely forested, mainly because of the extensive presence of wetlands; coniferous forests (dominated by Scots pine, *Pinus sylvestris* L.) being prevalent (Kiseleva, 1986). The flora of the Meshchera was the subject of a separate study led by Vadim N. Tikhomirov of the Moscow State University. As a direct result of these studies, two books on the flora of the Ryazan part of the Meshchera Lowlands (Tikhomirov, 1975) and the entire territory (Tikhomirov, 1986–1987) were published. These books were complemented by the revisional work on the flora of the Ryazan Region (Kazakova, 2004), the Vladimir Region (Seregin, 2012) and the Vladimir part of the Meshchera Lowlands (Seregin, 2004, 2013).

Uncommonly for treatments of Russian flora, all the books on the flora of the Meshchera have benefited from comprehensive revisions of the apomictic genera *Hieracium* L.

and *Pilosella* Hill (Asteraceae). Kiseleva and Novikov (1975, 1987) collected plants in the field and wrote a rather detailed treatment, although they declared that they accept a broader species concept because of difficulties in identification and presumed discontinuities that were reportedly observed between the species. The accounts of Kiseleva and Novikov were the basis of the relevant treatment of *Hieracium* for the Ryazan Region in Kazakova (2004). Since that treatment, some collections were revised by A.Sennikov and new records and corrections have subsequently been published (Kazakova and Lamzov, 2007; Sennikov, 2008).

Following Kiseleva and Novikov's treatment, some specimens were collected in the Vladimir Region by Ilya V. Vakhromeev and identified by Sennikov. As a result, a semi-popular treatment was published (Vakhromeev, 2002). Later, the material from the Vladimir Region was revised anew with inclusion of recent specimens collected by Alexey P. Seregin. A detailed treatment was published by Sennikov and Seregin (2012).

According to Seregin and Shcherbakov (2006), the collections of MW, RSU, OKA, and LE are the most significant representation of the flora of the Ryazan Region; minor collections from the region can be found also in MHA, MOSP, MWG and IBIW. For the present study, the specimens of *Hieracium* s. str. (excluding *Pilosella*) of LE, MHA, MW and RSU were examined. Since the apomictic taxa of *Hieracium* are very scarce in the Ryazan Region, only 16 gatherings were discovered. The greatest number of specimens is possessed by RSU (collections of M.Kazakova and, to a minor extent, of E.Gushchina), whereas the collections of MW include a few unique specimens from the early study of Skvortsov (1951) and the Meshchera expeditions by Tikhomirov and others, and also a few duplicates and other collections acquired from RSU. No specimens of *Hieracium* from the Ryazan Region were found in the other Herbaria examined, but a few duplicates have been donated later by RSU to H.

The collections of RSU, treated in respect to *Hieracium* for the first time, were the main subject of the present study. Some extra material complementing the treatment by Sennikov and Seregin (2012) had been discovered in MW and added to this study because it represented the same phytogeographical area.

Materials and methods

Herbarium collections of MW and RSU (acronyms according to Thiers, 2013) from the Ryazan and Vladimir Regions were identified and screened for new records. The records were evaluated against published sources: Sennikov (2006a) and Sennikov and Novikov (2006) for

Central Russia, with additions in Sennikov (2008) for the Ryazan Region and Sennikov and Seregin (2012) for the Vladimir Region.

Taxonomy and species circumscriptions follow Hackman and Sennikov (1998) and Sennikov (2006a); the nomenclature mostly follows Sennikov (2002a, 2003b).

Complete lists of specimens of the apomictic species of *Hieracium* that were collected in the Ryazan Region and examined for this study were entered in the GBIF-compatible database, of which Excel spreadsheets and original text files were placed in the public domain in Sennikov (2015). The records are in English and include transcripts (original and translated) of original labels, geospatial data recorded with Google Maps, and references to the publications in which the specimens were cited or treated.

New records and corrections

Hieracium jaccardii Zahn in Dörfler, Herb. Norm. Sched. Cent. 36: 186. 1898
= *Hieracium borodinianum* Üksip, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 19: 490. 1959.

Specimens examined: Central European Russia, Ryazan Region, Korablino District: Erlino, park, planted trees on the slope to a pond, 20.VI.1990, 22.VI.1990, *M.Kazakova s.n.* (RSU), 07.VI.2006, 20.VI.2006, *M.Kazakova, D.Lamzov s.n.* (RSU).

Comments: Not confirmed in the Ryazan Region.

Hieracium vulgatum Fr. was reported from Erlino in the Ryazan Region as occurring on the south-eastern limit of its native distribution (Kazakova, 2004). This occurrence is outside the continuous distribution area of the species, known to be limited on the east by the Valday Upland within the Tver Region (Sennikov, 2006a, 2006b). Kazakova's record was rejected by Sennikov (2008) as presumably referring to a form of *H. jaccardii* Zahn. However, *H. jaccardii* is also not known east of the Moscow Region (Sennikov, 2006a), being a 'western' thermophilous species in East Europe (Sennikov, 1999a). Further examination of later collections from Erlino demonstrated that the plant in question is most similar to *H. jaccardii* but clearly deviates in the shape of leaves and the pubescence of phyllaries and synflorescence branches. The Erlino plant has leaves with sparse teeth asymmetrically situated in the basal part of the lamina, sparsely covered with simple hairs up to 1 mm long on the upper surface, whereas the leaves of *H. jaccardii* have more numerous and regular dentation and are rather densely covered with simple hairs up to 0.5 mm long on the upper surface. The Erlino plant has phyllaries with abundant black-based simple hairs and synflorescence branches with unusually

abundant simple hairs, whereas the pubescence on the phyllaries of *H. jaccardii* is almost completely pale and the simple hairs on the synflorescence branches are scattered. These characters of the Erlino plant bear a superficial appearance to *H. incurrens* Norrl. (Sennikov, 2008), a native species of the boreal zone of East Europe whose distribution has its southern limit in Central Russia (Sennikov, 2006a).

The *Hieracium* locality in Erlino is situated within the former manor that was established by Peter G. Verderevsky (d. 1723). This manor was completely rebuilt at the end of the 19th century by its last private owner Sergey N. Khudekov (1837–1928) who turned the park into an arboretum (Chizhkov and Grafova, 2013). Although the houses and park decorations of the manor had been largely destroyed by “revolutionary forces” in the turmoil of 1917 and the Russian Civil War, the arboretum survived and is still preserved as a valuable botanical object (Kazakova, 2007).

Since the Erlino plant does not match any native *Hieracium* species of East Europe and is found in a historical park, we consider this locality as a relict of ornamental introduction (Hylander, 1943; Sennikov, 2006a). The precise identity of this plant remains unknown because the *H. vulgatum* s.l. complex is insufficiently studied in Central Europe (that is the presumed origin of the seed material used in East European parks).

Hieracium lepestoides (Johanss. ex Dahlst.) Brenner, Acta Soc. Fauna Fl. Fenn. 13(1): 25. 1895 = *Hieracium serratifrons* subsp. *lepestoides* Johanss. ex Dahlst., Kongl. Svenska Vetensk.-Akad. Handl. 25(3): 92. 1893.

Specimens examined: Central European Russia, Vladimir Region, Melenki District: 3 km NW of Manuylovka, birch forest, 21.VII.1976, V.Novikov, L.Volosnova Fl. Pl. Mestsch. 11647 (MW); between Ivanovskoe and Skripino, birch-aspen forest, 21.VII.1976, K.Glazunova, V.Tvorogov Fl. Pl. Mestsch. 11648 (MW). Ryazan Region, Kasimov District: 5 km NE of Kasimov, mixed forest, 19.VI.1973, V.Tikhomirov, I.Agajanian, V.Arnoldi Fl. Pl. Mestsch. 9663 (MW); 4 km SES of Gus-Zhelezny, pine forest with moss cover, 28.VI.2005, M.Kazakova, D.Lamzov s.n. (RSU); 0.3 km S of Gus-Zhelezny, spruce-pine forest, 11.VII.2014, M.Kazakova s.n. (RSU); 2 km W of Dankovo, mixed forest, 14.VI.2014, M.Kazakova s.n. (RSU).

Comments: New to the Vladimir Region.

This apomictic species is widely distributed in Fennoscandia (Samuelsson, 1954) and the boreal zone of East Europe, extending to the northern Urals eastwards (Sennikov, 2002c)

and to the hemiboreal zone of the north-western and northern parts of Central Russia southwards (Sennikov, 2006a). In Central Russia this species was known from the Valday Upland within the Tver Region (Sennikov, 2006b) and the Ryazan Region (Sennikov, 2008).

In the Ryazan Region *Hieracium lepestoides* seems to be naturally limited to the Meshchera Lowlands. The new localities reported here belong to the same narrow territory within the hemiboreal zone (Kazakova, 2004) as the only locality that was previously known (Sennikov, 2008). The localities of *H. lepestoides* in the Vladimir Region belong to the same phytogeographical region of the Meshchera Lowlands (Seregin, 2014). The isolated position of the distribution of *H. lepestoides* in the Meshchera Lowlands is surprising because of a large gap between it and the nearest sites in North-Western Russia (the Valday Upland) and Northern Russia (the species is not known from the whole north of Central Russia, i.e. the Ivanovo, Yaroslavl and Kostroma Regions: Sennikov, 2008). The distance between the localities in the Meshchera Lowlands and the other closest records of *H. lepestoides* is nearly 500 km.

The specimens of *H. lepestoides* collected by the Meshchera expeditions were identified as *H. murorum* L. s.l. (Kiseleva and Novikov, 1975, 1987) or *H. gentile* Jord. ex Boreau (Kazakova, 2004).

Hieracium lepestoides can be easily distinguished among native and introduced species of *H.* sect. *Hieracium* in Central Russia by its leaves (pale green, subovate with distantly situated narrow sharp teeth at the base, which are typically glabrous in the centre and sparsely pilose along margins of the upper side of the lamina) and phyllaries (blackish, shiny, covered with black glandular hairs without stellate pubescence on the surface, apically with a coma of abundant straight cilia).

Hieracium robustum Fr., Nova Acta Regiae Soc. Sci. Upsal. 14: 193. 1848.

Specimen examined: Central European Russia, Ryazan Region: Mikhailov District, 1.5 km SW of Zavidovka, left side of Pronya River, upper part of a steep river side, rare, 29.VII.2000, M.Kazakova s.n. (RSU).

Comments: New to the Ryazan Region.

This taxon is a hybrid between the sexual species *H. viosum* Pall. and *H. umbellatum* L. *Hieracium robustum* is variably intermediate between the parents, and this polymorphism suggests multiple origins for this hybrid in East Europe. Nevertheless, it should be treated as a single taxon because the variability of its numerous morphotypes, although they may be remarkably distinct one from another, is continuous and shows no distinct geographical pattern.

In some localities this hybrid may be of recent origin but in many instances it is no longer accompanied by one or both of its parental taxa, suggesting that the hybrid is stabilised.

According to our observations, this hybrid is present (and is expected to be) almost everywhere with the occurrence of *H. virosum*. In the Ryazan Region it was collected in the same locality as *H. virosum* but was confused with that species (Kazakova, 2004).

Hieracium robustum can be easily distinguished from the most similar *H. virosum* in its leaves (slightly glaucous, narrowly oblong with a less visible network of veins on the lower side of the lamina, with an indistinctly auriculate to rotund base, and the common presence of stellate pubescence at least on the uppermost cauline leaves; vs. prominently glaucous, broadly oblong with a prominent network of veins on the lower side of the lamina, with a distinctly auriculate base, and the complete absence of stellate pubescence even on the uppermost cauline leaves in *H. virosum*), capitula (rounded at the base, with phyllaries 8–10 mm long; vs. narrowed at the base, with phyllaries 7–8 mm long in *H. virosum*), and synflorescence branches (with stellate pubescence at the base, vs. glabrous in *H. virosum*) (Sennikov, 2008).

In Central Russia, isolated northernmost localities of *H. robustum* are situated in the Moscow Region (Sennikov, 2008) and the Ryazan Region (this study). Further south this species is found continuously in the forest steppe and steppe zones of East Europe (Sennikov, 1999b, 2008).

Hieracium sylvularum Jord. ex Boreau, Fl. Centre Fr., ed. 3, 2: 418. 1857

= *Hieracium grandidens* Dahlst., Kongl. Svenska Vetensk.-Akad. Handl. ser. 2, 25(3): 126, 129. 1893.

Specimens examined: Central European Russia, Ryazan Region: Korablino District, 3 km E of Kipchakovo, mixed forest, clearing, 09.VI.1977, *E.Gushchina s.n.* (RSU); Korablino District, E of Kipchakovo, pine forest, clearing, 13.VI.1977, *E.Gushchina s.n.* (MW, RSU); Kasimov District, near Gus-Zhelezny, sparse pine forest, 19.VI.1965, *E.Gushchina Fl. Pl. Mestsch.* 13148 (MW).

Comments: New to the Ryazan Region.

Native to Central Europe and western parts of East Europe, with the eastern limit of the distribution area in western Belorussia (Sennikov, 1999a, 2002b). This species was widely introduced as an ornamental plant to the parks of Fennoscandia, Baltic Countries and Russia (Hylander, 1943; Sennikov, 2000, 2003a; Tyler, 2004). It is the most abundant among the park species of *Hieracium*, often dominating where introduced. This species is capable of dispersing

short distances and has established locally in many places. It is considered as locally established in Sweden in several localities, being a good competitor, forming stands and having a frequent dispersal, and is assessed as invasive with a moderate impact on the native habitats and vegetation (Tyler *et al.*, 2015). In Central Russia it was assessed as established and potentially invasive (Mayorov *et al.*, 2013).

In the Ryazan Region, the occurrence of *H. sylvularum* near Kipchakovo comes from the manor of Blagodatnoe, whose last owner was Peter N. Romanov (1864–1931), Grand Duke of Russia. The manor was established at the end of the 17th century (Chizhkov and Grafova, 2013). The occurrence near the town of Gus-Zhelezny comes from the manor of Batashyov family that was established in 1780s (Chizhkov and Grafova, 2013). In both cases the plants of *H. sylvularum* were found outside the places of original cultivation, although at a distance of only very few kilometers. *Hieracium sylvularum* is to be considered an established alien in the Ryazan Region because of its persistence for at least a century, successful seed reproduction and the ability to colonize adjacent territories.

It seems that the capability of short-distance dispersal and establishing new colonies in *H. sylvularum* is much greater in Central Russia than in North-Western Russia. The first author observed only a few cases in North-Western Russia where the plants of park *Hieracium* species (usually very few) were found outside the places of original cultivation but typically not outside the limits of the former manors or historical parks; whereas in Central Russia the plants of *H. sylvularum* were frequently found established outside the former manors, though usually within a distance of about 10 km (e.g. Seregin, 2009; Sennikov and Seregin, 2012; Sennikov *et al.*, 2012).

In the Ryazan Region this alien species was formerly included in *H. murorum* s.l. (Kiseleva and Novikov, 1975, 1987) or *H. gentile* (Kazakova, 2004), and was not distinguished from the native *H. lepidoides*. Because of this confusion, this group as a whole was treated as native to the Ryazan Region outside the hemiboreal zone (Kazakova, 2004), which is phytogeographically erroneous. Besides, among the localities of *H. gentile* listed in Kazakova (2004), only one place represents a native distribution whereas the others belong to alien taxa.

The record of “*H. gentile*” from Poplevino in the Ryazhsk District (Kazakova, 2004) is another alien species but different from *H. sylvularum*. Unlike the latter, it has much broader ovate basal leaves which are rather densely covered with simple hairs up to 0.5 mm long on the upper side of the lamina (vs. oblong-ovate basal leaves which are sparsely covered with simple hairs up to 1 mm long on the upper side of the lamina in *H. sylvularum*). This specimen has not

yet been identified because of its immature state (it was collected at the end of April). The plants presumably originated from the manor of Chirkovo (Chizhkov and Grafova, 2013), at a distance of about 8 km from the recorded locality.

Hieracium virosum Pall., Reise Russ. Reich. 1: 501. 1771.

Specimens examined: Central European Russia, Ryazan Region: Mikhailov District, near Zavidovka, calcareous side of Pronya River, 01.VI.1948, A.Skvortsov 341 (MW); Miloslavskoe District, Loshaki, steppe with *Stipa*, 21.VI.2001, M.Kazakova, A.Palmarola s.n. (RSU).

Comments: Rare in the Ryazan Region.

Hieracium virosum is typical of the steppe and forest steppe zones of East Europe (Sennikov, 1999b). The locality on the Pronya River in the Ryazan Region (Skvortsov, 1951; Kazakova, 2004), confirmed earlier (Sennikov, 2008), is likely the northernmost site of this Eurasian species in the world. This is one of isolated occurrences of the steppe flora at the northern limit of its distribution in East Europe (Skvortsov, 1951). The second locality in the Ryazan Region at Loshaki (Kazakova, 2004), confirmed here, is situated further south and belongs to the area of extensive occurrence of steppe species in the upper reaches of the Don River (Skvortsov, 1951).

In the Ryazan Region *H. virosum* deserves protection at least on the Pronya River, where it occurs within the limits of the protected area ‘The valley at Zavidovka’, because of representing a complex of steppe species on the northernmost limit of distribution in a habitat that may be easily destroyed by human activities. In that locality *H. virosum* is accompanied by a number of other steppe species included in the Red Data Book of the Ryazan Region, most notably with another steppe species *Senecio erucifolius* L. that occurs in the Ryazan Region in this locality only (Kazakova and Vladykina, 2011). Because of its rarity and scattered occurrence in vulnerable habitats at the very limit of the distribution area, this species may be proposed for legal protection on the regional level with the Category 3 (rare) under the traditional Russian system of nature protection (as in Ivanchev and Kazakova, 2002).

The report of *H. virosum* in the Moscow Region (Smirnov, 1927) as occurring along the Oka River even further north than the locality on the Pronya River, was shown to refer to *H. robustum* (Sennikov, 2008). No other specimens of this group from the Moscow Region have been traced, and the occurrence of *H. virosum* in the Moscow Region is not confirmed.

Conclusions

Hemiboreal forests of Central Russia are still promising to provide new records of *Hieracium* species, especially those with boreal distributions. The level of collecting activity for *Hieracium* in Central Russia is far from adequate even in the best studied regions; the only exception is the Tver Region from which significant collections have recently become available (Sennikov, 2005, 2006b, 2009).

To date, the native *Hieracium* flora of the Ryazan Region is represented by five species, i.e. *H. arcuatidens* (Zahn ex Petunn.) Üksip (Sennikov, 2008), *H. lepidoides*, *H. robustum*, *H. umbellatum* and *H. virosum*. Of these species, only the first two are apomictic. *Hieracium arcuatidens* belongs to the Central Russian floristic element, whereas *H. lepidoides* is widely distributed in Fennoscandia and the boreal zone of European Russia. *Hieracium umbellatum* is a Eurasian species widespread in the forest and steppe zones, and *H. virosum* with its hybrid *H. robustum* are typical of the steppe zone of Eurasia. The composition of these five species is eclectic and reflects a combination of forest and steppe habitats that was observed in the Ryazan Region (Kazakova, 2004).

The native *Hieracium* flora of the Vladimir Region, which is situated north of the Ryazan Region, is even poorer, sharing the same species as in the Ryazan Region but lacking the two taxa of the steppe zone (*H. robustum*, *H. virosum*). This is because the steppe habitats and, consequently, their plant species are much less developed in the Vladimir Region (Seregin, 2014).

The identification of apomictic species has allowed for a proper distinction between native and alien occurrences of *Hieracium* species in the Ryazan Region. This distinction is important in phytogeographical analyses and conservation assessments because the native localities of the *Hieracium* taxa in the Ryazan Region are very few.

In the Ryazan and Vladimir Regions, the only native species of *H. sect. Hieracium* (*H. murorum* s.l.), *H. lepidoides* is restricted to the Meshchera Lowlands; this isolated fragment of its distribution area is rather equidistant from the limits of the main distribution area of this species in North-Western and Northern Russia. This species represents half of the localities of *H. murorum* s.l. in the Ryazan Region, and the other half belongs to alien taxa which were introduced in former manors as ornamental plants.

The hybridization between *H. umbellatum* and *H. virosum* with the formation of the hybridogamous *H. robustum* takes place also at the northernmost limit of the distribution of the latter species. Making the distinction between *H. virosum* and its hybrids is important in

conservation assessments, because *H. virosum* is very rare and endangered in its northernmost localities.

Although the main herbarium collections of European Russia (LE and MW) have good representations of Central Russia as a whole, their coverage is too poor when particular territories are concerned. This is exemplified by the concentration of the most representative collections of *Hieracium* from the Ryazan Region at RSU, whereas the collections of MW (the main Herbarium of Central Russia) are much less representative and the collections of LE (the main Herbarium of Russia) were found to contain no relevant material. Regional collections, even of relatively minor size, are often undervalued but have the best coverage at this scale and may help avoiding gross errors in circumscriptions and interpretations of distribution areas especially when the studied taxa are rare or scattered.

Acknowledgements

The curators of MW are thanked for the loan of specimens, and those of LE and MHA for the access to collections. Critical comments and linguistic corrections of two anonymous reviewers and editors are greatly appreciated.

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