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Floristic and chorological news from north Albania

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ABSTRACT: The North Albania region includes Albanian part of Mt Bjeshkët e Nemuna (Prokletije) massif, Mt Pashtrik on the east, Mt Tarabosh (southernmost part Mt Rumija) on the west, as well as the right side of the river Drin/Drim valley with surrounding mountain areas. It represents an area with the noticeably richer flora than any other region in Albania. Six new vascular plant species for Albania were reported: *Adenostyles alpina* (L.) Bluff & Fingerh, *Calamagrostis varia* (Schrad.) Host, *Grafia golaka* (Hacq.) Rech., *Melampyrum nemorosum* L. *Crocus weldenii* Hoppe & Fürnrohr and *Viburnum maculatum* Pant., of which last two species are Balkan endemics.

New floristic records for the Albanian flora are also presented for five taxa: *Amphoricarpus autariatus* Blečić. & May. subsp. *bertisceus* Blečić & E. Mayer, *Iris reichenbachii* Heuff., *Rumex balcanicus* Rech. fil., *Senecio squalidus* L. subsp. *rupestris* (Walds. & Kit.) Greuter and *Potentilla heptaphylla* L. subsp. *australis* (Krašan ex Nyman) Gams var. *malyana* (Borbás ex Malý) G. Beck.

Key words: New floristic and chorological additions, North Albania, Bjeshkët e Nemuna (Prokletije), Mt Pashtrik.

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INTRODUCTION

Flora of Albania shows a considerable floristic richness with a great number of interesting local and regional endemics. The 4-volumes of Flora e Shqiperise (Paparisto *et al.* 1988) comprises 3250 vascular plant species or 3758 taxa, including 175 cultivated species, of which 450 are Balkan endemic taxa, 46 are local endemic taxa, while 190 are sub-endemic taxa (V. Stevanovic *pers. comm.*). They constitute 29.5% of the species of the European flora, and 47% of the species of the Balkan Peninsula flora.

The North Albania region is located in the south-eastern part of the Dinaric mountain range including mountain blocks of Albanian part of Mt Bjeshkët e Nemuna (Prokletije), Mt Pashtrik, on the east, Mt Tarabosh (southernmost part Mt Rumija), on the west, as well as the right side of the river Drin/Drim valley with surrounding mountains where the highest peaks are between 1200 and 1500 m (Fig. 1). The southern border of the North Albania region is more than 150 km long valley of the river Drin/Drim. It represents an area with the noticeably richer flora than any other region in Albania. This area is characterized, predominately, by calcareous and serpentine rocks.

Geological and climatic characteristics. Bjeshkët e Nemuna (Prokletije) or so-called Albanian Alps is a transboundary high mountain chain which includes c. 40 separated mountains over 2.000 m high, including 17 peaks over 2.500 m. The highest peaks are Jezerca and Gjeravica at 2,694 m and 2,656 m, respectively (Gruda 1981). Bjeshkët e Nemuna (Prokletije) is mainly composed of limestone, although the siliceous rocks also abound.

The Albanian Alps range was formed by the folding actions of the African Plate which lies under the European one. Pleistocene glaciations are strongly expressed and caused actual mountain orography with the numerous traces of former glaciers and formation of fluvial-glacial erosion and deposits (moraines, glacial lakes, former glacial cirques and valleys).

Valleys are deep and extended almost to the mountain summits, while peaks are very edgy and high. Sources of the rivers Valbona, Shala, Cemi/Cijevna, Bistrica of

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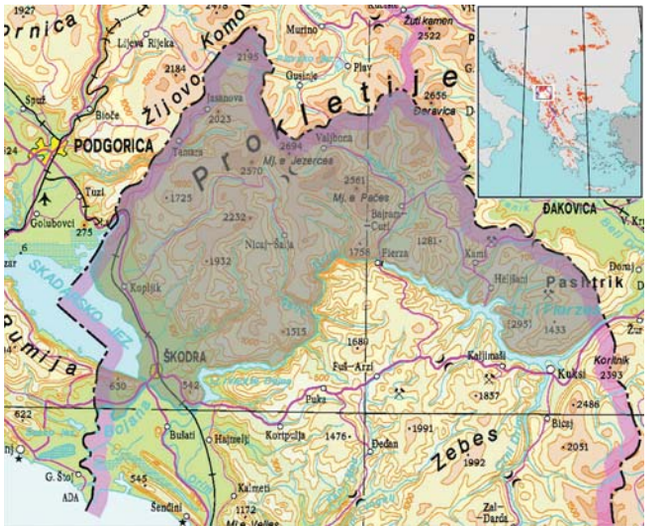

Fig. 1. The North Albania region

Peja/Pečka Bistrica) and some other, are situated in high mountain parts of Bjeshket e Nemuna (Prokletije). These rivers formed deep canyons and gorges of which some are c. 1000 m deep. A plenty of glacial lakes are also present in these mountains. For instance, only in the area of the mountain peak Jezerce (Buni of Jezerca), six small glacial lakes occurred.

The geological substrate of the North Albania is complex: limestone and dolomites, diabase-chert formation, argiloschists, ultrabasic or serpentine rocks, sandstone and conglomerate are to be found (Vranaj 1990).

The North Albania mountain region belongs to Dinaric Mountain transitional eco-region (Hoda 1992). It is characterized mainly by Alpine relief, alpine karst hydrography, as well as by very rich flora with numerous endemics and Alpine plant species. A transitional climate between perhumid sub-Mediterranean and humid mountain climate of the Alpine type is dominant (Gruda 1981).

Phytogeographical characteristics. Flora of the Albanian Alps is one of the richest in the Balkan. Approximately 1.611 wild vascular plant species and intraspecific taxa are described and recorded, which constitutes over 50% of Albanian flora. These plants belong to 690 genera and 150 families. Particularly significant are the numerous Tertiary and glacial relics, while 250 species are Balkan endemics, comprising 136 regional and 17 local endemics distributed only in Mt Bjeshkët e Nemuna (Prokletije), such as: *Crepis bertiscea* Ják., *Ligusticum albanicum* Ják., *Lunaria telekiana* Ják., *Valeriana bertiscea* Pančić, *Pedicularis ernesti-mayeri* Stevanović, *Heliosperma oliverae, Wulfenia baldaccii* Degen, etc. (Ruci & Vangjeli 2001; Stevanović 2002).

The natural potential vegetation is represented by the following communities *Fagetum montanum, Abieti-Fagetum, Piceetum excelsae montanum, Pinetum mugi, Pinetum peucis, Pinetum heldreichii, Oxytropidon dinaricae*. According to Ruci & Vangjeli (2001) 161 plant communities are described in this region of Albania.

The dominant habitat types are forests of the Turkey oak, Macedonian oak, Sessile oak, beech, Bosnian pine, Macedonian pine, as well as alpine and sub-alpine calcareous grasslands. Above the forest belt, there are various shrubby communities, mainly dominated by Siberian juniper (*Juniperus sibirica*) and blueberries (*Vaccinium* spp.). Riparian or flooded vegetation, as *Salicetum eleagni, Salicetum fragilis* and *Alnetum incanae* is distributed along the river valleys (Ruci & Vangjeli 2001).

The North Albanian region, situated at the crossroads of several plant migration routes, is one of the most important refugium in the Balkans and, probably, in whole S. Europe. It is the most important region both for preservation of plants during Ice Age and for plant speciation. Mountains of the North Albania could be regarded as a corridor for the migrations of plants from the Alps towards the south- and eastward regions.

According to Ruci & Vangjeli (2001) the following floristic spectrum was recorded in the investigated area: European mountains (Central and Alpine) floristic element 22%, Eurasian 24.5% (*Wulfenia, Forsythia, Gymnospermium, Ramonda, Aesculus, Dioscorea, Aster* etc.), Boreal 9.3%, Mediterranean 12.5%, Balkan endemics 28% and 3.7% of other ones.

The presence taxonomically isolated endemo-relict and relict species (*Pinus heldreichii* Christ, *Pinus peuce* Griseb., *Narthecium scardicum* Košanin, *Taxus baccata* L., *Forsythia europaea* Deg. & Bald., *Silene asterias* Griseb., *Edraianthus graminifolius* (L.) DC., *Acer heldreichii* Orph., *Juglans regia* L., *Asarum europaeum* L., *Campanula lingulata* Waldst. et Kit., *Valeriana pancicii* Hal. et Bald., *Rumex balcanicus* Rech., *Ramonda serbica* Pančić, *Ostrya carpinifolia* Scop., *Jasione orbiculata* Griseb. ex Velen.), as well as the existence of floristic affinities with ancient Mediterranean and sub-Mediterranean flora indicate that speciation of the Albanian flora have began since the Tertiary period.

The occurrence of common sub-endemic taxa in the Balkans and Apennine peninsula point to ancient amphiadriatic floristic link. The typical sub-endemic species having disjunct ranges (or Apennine-Scardo-Pindhic, Illyrian-Scardo-Pindhic-Apennine, Illyrian-Apennine, Subscardo-Pindhic-South Apennine, etc), are: *Pinus heldreichii* Crist., *Pinus nigra* Arnold, *Quercus trojana* Webb, *Drypis spinosa* L. subsp. *linnaeana* Murb., *Geum molle* Vis. et Pančić, *Potentilla apennina* Ten., *Anemone apennina* L., *Hypericum barbatum* Jacq., *Pinguicula hirtiflora* Ten., *Asyneuma pichleri* (Vis.) D. Lakušić &

F. Conti, *Campanula lingulata* Waldst. et Kit., *Jasione orbiculata* Griseb., *Cardamine glauca* Spreng., *Doronicum columnae* Ten., etc.

Pleistocene glaciations strongly effected on the current composition of the North Albanian mountain flora, as well as on the whole Balkan flora. The numerous species remained here after glaciers melted, such as: *Potentilla crantzii* (Crantz)Beck, *Arabis alpina* L., *Arctostaphylos alpinus* (L.) Spreng., *Aster alpinus* L., *Saxifraga aizoides* L., *Saxifraga oppositifolia* L., *Salix retusa* L., *Salix reticulata* L., *Dryas octopetala* L., *Androsace villosa* L., *Geum montanum* L., *Polygonum viviparum* L., *Trollius europaeus* L., *Parnassia palustris* L., *Veronica alpina* L., *Pedicularis verticillata* L. *Nigritella nigra* (L.) Reichenb., *Juncus trifidus* L., *Poa alpina* L., *Luzula spicata* DC., *Selaginella selaginoides* (L.) Schrank. & C. F. P. Mart etc. Stevanović *et al.* (2009) recorded c. 50 Arctic-Alpine plants in Mt Prokletije. The majority of the above mentioned plants are glacial relicts.

The North Albanian flora is characterised by a high number of isolated endemic species. Approximately 110 Balkan endemics have northern, eastern or southern limits of distribution in N Albania that is of special phytogeographical interest (Ruci & Vangjeli 2001). The northernmost limit of distribution is characteristic for *Alchemilla albanica* Rothm., M*inuartia baldaccii* subsp. *skutariensis* Hayek, *Ranunculus degenii* Kümmerle & Jav., *Ranunculus hayekii* Dörfler, *Viola kosaninii* (Degen) Hayek etc), *Viola dukadjinica* W. Becker et Bornm., while the eastern- or southernmost limits have *Cerastium dinaricum* G. Beck et Szyszyl., *Edraianthus serpyllifolius* (Vis.) A. DC., *Edraianthus tenuifolius* (Waldst. & Kit) A. DC., *Gentiana dinarica* G. Beck, *Petasites doerfleri* Hayek, *Minuartia velenovskyi* (Rohlena) Hayek, *Teucrium arduini* L., *Verbascum nicolai* Rohlena etc.

The number of plant endemic species in whole Mt Prokletije massif is particularly high. Approximately 17 local endemic species are known, as: *Alchemilla bertiscea* Martinčič, *Crepis bertiscea* Ják., *Dianthus behriorum* Bornm, *Hieracium wettsteinianum* Hayek & Zahn subsp. *wettsteinianum*, *H. guentheri-beckii* subsp. *phaedroleucum* Hayek & Zahn., *H. chloropannosum* Zahn, *H. geminum* Hayek & Zahn, *H. fritschianum* Hayek & Zahn, *Ligusticum albanicum* Jav., *Lunaria telekiana* Jav., *Pedicularis ernesti-mayeri* Stevanović, Niketić & D. Lakušić, *Sesleria wettsteinii* Dörfler & Hayek, *Heliosperma macranthum* Pančić, *Valeriana bertiscea* Pančić, *Wulfenia baldaccii* Degen, *Viola vilaensis* Hayek, etc. Three centres of endemism can be distinguished according to number and distribution of the regional and local endemic plant taxa from the North Albania region:

1. Mt Bjeshkët e Nemuna (Prokletije) – a big isolated mountain massif mainly made of calcareous (limestone and dolomite) substratum, represented by numerous regional and local paleo- and neo-endemic species, being an important centre of plant speciation and refugium;
2. Tropoja Valley, Bytyçi and White Drin Valley – a great serpentine area, represented also by numerous regional paleo- and neo-endemic taxa and few local endemics. It is important refugium (south-north corridor) of serpentine elements, as well as the speciation centre.
3. Has region, including Mt Pashtrik – mainly made of limestone, with few stenoendemic species.

However, the occurrence of the endemic species, such as *Asperula scutellaris* Vis., *Crepis baldaccii* Halácsy subsp. *albanica* Ják., *Edraianthus serpyllifolius* (Vis.) A. DC., *Phyteuma pseudorbiculare* Pant., *Pimpinella serbica* (Vis.) Bentham & Hooker fil. ex Drude, *Potentilla montenegrina* Pant., *Valeriana bertiscea* Pančić, etc. confirm floristic connection between N Albania and surrounding parts of the Balkans (Dinaric Alps and Scardo-Pindhian mountain system).

Therefore, this region is of a particular phytogeographical interest as a barrier for a numerous Mediterranean plant species, from one side, and an important distribution corridor for orophytes from N Dinaric Alps towards south (Albanids, Pindhos) and east (Mt Shar Planina), as well as *vice-versa*, from the other side.

History of investigation. The first floristic data for North Albanian flora have been obtained by Grisebach (1843, 1844) in the middle of the XIX century. The serious work on flora and vegetation begun in the first part of the XX century, when noumerous botanists, such as Degen & Dörfler (1897), Baldacci (1904), Janchen (1916), Hayek (1917, 1924), Jávorka (1921), Jávorka *et al.* (1926), Markgraf (1931), Bornmüller (1933), Rechinger (1935), Lemperg (1937), Košanin (1939), Rohlena (1942), etc., started the botanical explorations of this region. They recorded and described numerous new plant species, including local endemics, as *Wulfenia baldaccii* Degen, *Petasites doerfleri* Hayek, *Centaurea kosaninii* Hayek, *Crepis bertiscea* Ják., *Ligusticum albanicum* Ják., *Polygala doerfleri* Hayek, *Sanguisorba albanica* Andrasovszky and Ják., etc.

In the last three decades a number of Albanian botanists have also investigated this area and published their own studies, such as Demiri (1983), Ruci (1986), Paparisto *et al.* (1988), Hoda (1992), Qosja *et al.* (1992, 1996), Vangjeli et al. (2000), Ruci & Vangjeli (2001), Rakaj & Kashta (2003, 2007), Rakaj (2006), Kashta (2007), Barina & Pifko (2008a, 2008b) etc. In this region several new taxa for Albanian flora were recorded during the last decade: *Dianthus behriorum* Bornm, *Hyacinthella dalmatica* (Baker) Chouard., *Lathraea squamaria* L., *Parietaria lusitanica* L., *Prunus tenella* Batsch, *Ranunculus montanus* Willd.

It is worth to mention that the flora and vegetation of the northern parts of Mt Prokletije and Mt Pashtrik, outside Albania, were also investigated in more details by some ex-Yugoslav botanists: Lakušić (1971), Wraber (1986, 1989), Martinčič (1990), Lakušić & Stevanović (1995), Stevanović (1999), Stevanović & Lakušić (2000), Stevanović *et al.* (2002, 2003), Lakušić *et al.* (2004), Niketić (2005), Niketić & Stevanović (2006), etc. They found seven new local endemic species: *Alchemilla bertiscea* Martinčič, *Cynoglossum krasniqii* T. Wraber, *Draba bertiscea* D. Lakušić & Stevanović, *Draba kuemmerlei* Stevanović & D. Lakušić, *Hieracium bertisceum* Niketić, *Heliosperma oliverae* Niketić & Stevanović, *Pedicularis ernesti-mayeri* Stevanović, Niketić & D. Lakušić. Most of them were found in close proximity of the Albanian territory, so it is probable to assume that some of these taxa will be recorded in Albania too.

MATERIALS AND METHODS

The results of the present paper are based mainly on personal investigations and collecting plants material during the period of 2000-2009, and partly on the plant material stored in herbarium of Faculty of Natural Science, University of Shkodra, Albania. In addition, the literature data were used for the presentation of the distribution of the investigated taxa. The new plant species for Albania are mapped on UTM grid 10 x 10 sq. km.

RESULTS AND DISCUSSION

New taxa for the Albanian flora. Albanian flora, particularly, in mountain is not sufficiently known. In this paper six new vascular plant taxa for Albanian flora were reported, including one new genus (*Grafia*) (Fig. 2-4).:

1. *Adenostyles alpina* (L.) Bluff & Fingerh: limestone, in high-mountain rocky grounds and screes on Mt Shtegu i Dhenve (UTM CM99), 1850m, coll. T. Wraber, M. Rakaj, 15.07.2002; Mt Maja Jezerce (UTM DM09), 2340m, coll. B. Surina, M. Rakaj 16.08.2007; Mt Parun (UTM CM88), 1740m, coll. B. Surina, M. Rakaj 18.08.2007 (Fig. 2).
   This species was known from Alps, N Apennines and NW Dinarides (Slovenia and Croatia). The new localities in Albanian Alps represent a very isolated disjunction on the eastern and southern part of the species range.
2. *Calamagrostis varia* (Schrad.) Host: limestone, in high-mountain rocky grounds on Mt Shtegu i Dhenve (UTM CM99), 1700-1850m, coll. B. Surina, M. Rakaj 15.08.2007; Mt Parun, (UTM CM88), 1640m, coll. B. Surina, M. Rakaj 18.08.2007 (Fig. 3).
   Eurasian species widespread in mountain areas of C and S Europe. It has been recorded in all Balkan countries, except in Albania. Collected samples belong to the type subspecies (subsp. *varia*).
3. *Crocus weldenii* Hoppe & Fürnrohr: sunny hill slopes, grassy and stony places; Tarabosh, Goraj, Vrith (UTM CM65), 100 - 200m, coll. M. Rakaj, 22.02.2009; 14.03.2009 (Fig. 4).
   Balkan endemic with general distribution in Slovenia, Croatia, Herzegovina, Montenegro, Serbia and Macedonia.s North-western border of the species range reaches the vicinity of Trieste in NE Italy (Pulević 1977, Randjelović *et al.* 1990). It is interesting to note that Randjelović *et al.* (1990) also cited Albania for general distribution but without any locality. Species belongs to *C. biflorus* Mill. aggregate.
4. *Grafia golaka* (Hacq.) Rech.: limestone, on rocky ground next to Mt Shtegu i Dhenve (UTM CM99), 1700m, coll. B. Surina, M. Rakaj, 15.07.2007 (Fig. 4).
   Apennine-Balkan (Dinaric) mountain species. The new discovered population in Albania is situated on the easternmost part of the species area, and also provides the south-easternmost border of the Balkan part of the area. This species has been also found in adjacent parts of Mt Prokletije in Montenegro (M. Niketić, *pers. comm.*).

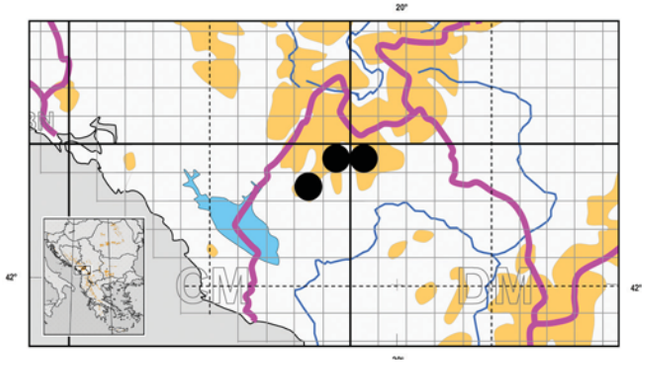

Fig. 2. – Distribution of *Adenostyles alpina* (L.) Bluff & Fingerh in Albania.

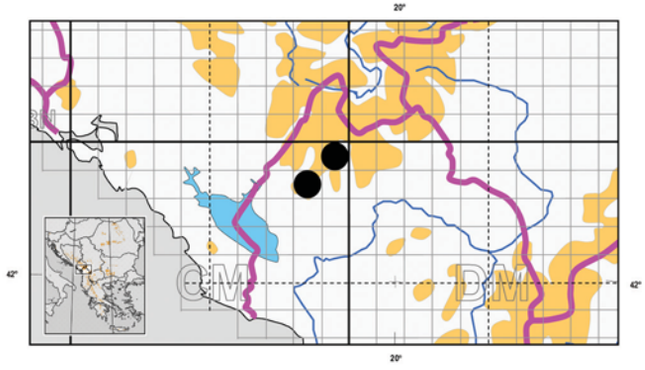

Fig. 3. – Distribution of *Calamagrostis varia* (Schrad.) Host in Albania.

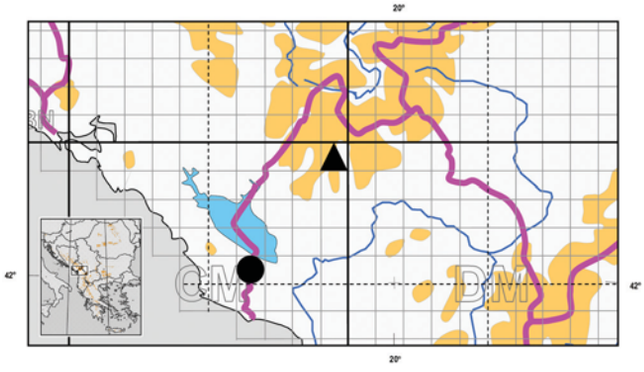

Fig 4. – Distribution of *Crocus weldenii* Hoppe & Fürnrohr (black circle) and *Grafia golaka* (Hacq.) Rech., *Melampyrum nemorosum* L. and *Viburnum maculatum* Pant. (triangle) in Albania.

5. *Melampyrum nemorosum* L.: on calcareous rocks of west slopes under Shpella upper Okol (Theth) (UTM CM99), 1450m, coll.: T. Wraber, M. Rakaj 16.07.2002; M. Rakaj, B. Surina 16.08. 2007 (Fig. 4).
   Widespread species in Europe, except on the West. It is also known from adjacent parts of Mt Prokletije in Montenegro (Rohlena 1942).
6. *Viburnum maculatum* Pant.: limestone, on rocky grounds on Mt Maja Shtegut (Theth) (UTM CM99), 1500m; coll. S. Barina, M. Rakaj, 16.08.2007 (Fig. 4).

Regional endemic outer chain of SE Dinaric Alps under strong Mediterranean climatic influence along Adriatic coast from Mt Orjen to Mt Rumija.

The new discovered locality in Albania provides the southeasternmost border of the species area.

New floristic records for the Albanian flora from North Albania

1. *Amphoricarpus autariatus* Blečić. & May. ssp. *bertisceus*: in stony places in the beech and pine forest on Thore, 1650m; bellow Qafa Pejes, 1600m; coll: B. Surina, M. Rakaj, 15, 08. 07. It is distributed southward to NW Greece. Regional endemic.
2. *Iris reichenbachii* Heuff. (=*Iris bosniaca* Beck): limestone, in high-mountain pastures and rocky grounds on Mt Pashtrik (UTM DM67), 1750m, coll. T. Wraber, M. Rakaj, L. Kashta 07.06. 2001. Literature data: Mt Maja Gjallices, 1840m (Košanin 1939: 75). Balkan – S Carpatian floristic element.
3. *Rumex balcanicus* Rech. fil.: limestone, high mountains and rocky grounds of Mt Maja Malisores (UTM DM09), 2300m; coll: M. Rakaj, 15.08. 08. Tertiary relict and Balkan endemic distributed in SE Dinaric Alps and N Scardo-Pindhic mountains.
4. *Potentilla heptaphylla* L. subsp. *australis* (Krašan ex Nyman) Gams var. *malyana* (Borbás ex Malý) G. Beck: serpentine, in stony places in the bush on Cahan, Mici-Has (Has) (530-800m) and (Kolsh 470m) (UTM DM57), coll. T. Wraber, M. Rakaj, L. Kashta 23.07. 2002. Literature data: Skanderbeg (Stane të Frenkthit, serpentine) (Markgraf 1931, sub. *P. australis*). *P. heptaphylla* subsp. *australis* is a south European orophyte, with an ecotype (var. *malyana*) characteristic for serpentinite rocky ground in the W and C Balkan.
5. *Senecio squalidus* L. subsp. *rupestris* (Walds. & Kit.) Greuter: on open grassy and calcareous rocks on Fusha e Runices 1750m (UTM CN90), coll. T. Wraber, M. Rakaj, 18.07.2000; Kroj i Kuq (Mt Gjallice) 2100m (UTM DM55); coll.: T. Wraber, M. Rakaj, 18.07.2000; 05.06.2001. Literature data: Mt Maja Pashtrik (Košanin 1939:75-105). This C and SE European orophyte is widespread through the Balkan mountains, particularly in the Dinaric Alps.

CONCLUSIONS

Flora of the North Albania is one of the richest in the region, even though it is not sufficiently known. Six new vascular plant taxa for Albanian flora were reported from North Albania: *Adenostyles alpina* (L.) Bluff & Fingerh, *Calamagrostis varia* (Schrad.) Host., *Grafia golaka* (Hacq.) Rech., *Melampyrum nemorosum* L., *Crocus weldenii* Hoppe & Fürnrohr and *Viburnum maculatum* Pant., of which last two are Balkan endemics. The genus *Grafia* is a new for the flora of Albania.

The new floristic records for five taxa of the Albanian flora are also presented: *Amphoricarpus autariatus* Blečić. & May. subsp. *bertisceus, Iris reichenbachii* Heuff., *Rumex balcanicus* Rech. fil., *Senecio squalidus* L. subsp. *rupestris* (Walds. & Kit.) Greuter and *Potentilla heptaphylla* L. subsp. *australis* (Krašan ex Nyman) Gams var. *malyana* (Borbás ex Malý) G. Beck.

The occurrence of numerous Tertiary and glacial relicts, as well as the high number of regional and local endemics establish North Albanian region, particularly Mt Bjeshkët e Nemuna (Prokletije), as a one of the most important centre of diversity and evolution of vascular flora in SE Europe.

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REZIME

Novi floristički i horološki podaci za Severnu Albaniju

Marash Rakaj

Severna Albanija obuhvata i deo Prokletijskog masiva, Paštrik na istoku i planinu Taraboš kao krajnji južni deo Runije na zapadu, te prostor desno od reke Drim sa dolinom i okolnim planinama. To je prostor koji ima primetno bogatiju floru od drugih albanskih regiona. Po prvi put se navodi šest novih vrsta za Albaniju: *Adenostyles alpina* (L.) Bluff & Fingerh, *Calamagrostis varia* (Schrad.) Host, *Grafia golaka* (Hacq.) Rech., *Melampyrum nemorosum* L. *Crocus weldenii* Hoppe & Fürnrohr i *Viburnum maculatum* Pant. Od kojih su poslednje dve Balkanski endemiti.

Novi podaci za Albansku floru dati su za pet taksona: *Amphoricarpus autariatus* Blečić. & May. subsp. *bertisceus* Blečić & E. Mayer, *Iris reichenbachii* Heuff., *Rumex balcanicus* Rech. Fil., *Senecio squalidus* L. subsp. *rupestris* (Walds. & Kit.) Greuter i *Potentilla heptaphylla* L. subsp. *australis* (Krašan ex Nyman) Gams var. *malyana* (Borbás ex Malý) G. Beck.

Ključne reči: Novi floristički i horološki podaci, Severna Albanija, Prokletije, Paštrik.