

CONFIRMATION OF THE AUSTRIAN VANILLA ORCHID,
NIGRITELLA AUSTRIACA (TEPPNER & E. KLEIN) P. DELFORGE
(ORCHIDACEAE) A NEW SPECIES IN THE SLOVENIAN FLORA

POTRDITEV AVSTRIJSKE MURKE, *NIGRITELLA AUSTRIACA*
(TEPPNER & E. KLEIN) P. DELFORGE (ORCHIDACEAE), NOVE
VRSTE V FLORI SLOVENIJE

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ABSTRACT

A new orchid species, *Nigritella austriaca* was finally confirmed for Slovenia. It's recently discovered locality is on the summit of Mt. Uršlja gora (1699 m), Carinthia, N Slovenia. According to the floral morphometrics and the early flowering period of the observed orchids (compared with *N. rhellicani*), the plants examined on Uršlja gora mountain were determined to be Austrian vanilla orchid, *Nigritella austriaca*, a new species in the Slovenian flora. Austrian vanilla orchid, *Nigritella austriaca* (Teppner & E. Klein) P. Delforge is distributed across the Central and Eastern Alps, Dolomites, Jura, Central Massif and as far as the Pyrenees.

Keywords: *Nigritella austriaca*, floral morphometrics, Mt. Uršlja gora, Slovenia

IZVLEČEK

V prispevku dokazujemo prisotnost avstrijske murke (*Nigritella austriaca*) v flori Slovenije ter rastišče majhne populacije le-te na vrhu Uršlje gore (1966 m) na Koroškem. Opravili smo morfometrične analize cvetnih elementov socvetja z Uršlje gore ter dobljene vrednosti primerjali z vrednostmi morfoloških potez pri podobni vrsti - Rhellikanovi murki (*Nigritella rhellicani*). Dimenzije cvetnih elementov Rhellikanove murke povzemamo po literarnih virih, ki jih navajamo v nadaljevanju. Glede na izmerjene vrednosti in dimenzije analiziranih cvetnih elementov, obliko socvetja ter zgodnji čas cvetenja smo osebke iz populacije na Uršlji gori determinirali kot avstrijsko murko *Nigritella austriaca* (Teppner & E. Klein) P. Delforge, novo vrsto v flori Slovenije.

Ključne besede: *Nigritella austriaca*, morfometrija cvetnih elementov, Uršlja gora, Slovenija.

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INTRODUCTION

The genus *Nigritella* L.C.M. Richard (Orchidaceae) includes about a dozen species that are distributed over the mountains of Central and Southern Europe (the Alps, Apennines, Carpathians, Balkans, Pyrenees and the Cantabrian mountains) and Scandinavia (TEPPNER 1996, TEPPNER & KLEIN 1998, DELFORGE 2001, DELFORGE 2006). Only three species from the genus *Nigritella* are mentioned by RAVNIK in his survey of Slovenian vanilla orchids (RAVNIK 2002): *N. rhellicani* Teppner & E. Klein, *N. lithopolitanica* RAVNIK and *N. rubra* (Wettst.) K. Richt. More recently, occurrences of new taxa of the genus *Nigritella* in Slovenia were reported (DAKSKOBLER et al. 2012): *N. widderi* Teppner & E. Klein, *N. archiducis-joannis* Teppner & E. Klein, *N. bicolor* W. Foelsche and *N. hygrophila* W. Foelsche & Heidtke, mostly in the Julian Alps.

Nigritella austriaca (synonyms: *Gymnadenia austriaca* (Teppner & E.Klein) P. Delforge, *Gymnadenia nigra* subsp. *austriaca* (Teppner & E.Klein) Teppner & E. Klein, *Nigritella nigra* subsp. *austriaca* Teppner & E. Klein) is distributed across the Central and Eastern Alps, Dolomites Jura, Central Massif in the west as far as the Pyrenees (DELFORGE 2001 and 2006, SÁEZ 2004). Mala Flora Slovenije (JOGAN et al. 2007) briefly mention the species under the synonym *Nigritella nigra* subsp. *austriaca* (Teppner & E. Klein) - the authors mention the occurrence of this species as “possible” for Slovenia and that it is distinguished from *N. rhellicani* by the margins of the bracteae, which don't bear papillae. However, this is not always the case. Other floral morphological characteristics should also be considered. Moreover such specimens are found on Mt. Rodica (Julian Alps). DAKSKOBLER et al. (2012) - briefly discuss the occurrence of the species in Slovenia, but again using the same source (JOGAN et al. 2007), and claiming it as “possible” for Slovenia. The species is also listed in the official checklist of plant species of Triglav National Park. The photos were made by Špela Novak within the Triglav National Park (mail conversation is stored by the author), in the area called Luknja. In fact, those plants were never morphologically or genetically determined to be *Nigritella austriaca*. The species is included in the web page Slovenske orhideje

(Slovene Orchids) (www.orhideje.si, 23.12.2014) by the author Branko Dolinar. According to the Branko Dolinar the material was never morphologically or genetically determined as *Nigritella austriaca*. The species (again under the homotypic synonym *N. nigra* subsp. *austriaca*) is also mentioned in a recently published monography, Kukavičevke Slovenije (DOLINAR 2015) using this, unpublished manuscript as a source. Franc Sušnik (SUŠNIK 1955) mentions the presence of the taxon *Nigritella nigra* in his gradual thesis on the vegetation of Uršlja gora. *Nigritella nigra* var. *rosea* is the former synonym of the species *Nigritella lithopolitanica*, which is actually quite abundant on the summit of Uršlja gora. It's unclear whether the author was writing about *Nigritella lithopolitanica* or, maybe, even about *Nigritella austriaca* in his thesis. According to botanists actively involved in research into the genus *Nigritella* (*Gymnadenia*) in Slovenia, all the material being attributed to *Nigritella austriaca* that has been morphologically (or genetically) analysed in Slovenia to date belongs to the species *Nigritella rhellicani*. From above, it can be concluded, that no published morphological (or any other) data from Slovenia for the taxon *N. austriaca* exist, that could prove the determination and existence of this species in any specific locality. So, contrary to expectations, *Nigritella austriaca* has not yet been confirmed for Slovenia.

Mt. Uršlja Gora (1699 m) represents the eastern calcareous outpost of the Karavanke mountain range (Map 1). The origin of the tree line (natural or anthropogenic), restricted to the summit area, was already a source of speculations in the past (GAMS 1976). The tree line was lowered in the past, owing to pasture activities in the summit area, but it has been gaining altitude since the change in traditional alpine extensive agriculture and the abandonment of pastures. According to WRABER 1959, the association *Adenostylo glabrae-Piceetum* var. *geogr. Cardamine trifolia* forms the natural vegetation of the summit area above 1500 m. The soil substrate on the summit area of Uršlja gora is acidic; meadows preserved by people for centuries have turned into tall herb overgrown areas.

METHODS

The area near the summit of Mt. Uršlja gora was surveyed during June 2014 in order to study the ecology of *Nigritella lithopolitanica*, which is abundant in the area.

However, two unusually deep red flowering specimens were found within the population of *N. lithopolitanica* (Fig. 1). After a closer inspection of the summit area, 11

additional plants were found among the numerous flowering *Nigritella lithopolitanica* specimens. Because of the very low number of deep red flowering specimens, only two inflorescences were taken from the locality for further analysis on 27 June 2014. We compared the floral morphometrics of the flowers taken from the field with similar taxa- we particularly focused on the differences between the morphologically and physiognomically closely related taxa, *N. rhellicani* and *N. austriaca*, which resembled the deep red specimens from Mt. Uršlja gora. Floral traits (macro-morphology) were examined on flowers from the basal 1/3 of the inflorescence and studied under the binocular stereoscopic microscope Nikon SMZ 1000 (8-80 x). NIS Elements D 4.2 software was used for the measurements.

The measured floral dimensions of the *Nigritella austriaca* from Mt. Uršlja gora (27 flowers analysed)

were compared with the macro-morphological traits of *N. rhellicani* but also with *N. austriaca*, for both obtained from the literature available: BRÜTSCH 2000, FOELSCH 2011, 2012 and 2014, KLEIN & DRESCHER 1996, TEPPNER 1990 and 2002, DELFORGE 2001 and 2006, WUCHERPFENNIG 1999, TIMPE & MRKVICKA 1991, SÁEZ 2004 and HEDRÉN 2000. In the determination of vascular plants, we followed MARTINČIČ et al. 2007. The occurrence of denticles in the margin of the lowermost bracts of the inflorescence (a characteristic that should be used with caution!), the length of the labellum, sepals, petals and spur, the colour of the flowers and the shape of the inflorescence were used as diagnostic characteristics to distinguish between *Nigritella austriaca* and *Nigritella rhellicani*, both taxa yet unknown in the area being studied.

RESULTS

In the close vicinity of the *Nigritella austriaca* specimens, on the summit of Mt. Uršlja gora, the following plant taxa were recorded: *Arnica montana*, *Aster alpinum*, *Botrychium lunaria*, *Briza media*, *Calluna vulga-*

ris, *Campanula barbata*, *Carlina acaulis*, *Coeloglossum viride*, *Cruciata glabra*, *Dactylorhiza fuchsii*, *Daphne mezereum*, *Geum rivale*, *Gymnadenia conopsea*, *Hieracium aurantiacum*, *Listera ovata*, *Lotus corniculatus*,



Map 1. Geographic position of Slovenia in Europe and the location of Mt. Uršlja gora, locality of *Nigritella austriaca* (Teppner & Klein) P. Delforge.

Karta 1. Geografski položaj Slovenije v Evropi in lokacija populacije avstrijske murke *Nigritella austriaca* (Teppner & Klein) P. Delforge na Uršlji gori.

Nigritella lithopolitanica, *Phyteuma orbiculare*, *Pinus mugo*, *Plantago media*, *Poa alpina*, *Polygala alpestris*, *Polygonum viviparum*, *Potentilla erecta*, *Rhododendron hirsutum*, *Tofieldia calyculata*, *Traunsteinera globosa*, *Trifolium montanum*, *Trollius europaeus*, *Veratrum album*, *Vaccinium myrtillus* and *Vaccinium vitis-idaea*.

Plant height of the 13 Austrian vanilla orchid specimens (measured in the field) varies between 11 and 17 cm (average 14.4 cm). The inflorescence of all specimens (observed in the field) was (hemi) spherical, even in the later stages of flowering (Figure 1B), obviously wider than long, with relatively large, wide-open, deep reddish flowers. Floral elements were closely analysed (from the lower 1/3 of the inflorescences, 27 flowers). The labellum was distinctly open, slightly narrow in its basal third, 7.5-8.7 mm long, (average 8.1 mm), 5.0- 5.5 mm wide (average 5.1 mm), sepals 7.5-8.1 mm (average 7.8 mm), petals 6.7-8.0 mm (average 6.8 mm), only slightly shorter and narrower than sepals. The spur was rather short: 0.8-1.2 mm (average 1.1 mm). On av-

erage, all the floral traits measured (except the spur) are longer than those mentioned in the literature in the case of *N. rhellicani* (Table 1). Closer inspection of the bracts revealed no denticles (marginal epidermal cells elongated to cylindrical papillae). The lowermost bracts of the inflorescence were without papillae (which are typical of *N. rhellicani*), and smooth or sometimes with only some marginal epidermal cells somewhat elongated in the margin of the lowermost bracts. Because of the colour, the dimensions of the measured floral elements (especially the length of the labellum, sepals and petals), which are longer on average (and wider) in the case of *N. austriaca* (compared to *N. rhellicani*), and owing to the different shape of the inflorescence, this taxon exhibits characteristics different from those of *N. rhellicani* even in the field. Thus, based on a close comparison of the studied plant material, we conclude that the deep red flowered vanilla orchid specimens from Mt. Uršlja gora do belong to *Nigritella austriaca*.

Table 1 gives the most typical morphometric differences (some of them easily observable even in the field) between *N. austriaca* and *N. rhellicani*, differences that are crucial in our opinion:

	<i>Nigritella austriaca</i>	<i>Nigritella austriaca</i> , Mt. Uršlja gora	<i>Nigritella rhellicani</i>
Flowering time	VI-VIII, at the same time as <i>Nigritella rubra</i> in the same habitat	Specimens were observed in full bloom on 27.6.2014. So the flowering started at least a week earlier. The same flowering phenophase as <i>Nigritella lithopolitanica</i>	VI-VIII, at least 7-10 days later than <i>Nigritella austriaca</i> in the same habitat
Inflorescence shape	Hemi- spherical, even in later stages of flowering obviously wider than long	Hemi- spherical, even in later stages of flowering obviously wider than long	At first conical, becoming sub-cylindrical at the end of flowering (longer than wide)
Colour	Flowers deep reddish (rarely brown) to brownish purple	Flowers deep reddish	Flowers dark reddish brown (very rarely red) to brownish (almost black), pink, yellowish, orange or white
Floral dimensions	Large flowers, Labellum length: (6.9-)7.5-9.8 mm Sepals: 6.3- 8.4 (-9.4) mm Petals: 6.0- 7.5 (-8.2) mm	Large flowers, Labellum length: 7.5- 8.7 mm Sepals: 7.5- 8.1 mm Petals: 6.7- 8.0 mm	Small flowers, Labellum length: (4.5-) 5.0-7.7 mm Sepals: (3.8-) 4.2 (-7.4) mm Petals: (3.5-) 4.0- 5.6 (-6.1) mm
Bracts	Bracts glabrous or rarely the 1-5 lower bracts slightly papillose (about 10% of them)	Bracts without papillae and smooth or sometimes with only some marginal epidermal cells somewhat elongated in the margin of the lowermost bracts	Lower bracts about equaling flowers, with papillae (up to 0.1 mm long) on edges

Spur length	0.9-1.3 mm	0.8-1.2 mm	1.1-1.7 mm
Reproduction	apomictic		sexual
Ploidy level	2n=4x=80		2n=2x=40
Distribution	Alps, Jura, Central Massif and the Pyrenees	The summit area of Mt. Uršlja gora	Alps, Jura, Balkans

Tab. 1. Floral macro- morphometric and other differences between *Nigritella austriaca* and *Nigritella rhellicani*.
Tabela 1. Makro- morfometrične in druge razlike med vrstama *Nigritella austriaca* in *Nigritella rhellicani*.

DISCUSSION AND CONCLUSIONS

The potential for occurrence of *Nigritella austriaca* in Slovenia had already been the subject of speculation in the past (JOGAN 2007, DAKSKOBLER et al. 2012). The recently discovered locality on the summit of Mt. Uršlja gora in Carinthia represents the first published record for Slovenia, supported with the morphometric measurements. The location of a small population on

the summit of Mt. Uršlja gora is possibly one of the south-easternmost in the species' range. The locality is threatened by the rapid succession of herbaceous perennials and *Pinus mugo*. Because of the poorly known distribution in Slovenia, this taxon definitely belongs to our Red List as a vulnerable taxon (V). The reason for this lack of data for Slovenia is mainly due to mor-



Fig. 1. *Nigritella austriaca* (Teppner & Klein) P. Delforge. A – habitus, B – inflorescence, C– habitat (photos by Igor Paušič, Mt. Uršlja gora, 27.6.2014).

Fotografija 1. Avstrijska murka, *Nigritella austriaca* (Teppner & Klein) P. Delforge. A- habitus, B- socvetje, C-habitat. (Igor Paušič, Uršlja gora, 27.6.2014)

phological similarity with the *N. rhellicani*, which is, especially in the Julian Alps and the western Karavanke mountain range, quite abundant, but which becomes extremely rare in the eastern part of the Karavanke mountain range (Mt. Košuta being its easternmost known limit in Slovenia). Closer inspection of the inflorescence and floral elements, on the other hand, reveals quite sufficient and reliable morphometrical dissimilarities between these two taxa. The occurrence of this taxon in Slovenia is not surprising, and it is likely to have more localities elsewhere in the northern

Slovenian territory. Specimens of *N. austriaca* on Mt. Uršlja gora flower at least 7-10 days before *N. rhellicani* on its closest known locality on the slopes of Mt. Košuta in Karavanke. The closest known *N. austriaca* locality lies on the slopes of Mt. Obir (Hochobir, Austria, Carinthia). The determination key for the Slovenian taxa from the genus *Nigritella* (JOGAN 2007) is not sufficiently sophisticated or up-to-date and must be upgraded in its next edition, especially since new taxa have been described for the Slovenian territory, including *Nigritella austriaca*.

POVZETEK

5.1 Uvod

Rod *Nigritella* L. C. M. Richard (Orchidaceae) obsega približno ducat vrst in podvrst (TEPPNER 1996, TEPPNER & KLEIN 1998). Vsi taksoni se pojavljajo v montanskem in alpskem pasu v gorovjih Srednje in Južne Evrope (Alpe, Apenini, Karpati, Pireneji, Kantabrija) ter v Skandinaviji (TEPPNER 1996, TEPPNER & KLEIN 1998, DELFORGE 2001, DELFORGE 2006). Ravnik (RAVNIK 2002) navaja v svoji monografiji Kukavičevke Slovenije za območje Slovenije le tri vrste iz roda *Nigritella*: *N. rhellicani* Teppner & E. Klein, *N. lithopolitana* Ravnik in *N. rubra* (Wettst.) K. Richt. V zadnjih letih dokazujejo avtorji pojavljanje novih vrst iz rodu *Nigritella* na območju Slovenije (DAKSKOBLER s sod. 2012): *N. widderi* Teppner & E. Klein, *N. archiducis-joannis* Teppner & E. Klein, *N. bicolor* W. Foelsche in *N. hygrophila* W. Foelsche & Heidtke, večinoma na območju Julijskih Alp.

Areal razširjenosti avstrijske murke - *Nigritella austriaca* (sinonimi: *Gymnadenia austriaca* (Teppner & E. Klein) P. Delforge, *Gymnadenia nigra* subsp. *austriaca* (Teppner & E. Klein) Teppner & E. Klein, *Nigritella nigra* subsp. *austriaca* Teppner & E. Klein) - obsega Osrednje in Vzhodne Alpe in Dolomite. Vrsto srečamo v Juri in Centralnem masivu. Na vzhod pa sega areal razširjenosti vrste do Pirenejev (DELFORGE 2001 in 2006, SÁEZ 2004). Mala flora Slovenije (JOGAN s sod. 2007) omenja vrsto s sinonimom *Nigritella nigra* subsp. *austriaca* (Teppner & E. Klein). Navaja tudi možno oz. verjetno pojavljanje te vrste v Sloveniji. Po Mali flori Slovenije (2007) se avstrijska murka razlikuje od Rhellikanove murke po robovih spodnjih braktej, ki niso papilozne (upoštevanje tega znaka kot dominantnega kriterija je pomanjkljivo, glede na dejstvo, da lahko opazujemo redke primerke Rhellikanove murke, pri katerih rob braktej ni izrazito papilozen). Tako je po-

trebno pri zanesljivi morfološki/morfometrični determinaciji avstrijske murke upoštevati še druge znake cvetov in socvetja kot celote. DAKSKOBLER s sod. (2012) prav tako omenja vrsto ter njeno "verjetno" pojavljanje na območju Slovenije, a se ponovno sklicuje na isti vir (JOGAN s sod. 2007). Vrsta je navedena v seznamu vrst Triglavskega narodnega parka. Avtorica fotografij je Špela Novak, ki je avstrijski murki podobne rastline fotografirala na območju Luknje v Triglavovi skupini. Za fotografirane primerke pa ni nobenih morfometričnih podatkov, tudi genetskih raziskav ne, ki bi lahko potrdile prisotnost avstrijske murke v visokogorju v bližini Triglava oz. Slovenije. Tudi na spletni strani Slovenske orhideje (www.orhideje.si, 23.12.2014) avtorja Braneta Dolinarja je vrsta navedena. Avtor tudi teh fotografiranih primerkov v preteklosti ni nikoli morfometrično ovrednotil ali poslal delov rastlin na genetske raziskave. Vrsta (avtor je uporabil sinonim *N. nigra* subsp. *austriaca*) je vključena v monografijo Kukavičevke Slovenije (DOLINAR 2015), kjer avtor za lokacijo rastišča navaja tudi Uršljo goro, nanašajoč se na ta, takrat še ne objavljen rokopis. Franc Sušnik (SUŠNIK 1955) omenja v svojem diplomskem delu o vegetaciji in flori Uršlje gore tudi takson *Nigritella nigra*. *Nigritella nigra* var. *rosea* je star sinonim za kamniško murko (*Nigritella lithopolitana*), ki je danes pogosta na ovršnem predelu Uršlje gore. Ni povsem jasno, ali je avtor v svojem delu navajal prisotnost vrste *Nigritella lithopolitana* ali pa je morda res naletel na avstrijsko murko. Strnemo lahko, da pripadajo primerki, ki so jih nekateri avtorji v preteklosti uvrščali oz. poimenovali avstrijska murka, v resnici vrsti Rhellikanova murka (*Nigritella rhellicani*), ki je na prvi pogled avstrijski murki sicer res zelo podobna. Tako nimamo nobenih morfometričnih ali pa genetskih dokazov o obstoju avstrijske murke na območju Slovenije do sedaj, torej obstoj vrste v Sloveniji še ni bil potrjen.

Geološko predstavlja Uršlja gora (1699 m) enega najbolj vzhodno ležečih apnenčastih osamelcev, odrastkov Karavank (karta 1). O pojavu gozdne meje na samem vrhu gore (naravna ali pa antropogena) je bilo v preteklosti že veliko napisanega (GAMS 1976). Gozdna meja je segala v preteklosti precej nižje kot danes, kar je bilo posledica paše na ovršnem predelu gore. Danes se travišča na vrhu gore spet zaraščajo, predvsem zaradi odsotnosti paše ali redne košnje. Na vrhu Uršlje gore se pojavlja združba *Adenostylo glabrae* - *Piceetum* var. geogr. *Cardamine trifolia* (WRABER 1959) in predstavlja naravno obliko vegetacije vrha gore nad sklenjenim območjem gozda (nad 1500 m). Prsti na vrhu so kisle, travnike in pašnike, ki so bili v preteklosti aktivni, danes zarašča rušje (*Pinus mugo*) in zelne trajnice.

5.2 Metode

Na vrhu Uršlje gore smo junija 2014 analizirali ekološke značilnosti rastišča kamniške murke (*Nigritella lithopolitanica*), katere populacija je na Uršlji gori številčna. Pozorni smo postali na dva škrlatno rdeča primerka (fotografija 1). Po natančnejšem pregledu območja vrha smo zabeležili še dodatnih 11 škrlatno rdečih primerkov murke, skupno torej trinajst. 27. 6. 2014 smo odvzeli dve kompletni socvetji. Primerjali smo morfometrične vrednosti izbranih cvetnih elementov z vrednostmi, ki jih literatura navaja za vrsti *N. rhellicani* in *N. austriaca*. Na oddelku za biologijo FNM UM smo opravili morfometrijo cvetnih elementov 27 cvetov iz spodnje tretjine socvetja. Meritve smo opravili z uporabo stereolupe Nikon SMZ 1000 (8-80 x) ter programskega paketa NIS Elements D 4.2.

Primerjali smo nekatere morfometrične vrednosti cvetnih elementov avstrijske murke z Uršlje gore (27 cvetov) z znanimi vrednostmi, ki jih literatura podaja za avstrijsko in Rhelikanovo murko: BRÜTSCH 2000, FOELSCH 2011 in 2012, KLEIN & DRESCHER 1996, TEPPNER 1990 in 2002, DELFORGE 2001 in 2006, WUCHERPFENNIG 1999, TIMPE & MRKVICKA 1991, SÁEZ 2004 in HEDRÉN 2000. Prisotnost obeh zgoraj omenjenih vrst na Uršlji gori do sedaj še ni bila potrjena. Nomenklaturu višjih rastlin na rastišču na vrhu Uršlje gore povzemamo po Mali flori Slovenije (Martinčič s sod. 2007). Med pomembnimi diagnostičnimi, razlikovalnimi znaki med vrstama *N. austriaca* in *N. rhellicani* smo obravnavali: odsotnost papil na robovih braktej, dolžino medene ustne, dolžino sepalov, dolžino petalov ter dolžino ostroge, barvo cvetov ter obliko socvetij - pri primerkih v poznih stadijih cvetenja.

5.3 Rezultati

V neposredni okolici primerkov avstrijske murke na ovršnem delu Uršlje gore smo zabeležili naslednje rastlinske vrste: *Arnica montana*, *Aster alpinum*, *Botrychium lunaria*, *Briza media*, *Calluna vulgaris*, *Campanula barbata*, *Carlina acaulis*, *Coeloglossum viride*, *Cruciata glabra*, *Dactylorhiza fuchsii*, *Daphne mezereum*, *Geum rivale*, *Gymnadenia conopsea*, *Hieracium aurantiacum*, *Listera ovata*, *Lotus corniculatus*, *Nigritella lithopolitanica*, *Phyteuma orbiculare*, *Pinus mugo*, *Plantago media*, *Poa alpina*, *Polygala alpestris*, *Polygonum viviparum*, *Potentilla erecta*, *Rhododendron hirsutum*, *Tofieldia calyculata*, *Traunsteinera globosa*, *Trifolium montanum*, *Trollius europaeus*, *Veratrum album*, *Vaccinium myrtillus* and *Vaccinium vitis-idaea*.

Na terenu samem smo izmerili višino socvetij vseh 13 primerkov, ki variira med 11 in 17 cm (povprečna višina znaša 14.4 cm). Vsi primerki (opazovani v poznih stadijih cvetenja) so imeli izrazito poloblata socvetja, širša kot pa visoka (fotografija 1B). Cvetovi vseh primerkov so bili škrlatno rdeče barve s široko razprtimi cvetnimi elementi. Analizirali smo dolžino cvetnih elementov: sepalov, petalov, medene ustne ter ostroge na spodnji tretjini dveh socvetij (27 cvetov). Lateralna robova medene ustne sta bila široko razprta. Medena ustna je bila rahlo zožena na spodnji (distalni) tretjini, 7.5-8.7 mm dolga (povprečje znaša 8.1 mm) in 5.0-5.5 mm široka (povprečje znaša 5.1 mm). Sepali merijo v dolžino 7.5-8.1 mm (povprečje znaša 7.8 mm), petali 6.7-8.0 mm (povprečje znaša 6.8 mm). Petalni listi so v povprečju le nekoliko krajši in ožji od sepalnih. Ostroga analiziranih cvetov je bila kratka, 0.8-1.2 mm dolga (povprečje znaša 1.1 mm). V povprečju so bile izmerjene vrednosti vseh opazovanih cvetnih elementov (z izjemo ostroge) večje, kot jih literatura navaja za vrsto *Nigritella rhellicani*, ter ustrezajo dimenzijam, ki jih literatura navaja za vrsto *Nigritella austriaca* (tabela 1). Opazovali smo rob braktej, ki v nobenem primeru ni bil papilozen. Zaradi izmerjenih vrednosti analiziranih cvetnih elementov, škrlatno rdeče barve cvetov ter poloblaste oblike socvetij v poznih fazah cvetenja in braktej brez izrazitih papil na robovih ugotavljamo, da pripada populacija škrlatno rdečih murk z vrha Uršlje gore vrsti avstrijska murka (*Nigritella austriaca*).

Tabela 1 prikazuje najpomembnejše morfometrične razlike (nekatero od njih lahko brez težav spremljamo na terenu samem) med vrstama *Nigritella austriaca* ter *Nigritella rhellicani*. Prav tako so podane izmerjene vrednosti spremljanih znakov pri dveh socvetjih z Uršlje gore.

5.4 Razprava in zaključki

Potencialna prisotnost avstrijske murke v slovenski flori je bila v preteklosti že predmet razprav (JOGAN 2007, DAKSKOBLER s sod. 2012). Pričujoč prispevek je prvi, ki s pomočjo morfometrije cvetnih elementov dokazuje prisotnost taksona na območju Slovenije, na vrhu Uršlje gore na Koroškem. Majhna populacija avstrijske murke na Uršlji gori se po do sedaj znanem pojavljanju nahaja na skrajno jugovzhodnem delu celotnega areala razširjenosti te vrste. Širše območje je, predvsem zaradi odsotnosti paše, podvrženo hitri sukcesiji, zaraščanju z zelnatimi trajnicami in grmovnimi vrstami, predvsem z rušjem (*Pinus mugo*). Zaradi majhnega števila opaženih primerkov na Uršlji gori ter predvsem zaradi do sedaj edinega potrjenega rastišča omenjene vrste sodi avstrijska murka nedvomno na naš Rdeči seznam kot ranljiva vrsta (V). Razlog za pomanjkanje podatkov o prisotno-

sti vrste v našem alpskem svetu je tudi velika morfološka podobnost z Rhellikanovo murko (*Nigritella rhellikani*), ki je zlasti v Julijskih Alpah in zahodnih Karavankah relativno pogosta, a redka v vzhodnem delu Karavank (najbolj vzhodno se vrsta po danes znanih podatkih pojavlja na Košuti). Po drugi strani pa ob natančnem morfološkem pregledu lahko obe vrsti, ki ju v prispevku primerjamo, relativno enostavno ločimo. Pojavljanje avstrijske murke na območju Slovenije je bilo pričakovano, morda ima vrsta drugod v našem visokogorju celo še več rastišč. Primerki avstrijske murke cvetijo na Uršlji gori približno 7-10 dni pred Rhellikanovo murko v Karavankah. Najbližja znana populacija avstrijske murke pa se pojavlja na pobočjih Obirja (Hochobir) na Avstrijskem Koroškem. Ključ za določevanje murk (JOGAN 2007) bo v prihodnje potrebno ažurirati, saj je bilo na območju Slovenije že dokazano pojavljanje novih vrst murk, sedaj tudi avstrijske murke.

ACKNOWLEDGEMENTS

Sincere thanks to prof. Mitja Kaligarič for the corrections of the manuscript. Thanks to botanists actively involved in research into the genus *Nigritella* (*Gymna-*

denia) in Slovenia: Matej Lipovšek, Branko Dolinar and Mihael Kocjan for a constructive debate on the occurrence of *Nigritella austriaca* on Mt. Uršlja gora.

ZAHVALA

Iskreno se zahvaljujem profesorju Mitji Kaligariču za pregled rokopisa. Hvala botanikom, ki se aktivno posvečajo problematiki pri rodu *Nigritella* (*Gymnadenia*):

Mateju Lipovšku, Branetu Dolinarju in Mihaelu Kocjanu za konstruktivno debato o pojavljanju avstrijske murke na Uršlji gori.

REFERENCES-LITERATURA

- BRÜTSCH, J.P., 2000: *Die Gattung Nigritella* Rich. *Bauhinia* 14: 21-32.
- DAKSKOBLER, I., B. DOLINAR, B. ZUPAN, R. ISKRA, P. STRGAR & A. TRNKOCZY, 2012: *Nigritella widderi* Teppner & E. Klein, a new species in the flora of Slovenia. *Folia Biologica et Geologica* (Ljubljana) 53/1-2: 25-43.
- DELFORGE, P., 2001: *Guide des Orchidées d'Europe, d'Afrique et du Proche Orient*. Ed. 2. Delachaux et Niestlé. Lausanne-Paris.
- DELFORGE, P., 2006: *Orchids of Europe, North Africa and the Middle East*. A&C Black Publishers Ltd. (Ljubljana), London: 640 pp.
- DOLINAR, B.: *Slovenske orhideje* (<http://www.orhideje.si/>), 23.12.2014.
- DOLINAR, B., 2015: *Kukavičevke Slovenije*. Pipinova knjiga. Dobrova: 120-121.
- FOELSCH, W., 2011: *Das Erzherzog-Johann-Kohlröschen, Nigritella archiducis-joannis* Teppner & E. Klein, und die *Kohlröschen-Arten Österreichs*. *Joannea Botanik* 9: 61-95.
- FOELSCH, W., 2012: *Bestimmungsschlüssel für die Kohlröschen der Ostalpen*, Version 10. May 2012. http://www.museum-joanneum.at/upload/file/Bestimmungsschluesel_Nigritella_2012.pdf (7.7.2015)

- FOELSCH, W., 2014: Bestimmungsschlüssel für die Arten und Unterarten der Gattung *Nigritella* mit Kurzbeschreibungen, Verbreitungsangaben und Abbildungen, Vestion 1, Dezember 2014.
http://www.museum-joanneum.at/upload/file/Bestimmungsschluessel_Nigritella_2012.pdf (7.7.2015)
- GAMS, I., 1976: *O zgornji gozdni meji na jugovzhodnem Koroškem*. Geografski zbornik (Ljubljana) 16: 158-163.
- HEDRÉN, M., E. KLEIN & H. TEPPNER, 2000: *Evolution of Polyploids in the European Orchid genus Nigritella: Evidence from Allozyme Data*. *Phyton* 40 (2): 239-275.
- JOGAN, N., 2007: *Orchidaceae – kukavičevke*. In: Martinčič, A. (ed.): *Mala flora Slovenije. Ključ za določanje praprotnic in semenk*. Tehniška založba Slovenije, Ljubljana: 756–784.
- KLEIN, E. & A. DRESCHER, 1996: *Nigritella nigra (Orchidaceae - Orchideae) im Massif Central (Frankreich)*. *Phyton*, 36 (2): 231-250.
- MARTINČIČ, A. s sod.: 2007. *Mala flora Slovenije. Ključ za določanje praprotnic in semenk*. Tehniška založba Slovenije, Ljubljana.
- RAVNIK, V., 2002: *Orhideje Slovenije*. Tehniška založba, Ljubljana.
- SÁEZ, L., 2004: *The genus Nigritella (Orchidaceae) in the Iberian Peninsula*. *Anales del Jardín Botánico de Madrid* 61(1): 81-90.
- SUŠNIK, F., 1955: *Vegetacija in flora Uršlje gore*. Diplomsko delo. 106 str., Ljubljana.
- TEPPNER, H. & E. KLEIN, 1990: *Nigritella rhellicani spec. nova und N. nigra (L.) Rchb. f. s. str. (Orchidaceae - Orchideae)*. *Phyton* 31 (1): 5-26.
- TEPPNER, H. & E. KLEIN, 1993: *Nigritella gabasiana spec. nova, N. nigra subsp. iberica subsp. nova (Orchidaceae - Orchideae) und deren Embryologie*. *Phyton* 33 (2): 179-322.
- TEPPNER, H. & E. KLEIN, 1998: *Etiam atque etiam: Nigritella versus Gymnadenia: Neukombinationen und Gymnadenia dolomitensis spec. nova (Orchidaceae - Orchideae)*. *Phyton* 38 (1): 220-225.
- TEPPNER, H. & E. KLEIN, 1990: *Nigritella rhellicani spec, nova und N. nigra (L.) RCHB. f. s. str. (Orchidaceae - Orchideae)*. *Phyton* 31 (1): 5-26.
- TEPPNER, H. & T. STER, 1996: *Nigritella buschmanniae spec. nova (Orchidaceae-Orchideae) und eine Biographie für Frau Adolfine Buschmann*. *Phyton* 36 (2): 277-294.
- TEPPNER, H., 2002: *A review of new results in Nigritella (Orchidaceae)*. *Polska Akademia Nauk, Tom XLVI (2), Krakow 2004*.
- TIMPE, W. & A. CH. MRKVICKA, 1991: *Zur Unterscheidung von Nigritella nigra (L.) RCHB.fil. subsp. austriaca Teppner & Klein und Nigritella rhellicani Teppner & Klein anhand makroskopischer Merkmale*. *Mitt.Bl. AHO Baden- Württ.* 23(3): 449- 466.
- WRABER, T., 1959: *Tipološka razčlenitev gozdne vegetacije zgornje Mežiške doline*. Tipkopis, knjižnica Biološkega inštituta J. Hadžija, SAZU, Ljubljana.
- WUCHERPFENNIG, W., 1999: *Die Gattung Nigritella*. *AHO Bayern articles, Wolfgang Wucherpfennig, Lerchenweg 1, D-85386 Eching*.

