The endemic species *Aquilegia grata* Maly ex Zimmeter was originally described from Mt Orjen in south-western Montenegro, in the nineteenth century. At that time, a specimen collected by J. Pančić from western Serbia was erroneously designated as a paratype. This claim was later accepted and the majority of the authors and collectors mentioned this plant from the canyons of western Serbia, eastern Bosnia and northern Montenegro. Other authors thought that the species *A. amaliae* Heldr. ex Boiss. grew in this area, which was also incorrect. On the basis of the original herbarium material and the recently collected material from Mt Orjen, it became clear that the populations of the mentioned area (outside this mountain) actually belong to a new, still undescribed species. The name of the subspecies previously described from this area, *A. grata* subsp. *nikolicii* Niketić, was taken for the basionym. After the validation of the name, the taxon was raised to a specific rank as *A. nikolicii* (Niketić) Niketić & Cikovac. Two varieties are recognised within the species. Two new chorological records from western Serbia are also reported.

**Key words:** plant taxonomy, *Aquilegia*, Balkan Peninsula, endemic species
INTRODUCTION

This paper deals with problem to the taxonomy and nomenclature of some Dinaric species (western Balkan) in the genus *Aquilegia*. While the European species of the genus *Aquilegia* L. belong to particular phylogenetic group (Fior et al. 2013) and the south-eastern part of their geographic range produces one of the centres of the global generic diversity (Nold 2003), significant studies on the taxonomy of these columbines is lacking and their recent diversification remains unresolved (Fior et al. 2013). In the area of the Balkan Peninsula they can be differentiated into two groups separated morphologically and ecologically (Skalińska 1964). The first group includes mesophilous montane and subalpine species (such as *A. vulgaris* L. and *A. nigricans* Baumg.) with elongated follicles tapering gradually at the top. The second one includes mostly vicarious (oro)submediterranean calcicole chasmophytes which express more xerophilous adaptations (e.g. *A. ottonis* Orph. ex Boiss. and *A. kitaibelii* Schott) with broader follicles tapering abruptly at the top.

MATERIAL AND METHODS

Field investigations and collecting of herbarium material were carried out in Montenegro, western Serbia and eastern Bosnia and Herzegovina. Additional material was examined in herbarium collections (BEO, BEOU, BP, SARA, W, WU). The study and revision of the material was done according to the assessment of morphological characters and observed ecological and spatial patterns. Besides the field survey, checking and revision of the herbarium material, relevant literature sources were used for identification, taxonomic interpretation and spatial overview of the overall distribution of the investigated taxa. The taxonomic concept is based on surveyed herbarium material and literature data. Nomenclature changes have been made in agreement with ICB (McNeill et al. 2012). Distribution of taxa has been mapped on UTM grid system 34T (10×10 km grid).

RESULTS AND DISCUSSION

One of the critical taxa, *A. grata* Maly ex Zimmeter, is an endemic columbine of the south-eastern Dinaric Alps (Montenegro, Bosnia and Herzegovina and Serbia). On the basis of present knowledge, it is closely related to *A. ottonis* (Niketić 1992) which belongs to the aforementioned probably relictic group (Lakušić 1980). F. Maly discovered this columbine in 1864 in the present part of south-western Montenegro, in the area of Mt
Orjen ("Crivoscie"). The plant was described by Zimmeter (1875) after he had cultivated it for a few years in the Botanical Garden in Vienna:

**Aquilegia grata** Maly ex Zimmeter in Jahres-Ber. Staats-Ober-Realsch. Steyr 5: 21 (1875) (Fig. 1)

≡ **A. vulgaris** subsp. grata Brühl, Journ. Asiatic Soc. Bengal, 61(2): 299 (1893)

≡ **A. ottonis** Orph. ex Boiss. var. grata (Maly ex Zimmeter) Rapaics in Bot. Közlem. 8: 131 (1909)

The type specimens from Mt Orjen and the Botanical Garden were not exactly indicated in the protologue\(^1\), but Zimmeter (1875) mentioned a specimen of the same taxon from western Serbia (Mokra Gora, leg. J. Pančić, May-1868, WU), originally identified as [Italian] *A. thalictrifolia* Schott & Kotschy. Specifying of this ‘paratype’ was probably both wrong and unnecessary given the significant incongruence between the original description of *A. grata* collected on Mt Orjen (concolorous flowers etc.) and examined traits in specimens found outside this Dinaric mountain (bicolorous flowers etc.) (Lakušić 1980, Niketić 1992). Following this record (Mokra Gora), similar cumbines were subsequently found in eastern Bosnia, northern Montenegro and western Serbia (Malý 1908, Lakušić 1980, Lakušić & Redžić 1989, Gajić & Niketić 1992, as *A. grata*), but field observations at the ‘classical locality’ on Mt Orjen were not investigated. Some authors and collectors treated these plants as [Greek] *A. amaliae* Heldr. ex Boiss. (Hayek 1924, Cullen & Heywood 1964, Gajić 1970, Regula-Bevilacqua 1973, Greuter *et al.* 1989).

It was suspected that there are actually two different taxa mentioned in Zimmeter’s protologue, but due to the lack of type specimens\(^2\), this assumption has not been proven yet. Fortunately, well preserved exsiccates from the Botanical Garden in Vienna were revealed in BP a few years ago (*A. grata*, Dalmatia, in montibus Krivošije, cult. in horto Maly Vindobonac, 1889. jun 9, Dedit: Maly, Simonkai L., rev. B. Yauli [illegible] “prob. Hybr. *A. einseleana* × ? (culta) (non *A. grata*!)”, BP!), and even more, similar plants from Mt Orjen were recollected recently, very close to the type locality (leg. P. Cikovac). Fruits of these plants resemble those from the ‘*A. vulgaris-nigricans* group’ and similarities in ecological and other morphological traits are also obvious, which is not the case with plants from the remaining (northern) populations. It should be also borne in mind that the population from Mt Orjen is spatially and ecologically isolated.

\(^1\) Zimmeter (1875) pointed out only that exsiccates are contained in Bischof Heinald’s collection.

\(^2\) Material from the Botanical Garden in Vienna is found in Pančić’s herbarium (leg. F. Maly, 2053 BEOU), but it is very scarce (Niketić 1992).
from northern populations – subadriatic oromediterranean woodland habitats (Seslerio autumnalis-Abieti-Fagetum) versus saxicolous communities in subcontinental canyons (Amphorcarpetalia, Arabidetalia flavescentis)³.

Fig. 1. - Aquilegia grata Maly ex Zimmeter from south-western Montenegro (Mt Orjen ). Photo by P. Cikovac.

Based on the above, the presence of a particular species is to be expected in northern populations. Niketić (1992) has already described a separate taxon from that region, A. grata subsp. nikolicii Niketić. It is questionable whether this name was validly published in accordance with ICN (McNeill et al. 2012: Art. 40.7) or not. Actually, in the paragraph with data on the type specimen an associated herbarium collection was not specified (Niketić 1992: 57). However, an acronym for a collection (BEO) was mentioned in the signatures of Figures 1 and 2 (Niketić 1992: 61). In any case, validation and designation of the name are presented now:

Aquilegia grata Maly ex Zimmeter subsp. nikolicii Niketić in Glasnik Prirodnjačkog muzeja u Beogradu B47: 57.


Isotype: BEOU, W.

³ A. grata from Mt Orjen is also morphologically and ecologically separated from sympatric A. dinarica Beck, a saxicolous and frigophilous altimediterranean species seen only in open habitats (Micromerion croaticae).
This subspecies should be raised to a specific level, in accordance with the proposed taxonomic concept:

*Aquilegia nikolicii* (Niketić) Niketić & Cikovac, comb. et stat. nov. (Fig. 2)

≡ *A. grata* Maly ex Zimmeter subsp. *nikolicii* Niketić in Glasnik Prirod-njačkog muzeja u Beogradu B47: 57 (validated and designated in this paper)

– *A. grata* auct., non Maly ex Zimmeter 1875

Fig. 2. - *Aquilegia nikolicii* (Niketić) Niketić & Cikovac from western Serbia:
a) *A. n.* var. *nikolicii* from the Drina River canyon in vicinity of Bajina Bašta (Perućac village); b-d) *A. n.* var. *pancicii* Niketić from the Beli Rzav canyon in vicinity of Mokra Gora (Kršanje village).

Photo by M. Niketić.
Description:

Variability:
Niketić (1992) recognized two subspecies in that area (A. grata subsp. nikolicii and A. g. subsp. grata). However, subsequent field investigations and herbarium inspection have shown that both taxa can occasionally be found at the same locations. Consequently these subspecies must be lowered to the rank of varieties:

a) A. nikolicii var. nikolicii
   – A. amaliae sensu Pančić in Dodatak Flori Kneževine Srbije: 105 (1884), non Heldr. ex Boiss. (1854); auct.
   Description: Basal and cauline leaves finely hairy above and beneath, rarely glabrous above; without or with very thin glandular hairs. For other diagnostic details see Niketić (1992: 58, sub A. grata subsp. nikolicii).
   Upper surface of leaves glabrous - A. nikolicii f. calvescens (Niketić) Niketić, comb. nova; basyon. A. grata f. calvescens Niketić op. cit.: 58.
   Holotype (see Niketić l.c., validated and designated here): A15 BEO.

b) A. nikolicii var. pancicii Niketić, var. nov.
   – A. thalictrifolia sensu Pančić in Flora Kneževine Srbije: 117 (1874), non Schott & Kotschy (1853)
   – A. grata subsp. grata sensu Niketić op. cit.: 58
   Description: The whole plant is dense glandular viscid. For other diagnostic details see Niketić (1992: 58, sub A. grata subsp. grata).

Distribution:
A. nikolicii is an east Illyrian endemic species apparently limited to the moist canyons from the Drina River Basin, in eastern Bosnia, northern Montenegro and western Serbia (Fig. 3). Only one population, at the easternmost locality, reached the catchment area of the Western Morava River
(Potpećka Cave near Užice, western Serbia, DP14). Species are known from ca. 30 localities distributed in 15 UTM grid squares $10 \times 10 \text{ km}$.

Fig. 3. - Distribution of *Aquilegia grata* (stars) and *A. nikolicii* (circles) on a $10 \times 10 \text{ km}$ UTM grid map (UTM Zone 34T). New records include findings that so far have not been registered in the literature for individual UTM squares. Catchments of the Drina and Morava rivers are shaded.

**New records for Serbia:**

Western Serbia, Mt Tara: canyon of the Grlac Stream, rocks, 300 m, limestone, CP67, coll./det. M. Niketić, S. Jovanović, G. Tomović 03-Jul-1998 (19980711 BEO, 12583 BEOU).

Western Serbia, Priboj: Sjeverin village (canyon of the Sutjeska River), rocks, 400-450 m, limestone, CP62, coll./det. M. Niketić, G. Tomović 13-Aug-2008 (20080804 BEO, 27986 BEOU).
Ecology:

It grows between 250 and 1200 m s.m. in the zones of Ostrya carpinifolia, Pinus nigra, Fagus sylvatica, Picea omorika or in mixed forests. Usually prefers limestone rock crevices and screes in moist and shady places. It is a member of the chasmophytic community Centaureo der-vantanae-Seslerietum tenuifoliae (Gajić & Niketić 1992).

IUCN threatened status:

In the global IUCN Red List of Threatened Plants (Walter & Gillett 1998) A. grata [s.l.] has rare status (R). It could be assumed that the same estimation applies to A. nikolicii, given that the majority of populations previously treated as A. grata actually belong to this species. The species has a vulnerable status (VU) in accordance with newer IUCN categories (estimated here).

CONCLUSIONS

There are three taxonomic issues to resolve concerning the name A. grata (Niketić 1992). The first of them is settled now, as it has been shown that the population from Mt Orjen and other populations (previously treated as A. grata) actually belong to two different species: A. grata and A. nikolicii. The two remaining questions are: “whether it [A. grata] represents an infraspecific category or a synonym of some other taxon – or the reverse –; or, is it perhaps an independent taxon” (Niketić 1992). In particular it seems to be closely related to A. nigricans which is also recorded for Mt Orjen (Malý & Bjelčić 1949). However, A. grata differs in having smaller mauve-violet flowers, shorter laminae (6-7 mm long), shorter spur (16-18 mm long), a more pronounced projection of its stamens, a sometimes erect flower, foliage segments inserted to only 1/3 of the leaflet, greyish green (not whitish) lower leaflet colour and rounded oblong lobes (not toothed with rounded oblong teeth). Therefore, the taxonomy and distribution of A. grata (currently known only from Mt Orjen) will be the subject of further research.

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REFERENCES


