Wulfenia **27** (2020): 65–85

Wulfenia
Mitteilungen des
Kärntner Botanikzentrums
Klagenfurt

New data on distribution and ecology of *Narcissus* L. (Amaryllidaceae) from Kosovo

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Summary: Exact distributional data concerning *Narcissus* taxa along with the current status of their population trends are needed, because they are particularly meaningful in efforts to protect and conserve these fragile plants. We studied the natural populations of *Narcissus* taxa in Kosovo, exploiting new survey-based data to produce a suitable distribution map for the two present subspecies of this genus (*Narcissus poeticus* L. subsp. *poeticus* and *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker) and therefore support their sustainable management and conservation. Their natural habitats, the degree of present and foreseen threats, the level of current anthropogenic impact and the ways of protecting their fragile habitats are all cautiously analyzed and finally a number of carefully crafted recommendations are provided. Human impact on distribution was notable for the two studied subspecies. Data derived from this analysis will provide an essential basic information to support national conservation and management efforts, mainly for natural meadows and their endangered plant taxa, for which continuous selective harvesting has had a distinctive impact on their natural distribution. Our results highlight the importance of natural meadows and pastures for the distribution of plant taxa, their unshared richness in plant diversity and signals for future research to show the variety of human impacts on sustainability of these habitats.

Keywords: *Narcissus*, SE Europe, plant conservation, biodiversity

The Amaryllidaceae family comprises considerably cosmopolitan and mostly pantropical plant species (Meerow et al. 1999) that were distinguished by many different systematic treatments throughout botanical taxonomic history. Based on molecular data, Amaryllidaceae along with Agapanthaceae and Alliaceae altogether form a monophyletic group (Fay & Chase 1996). However, on the other hand there are other systematists (Meerow et al. 1999; Meerow & Snuman 2006; Berkov et al. 2014) that support the idea of an independent Amaryllidaceae status, based on various morphological characters and their very unique alkaloid biosynthesis.

The greatest diversity of the Eurasian clade of the Amaryllidaceae (including the genus *Narcissus*) is found in the Iberian Peninsula (Fernandes 1968), where more than 90% of the taxa of this genus are present. In addition to the Iberian peninsula, another diversification centre is assumed in North Africa (Meerow et al. 2006; Gage et al. 2011). Furthermore, Meerow et al. (2006) conclude that the allopatric derivation from North African species and diversification at the specific and subspecific level most probably occurred during the last full glaciation.

The genus *Narcissus* comprises about 55–180 species according to different authors (Fernandes 1968; Webb 1978; Blanchard 1996; Rivera et al. 2006). It is characterized by many interspecific hybrids and polyploid forms (Fernandes 1951, 1967) and has wide geographical distribution in different habitats, which altogether explain their very large morphological variation. The habitats of the species range from lowland valleys to mountain sites, mainly in restricted fragile areas, including grassland, shrubland, woods, river banks and rocky crevices (Ríos et al. 2010; Martínez-Francés et al. 2009; Rivera et al. 2006). In all natural habitats, particularly in

Table 1. List of known *Narcissus* taxa in the region of SE Europe.

No.	Taxon	f. YU	GR	AL	BG	RO	XK
1	*Narcissus jonquilla* L.	•					
2	*Narcissus jonquilla* L. subsp. *jonquilla*	•					
3	*Narcissus obsoletus* (Haw.) Spach	•	•	•			
4	*Narcissus papyraceus* Ker Gawl.	•	•				
5	*Narcissus papyraceus* Ker Gawl. subsp. *papyraceus*	•	•				
6	*Narcissus poeticus* L.	•	•	•		•	
7	*Narcissus poeticus* L. subsp. *poeticus*	•	•	•			•
8	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker.	•	•	•		•	•
9	*Narcissus pseudonarcissus* L.	•		•	•	•	
10	*Narcissus pseudonarcissus* L. subsp. *pseudonarcissus*	•			•	•	
11	*Narcissus tazetta* L.	•	•	•			
12	*Narcissus tazetta* L. subsp. *tazetta*		•				
13	*Narcissus tazetta* subsp. *aureus* (Jord. & Fourr.) Baker		•				
14	*Narcissus tazetta* subsp. *corcyrensis* (Herb.) Baker		•				
15	*Narcissus tazetta* subsp. *italicus* (Ker Gawl.) Baker	•	•	•			

f. YU – Former Yugoslavia, GR – Greece, AL – Albania, BG – Bulgaria, RO – Romania, XK – Kosovo

the Euro-Mediterranean area, high vulnerability of habitat loss is reported and even more is anticipated (Lasen et al. 2018). Phylogeny of *Narcissus*, despite of numerous studies carried out so far (Graham & Barrett 2004; Rønsted et al. 2012), mainly including DNA sequence data (*trn*L-F & *ndh*F), is still not well-defined (Berkov et al. 2014).

Concerning the regional diversity of the genus (Table 1), there is evidence for the presence of twelve *Narcissus* taxa in former Yugoslavia, eleven *Narcissus* taxa in Greece, seven *Narcissus* taxa in Albania, two *Narcissus* taxa in Bulgaria, four *Narcissus* taxa in Romania and two *Narcissus* taxa in Kosovo (WCSP 2019; Krasniqi et al. 2019; Barina et al. 2018; Vladimirov et al. 2017; Dimopoulos et al. 2016; Millaku et al. 2013; Euro+Med 2006–; Vangjeli 2003; Vangjeli et al. 2000; Rexhepi 1994; Demiri 1983; Paparisto & Qosja 1981; Hundozi 1980, 1983; Josifović 1975; Paparisto et al. 1962; Turrill 1932). The genus *Narcissus* in Kosovo is considered as a species of international importance (Veselaj et al. 2006). Subspecies *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker is categorized as Endangered (EN) in Kosovo (Millaku et al. 2013).

The aims of our study were: (1) to determine the exact geographic distribution of the two subspecies in Kosovo, visiting different habitats, extensively using literature and herbarium data (Herbarium of the Faculty of Mathematics and Natural Sciences, University of Prishtina) and verifying available data on sites, in order to establish accurate geographic overview, (2) to analyze the composition of the plant populations and their status across different habitats and (3) to determine which populations are most vulnerable to threats and therefore deserve priority in conservation measures.

It is known that distributional data along with spatial information and abundance are vital to the sustainable management of natural habitats, especially those containing endangered or threatened plant taxa. We believe that the provided data in this work represent valuable datasets for protecting Kosovo's biodiversity and implementing comprehensive conservation measures.

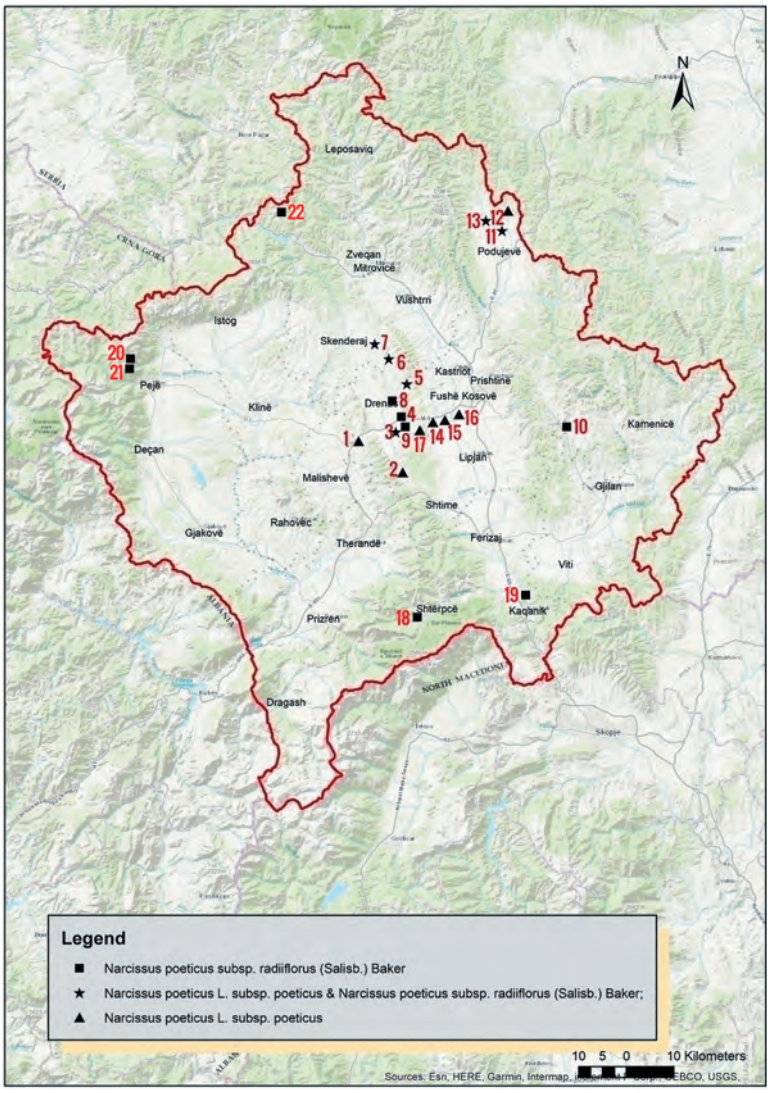

Figure 1. Studied localities of *Narcissus* taxa in Kosovo.

Materials and methods

The present work encompasses an extensive field study (22 different localities), a comprehensive study of available literature data and herbarium material (Herbarium of the Faculty of Natural Sciences, University of Prishtina). The distribution of analyzed localities is given in Fig. 1, while their characteristics are provided in Table 2. Pedological data were obtained from Pavićević et al. (1974) and climatic data from Çavolli (1997). Plant specimens of *Narcissus* subspecies as well as of all associated plant taxa were collected. On each studied site, Area of Occupancy (AOO) as a standardised measure of the area that is occupied by a plant population was calculated (Keith et al. 2018) using GPS data from boundaries of their spatial extent, as well as number of *Narcissus* spp. individuals per 10 m^2. In order to register vegetation types based on the total floristic composition of stands, a phytosociological relevé was made on each plot (Appendix 1) according to Braun-Blanquet (1964). For determination of all plant species, Flora Europaea (Tutin et al. 1964–1980) and Flora of Albania (Paparisto et al. 1988–1992; Qosja et al. 1996; Vangjeli

Table 2. Characteristics of the studied localities.

No	Locality	Region	Ø / O	Altitude (m)	Average temp. (°C)	Sum of precipitation (mm)	AOO (ha)	n (10 m²)
1.	Arllat	Drenicë	Ø	645	10	589	9	15
2.	Krojmir	Drenicë	Ø	621	10	650	8	10
3.	Komoran	Drenicë	Ø & O	598	10	664	18	7
4.	Poklek	Drenicë	O	575	10	650	70	16
5.	Dobroshec	Drenicë	Ø & O	568	10	651	7	12
6.	Qirez	Drenicë	Ø & O	659	10	600	90	450
7.	Prellovc	Drenicë	Ø & O	719	10	590	20	120
8.	Flamuras	Drenicë	O	693	10	626	11	18
9.	Mirenë	Drenicë	O	684	10	626	13	19
10.	Llabjan	Anamoravë	O	830	10	700	11	17
11.	Livadhishtë	Llap	Ø & O	615	10	697	5	11
12.	Dumnicë	Llap	Ø	611	10	697	19	23
13.	Dobërdol	Llap	Ø & O	673	10	697	12	18
14.	Harilaç	Kosovo valley	Ø	576	10	592	24	22
15.	Henc	Kosovo valley	Ø	536	10	592	21	17
16.	Miradi	Kosovo valley	Ø	545	10	582	17	16
17.	Golesh	Kosovo valley	O	930	9	611	9	15
18.	Brezovicë	Sharri Mts	O	1400	9	1000	130	>800
19.	Kaçanik	Sharri Mts	O	542	9	861	13	19
20.	Maja e Vjellakut	Albanian Alps	O	1710	8	902	11	5
21.	Pekleni Mt.	Albanian Alps	O	1630	9	902	14	7
22.	Rogozna Mt.	Kopaonik	O	910	9	627	100	>300

Ø – *Narcissus poeticus* L. subsp. *poeticus*; O – *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker; AOO – Area of Occupancy; n – number of recorded *Narcissus* individuals per 10 m².

et al. 2000) were used, while for final taxonomic verification we relied on EuroMed Checklist (Euro+Med 2006–). Much care has been taken to accurately identify the two *Narcissus poeticus* L. subspecies on each studied locality. The most distinctive features were corona shape (discoid – *poeticus* or cylindrical – *radiiflorus*), clear distinction of claw on perianth segments (*radiiflorus*) or without disctint claw (*poeticus*), the more starry shape of flowers and non-overlapping petals (*radiiflorus*) or the petals were overlapping (*poeticus*), among others. As the studied taxa were mainly found on increasingly fragmented landscapes due to anthropogenic influences, efforts were made to evaluate the presence of pressures and threats towards them. On each site a form was filled in, concerning the fragmentation of population(s), main apparent anthropogenic influences (like urbanization, water/soil pollution, recreation, etc.) and approximate determination of the extent of negative impact was noted. Plant species were studied in 21 different locations (Fig. 1) across Kosovo during 2018, and additionally for one locality in Northern Kosovo only literature data were used from a recent publication (Prodanović et al. 2018). Floristic elements were defined according to Meusel et al. (1965, 1978) and modified according to Stevanović (1992).

Results

General characteristics of the studied localities

The majority of studied localities were hay meadows, in phytogeographic terms belonging to the lowland area (localities 1–17 and 19), respectively to the class *Molinio-Arrhenatheretea* Tx. 1937 (class of anthropogenic managed pastures, meadows and tall-herb meadow fringes), the order *Trifolio-Hordeetalia* Horvatić 1963 and the alliance *Trifolion resupinati* Micevski 1957 (vegetation of wet meadows of the subarid continental regions of the Southern Balkans). Locality 18, based on its floristic composition, most likely belongs to the class *Elyno-Seslerietea* Br.-Bl. 1948 (class of alpine and subalpine calcicolous swards of the nemoral mountain ranges of Europe), the order *Onobrychido-Seslerietalia* Horvat 1960 and the alliance *Anthyllido-Seslerion klasterskyi* Simon 1958 (vegetation of alpine tussock grasslands on limestone in mountains of the southern and central regions of the Balkan Peninsula). Releves on localities 20, 21 as well as those on 22 are, at the moment, difficult to be properly classified syntaxonomically due to their unique floristic composition and ecological characters. Therefore, they will need to be treated in more detail in future studies, with focus on their syntaxonomy.

Based on the phytosociological relevés on all sites (Appendix 1), the most common companion plant species recorded in these *Narcissus* L. habitats were: *Hordeum secalinum* Schreb., *Inula britannica* L., *Plantago lanceolata* L., *Oenanthe silaifolia* M. Bieb., *Schedonorus pratensis* (Huds.) P. Beauv., *Carex distans* L., *Alopecurus pratensis* L. and *Filipendula vulgaris* Moench.

Additionally, three localities in high-mountain pastures were recorded: in Sharri Mts (locality 18) and in the Albanian Alps of Kosovo (localities 20 and 21). These localities singled out with completely unique features. Here, following accompanying plant species were recorded as more dominant: *Anthoxanthum odoratum* L., *Poa bulbosa* L., *Bromopsis erecta* (Huds.) Fourr., *Luzula forsteri* (Sm.) DC., *Geum montanum* L., *Asphodelus albus* Mill., *Iris reichenbachii* Heuff. and *Potentilla micrantha* DC. among others. These two localities belong to the mountain beech forest and the Bosnian pine zone forests (*Pinion heldreichii* Horvat 1946) at > 1715 m. a.s.l. on calcareous substrates.

Ecological characteristics of the studied localities

In the localities Arrlat (1), Krojmir (2) and Poklek (4), natural populations of *Narcissus poeticus* L. subsp. *poeticus* were growing on hay meadows. They shared similar characteristics concerning their population stands, habitat and species composition of their vegetation types. In all three sites, subsp. *poeticus* was observed to form relatively small and considerably fragmented populations, the smallest one being in Krojmir (2; 10 individuals/m^2, AOO 8 ha). In Poklek (4), a very broad distribution of *Narcissus* was observed (AOO 70 ha). The construction and expansion of nearby human settlements as well as the extension of roads are continuously endangering the natural populations of *Narcissus* in these localities.

In Komoran (3) two subspecies were present: *N. poeticus* L. subsp. *poeticus* and *N. poeticus* subsp. *radiiflorus*. They were growing in meadows surrounded by human settlements on all sides. These populations were fragile and rather small (altogether within an AOO of 18 ha). Constructions of a highway, hotels as well as various workshops along its natural habitat have had a direct impact on reduction of its habitat for some >30%, compared to the borders described by Hundozi (1980).

Other potential factors that will further endanger these populations are the water pollution in Drenica River, the expansion of human settlements and their collection as ornamental plants.

The other three localities of Drenica region, Dobroshec (5), Qirez (6) and Prellovc (7), had quite a similar habitat structure and floristic composition compared to Komoran (3). Here, the presence of the two *Narcissus* subspecies was also observed. Anyhow, there are differences worth noting. In Dobroshec (5) the population was exclusively small in terms of its spatial distribution. Its AOO was only 7 ha and the habitat was highly disturbed from alleyways that pass through meadows and also from the sewage water that passes nearby. On the other hand, localities Qirez (6) and Prellovc (7) had richer and more stable *Narcissus* populations. In particular in Qirez, the populations of *Narcissus* subspecies were rich in adult individuals (450 individuals per 10 m^2) and the AOO was considerably large (90 ha). In Prellovc (7), the populations were registered as very stable and not threatened. In all these three localities of Drenica region, the only factor that could endanger the natural populations of *Narcissus* subspecies is the excessive and irresponsible gathering of these plants in their flowering stage as decorative plants.

Narcissus poeticus subsp. *radiiflorus* was present in Flamuras (8) and Mirenë (9) with similar habitat and floristic characteristics. Here, the number of mature individuals of *Narcissus* was abundant taking into account the habitat AOO (Table 1). Subspecies *radiiflorus* was observed to form patches of individuals scattered uniformly across the meadows. Their populations in these two localities were observed to be stable and no damage was observable herein. Anyhow, as in many other localities of the studied *Narcissus* populations, irresponsible gathering of these plants from their natural habitats as well as habitat alterations from human activities remain a potential threat there.

Llabjan (10) is a hay meadow, where *Narcissus poeticus* subsp. *radiiflorus* is recorded. The population is very small (17 mature individuals per 10 $m^{2)}$. Llabjan is also an isolated locality in Anamorava region of Kosovo. In the vicinity of meadows in Llabjan, inert waste was found, distributed in two places in these meadows. In this locality, the habitat loss occurred as a result of urban and industrial construction.

Livadhishtë (11) and Dobërdol (13) from the Llapi valley are characterized by similar features. Both subspecies *N. poeticus* L. subsp. *poeticus* and *N. poeticus* subsp. *radiiflorus* are growing there. *Narcissus* habitat at Livadhishtë comprised 5 ha. In both of these localities, local people collect *Narcissus* flowers for trade, damaging and endangering their habitats and driving it to critical status levels. In Dobërdol (13) the population is more sustainable than in Livadhishtë in all terms (Table 2). In floristic terms and general ecological composition of the habitat, also Dumnica (12) was quite similar, but only *N. poeticus* L. subsp. *poeticus* is growing there and AOO is considerably larger (19 ha) in comparison to the other two localities in Llapi valley.

From the four studied localities in the Kosovo valley, Harilaç (14), Henc (15) and Miradi (16) shared very comparable features. In all of them, only *N. poeticus* subsp. *poeticus* was growing. In Harilaç, the number of individuals recorded per 10 m^2 was 22 with the higher AOO (24 ha), while in Miradi the number of individuals recorded per 10 m^2 was 16 and the AOO was 17 ha. In these localities, *Narcissus* was growing in hay meadows forming patches of individuals scattered uniformly. *Narcissus* populations in all three localities were subject of human induced pressures that resulted in changes of their natural habitat structure, mainly through road construction, agriculture and the improper herbicide use and application as well as sewage waters.

The fourth studied locality of *Narcissus poeticus* subsp. *radiiflorus* in Kosovo plain, Golesh (17), had very different characteristics compared to the previous three ones of the same region, due to higher altitude (930 m a.s.l.) as well as to its serpentine substrate. The AOO in Golesh was 9 ha with an average of 15 *Narcissus poeticus* subsp. *radiiflorus* individuals per 10 m^2. It was growing on dry grasslands of the eastern slope of the mountain. The studied habitat here has not been observed to be particularly threatened at the moment. However, due to the small population and harsh conditions on serpentine soils, continuous monitoring would be highly recommended.

In the Sharri Mountains, *Narcissus* was recorded growing naturally in Brezovicë (18) and Kaçanik (19). In both localities, only *N. poeticus* subsp. *radiiflorus* was present. From all studied localities of *Narcissus* in Kosovo, Brezovicë was the richest one in all terms (AOO >130 ha and more than 800 *Narcissus* individuals per 10 m^2). The habitat was stretched in a variable relief at an average altitude of 1400 m a.s.l of natural grasslands, characterized by a rich floristic diversity. In this locality, this subspecies was forming several small populations fragmented equally from one another, usually growing nearby habitats dominated by common alder (*Alnus glutinosa* (L.) Gaertn.). Habitats in Brezovicë were sustainable and there have been no threats recorded that could potentially endanger their natural viability. Floristic diversity in this locality was extraordinary rich (Appendix 1). The AOO in Kaçanik (named by locals as Bob or meadows of Bobi) was >13 ha, while the number of individuals per 10 m^2 was 19. The floristic diversity and the habitat was rich, too, but threatened directly by human activities (mainly by farming, extensive grazing and collecting of *Narcissus* plants for trade).

According to Millaku et al. (2013), *N. poeticus* subsp. *radiiflorus* was found in Maja e Vjellakut (20; Albanian Alps), while during 2018 this subspecies was also found in Pekleni Mt (21) as a new locality. Both localities share very similar characteristics in terms of floristic composition and habitat preferences. Anyhow, Maja e Vjellakut (20) had very small number of individuals recorded per 10 m^2 (only 5 *Narcissus* individuals) providing the most fragile natural population of *Narcissus* in the country. A slightly richer population was recorded in Pekleni Mt (21) with 7 *Narcissus* individuals per 10 m^2 and AOO of 14 ha. *Narcissus* populations recorded in these two localities are isolated ones in forest clearings at higher altitudes (>1630 m a.s.l) and they are not subject of being endangered from human induced activities compared to other populations growing down in hay meadows. Anyhow, even here, human induced fires can represent a direct threat to their populations. All accompanying plant species recorded in these two localities (20 and 21) do not grow with *Narcissus poeticus* subsp. *radiiflorus* in other habitats.

According to Prodanović et al. (2018), *N. poeticus* subsp. *radiiflorus* was found in Rogozna Mt (22), at the foots of Kopaonik Mts. It was recorded forming two small populations close to each other, inhabiting wet meadows. These populations have an exceptionally high number of individuals, an estimated thousands of *Narcissus* plants. As this locality is far from settlements, it is believed that there is no real human induced threat exposed to them at the moment.

Discussion

This work presents the first comprehensive contribution towards the ecology and distribution of two present *Narcissus* subspecies (*N. poeticus* L. subsp. *poeticus* and *N. poeticus* subsp. *radiiflorus* (Salisb.) Baker) in Kosovo. The provided data, besides the map and phytosociological relevés, establish an essential basis for supporting national sustainable management of meadows and

natural grasslands, based on their conservation priorities and threats being exposed to. Information provided here will be useful for evaluating future human impacts on natural habitats as well as on distribution of these valuable and threatened plant taxa.

Based on our own field data, literature review and available herbarium material, *Narcissus poeticus* L. subsp. *poeticus* was recorded to grow naturally in the following localities in Kosovo: Arllat, Krojmir, Komoran, Dobroshec, Qirez, Prellovc, Livadhishtë, Dumnicë, Dobërdol, Harilaç, Henc and Miradi. In total, its AOO in the country reaches ~ 250 ha, spread across 12 localities. The most vital and rich population of these subspecies was recorded in Qirez, though the *Narcissus* population there was a mixture of the two subspecies. The smallest *Narcissus poeticus* L. subsp. *poeticus* population was recorded in Livadhishtë (AOO >5 ha and 11 individuals per 10 m^2). Our findings correspond to those reported by Hundozi (1980, 1982, 1983). Sarić & Diklić (1986) report the taxon only for Skënderaj without providing precise localities. There, we have studied in detail 6 localities (1–6). Additionally, Sarić & Diklić (1986) mention one locality called Zabel (above Klina). Anyhow, we were unable to verify the presence of the subspecies there. Therefore, it was most probably reported erroneously for this locality. Based on field observations, the most threatened *Narcissus poeticus* L. subsp. *poeticus* population is recorded in Arllat.

Narcissus poeticus subsp. *radiiflorus* (Salisb.) Baker was recorded to grow naturally in the following localities in Kosovo: Komoran, Poklek, Dobroshec, Qirez, Prellovc, Flamuras, Mirenë, Llabjan, Livadhishtë, Dobërdol, Golesh, Brezovicë, Kaçanik, Maja e Vjellakut and Pekleni Mt. Subspecies AOO reaches ~ 434 ha, spread across 15 localities. The largest and richest population was recorded in Brezovicë (Sharri Mts), where several small populations equally separated from one another were found. The smallest population was recorded in Maja e Vjellakut (in the Albanian Alps of Kosovo), AOO was >11 ha and only 5 individuals within 10 m^2. *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker is an endangered taxon (EN) in Kosovo (Millaku 2013). The two reported localities, where *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker was growing in the Albanian Alps of Kosovo, represent a new finding of a particular biodiversity and floristic importance. Josifović (1975) mentions this taxon only for three localities in Kosovo (localities 10, 11 and 19 in our list).

Based on comparison with availabe literature sources, we can conclude that in total 11 localities (1, 3, 4, 6, 7, 8, 9, 13, 14, 15 and 21) with the presence of *Narcissus* taxa new for Kosovo are reported in this study (Table 3). Out of them, four localities with the presence of populations of both subspecies shared the same habitats.

It is worth mentioning that in a large part of Kosovo valley extending from Ferizaj to Lipjan (central and south-eastern Kosovo), there do not grow any *Narcissus* populations, despite of very similar ecological conditions as in localities 14–17 in our study. The same was reported by Micevski (1968), who did not find *Narcissus* taxa, even not as an accompanying plant species. Surprisingly, though Josifović (1976) mentions *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) for Ferizaj, while Hundozi (1983) mentions *N. poeticus* subsp. *poeticus* for Ferizaj, we have not been able to verify the presence of *Narcissus* in those habitats, as described. Probably, the species' habitats have been damaged and/or altered and, as a result, the taxa disappeared completely.

In floristic terms, all populations of *Narcissus* taxa spreading in the Kosovo valley have very similar floristic composition of accompanying plant species. Major differences were observed between

Table 3. List of all 22 recorded localities of two *Narcissus* subspecies and their corresponding data.

No.	Locality name	Subspecies	Data status	Literature reference
1.	Arllat	*Narcissus poeticus* L. subsp. *poeticus*	■	—
2.	Krojmir	*Narcissus poeticus* L. subsp. *poeticus*	≠	Josifović (1975)
3.	Komoran	*Narcissus poeticus* L. subsp. *poeticus* *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	■	—
4.	Poklek	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	■	—
5.	Dobroshec	*Narcissus poeticus* L. subsp. *poeticus* *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠ ≠	Hundozi (1983) Josifović (1975); Hundozi (1983)
6.	Qirez	*Narcissus poeticus* L. subsp. *poeticus* *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	■	—
7.	Prellovc	*Narcissus poeticus* L. subsp. *poeticus* *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	■	—
8.	Flamuras	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	■	—
9.	Mirenë	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	■	—
10.	Llabjan	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠	Josifović (1975)
11.	Livadhishtë	*Narcissus poeticus* L. subsp. *poeticus* *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠	Josifović (1975)
12.	Dumnicë	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠	Josifović (1975); Hundozi (1980; 1983)
13.	Dobërdol	*Narcissus poeticus* L. subsp. *poeticus* *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	■	—
14.	Harilaç	*Narcissus poeticus* L. subsp. *poeticus*	■	—
15.	Henc	*Narcissus poeticus* L. subsp. *poeticus*	■	—
16.	Miradi	*Narcissus poeticus* L. subsp. *poeticus*	≠	Hundozi (1980)
17.	Golesh	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠	Krasniqi (2019)
18.	Brezovicë	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠	Josifović (1975)
19.	Kaçanik	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠	Josifović (1975); Hundozi (1983)
20.	Maja e Vjellakut	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠	Millaku (2013)
21.	Pekleni Mt	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	■	—
22.	Rogozna Mt	*Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker	≠	Prodanović et al. (2018)

Data status icons meaning: ■ – new data; ≠ – known also from literature.

populations in Kosovo valley and those in Sharri Mountains. The most distinct populations in terms of vegetation cover and floristic composition are those reported for the first time in the Albanian Alps of Kosovo (Pekleni Mt) and Maja e Vjellakut (Millaku et al. 2013), as these populations here are accompanied by plant species that are unusual for *Narcissus* habitats in hay meadows. The majority of the plant species accompanying *Narcissus* there are endangered and listed in the Red Book of Vascular Flora of the Republic of Kosovo (Millaku 2013), e.g. *Lilium albanicum* Griseb., *Fritillaria messanensis* subsp. *gracilis* (Ebel) Rix, *Gentiana lutea* L., *Genista radiata* (L.) Scop. and *Pinus heldreichii* H. Christ.

The distributional preferences of *Narcissus* taxa in Kosovo concerning the altitude lie between 500 and 700 m a.s.l. (Fig. 2) except of localities in Golesh (930 m), Brezovicë (1400 m), Maja e Vjellakut (1710 m) and Pekleni Mt (1630 m). Additionally, a positive correlation between the

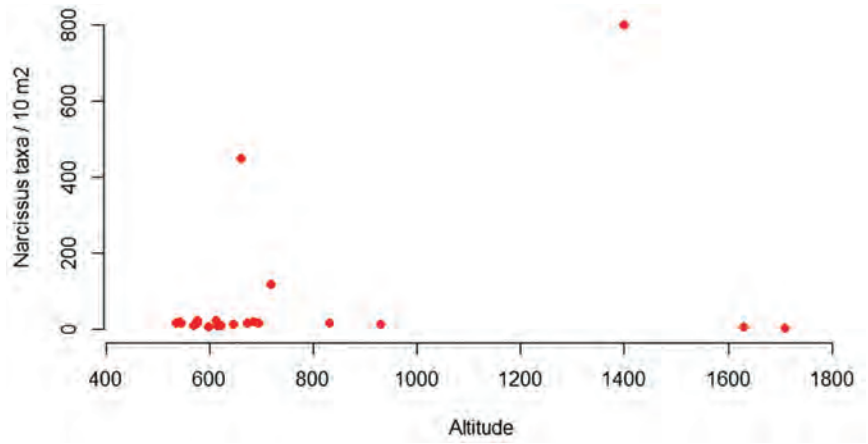

Figure 2. Distributional preferences of *Narcissus* taxa along the altitude.

AOO and the species density per 10 m^2 was observed at the AOO range between 6–30 ha, where the largest proportion of species numbers was recorded (Fig. 3).

In total, six localities with two *Narcissus* subspecies are present in Komoran (3), Dobroshevc (5), Qirez (6), Prellovc (7), Livadhishtë (11) and Dobërdol (13) (Fig. 1).

Narcissus species density per 10 m^2 compared to the AOO (Fig. 4) across all 22 localities highlights three richest and most viable populations of *Narcissus* in Kosovo: Poklek (4), Qirez (6) – [*Narcissus poeticus* subsp. *radiiflorus* and *Narcissus poeticus* subsp. *poeticus*], Brezovicë (18) – [*Narcissus poeticus* subsp. *radiiflorus*] and Rogozna (22) – [*Narcissus poeticus* subsp. *radiiflorus*]. All these four localities are characterized by sustainable *Narcissus* populations with little or no pollution, neither anthropogenic influences nor non-fragmented populations.

Particularily in Brezovica (18), *Narcissus* populations are well developed, rich in floristic terms and in good, viable condition due to higher altitude and favorable conditions.

The smallest and the most fragile *Narcissus* populations were recorded in Arllat (1) and & Krojmir (2) – [*Narcissus poeticus* subsp. *poeticus*], with road construction and settlement expansion as the

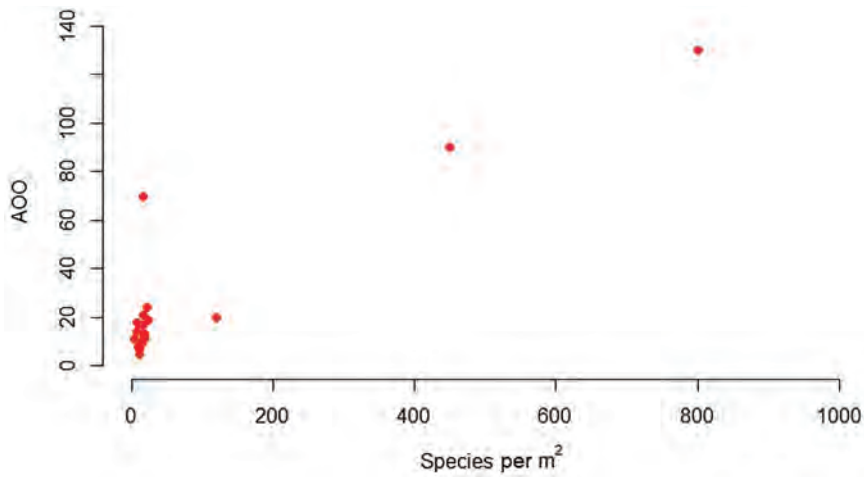

Figure 3. Area of Occupancy (AOO) versus the *Narcissus* species density.

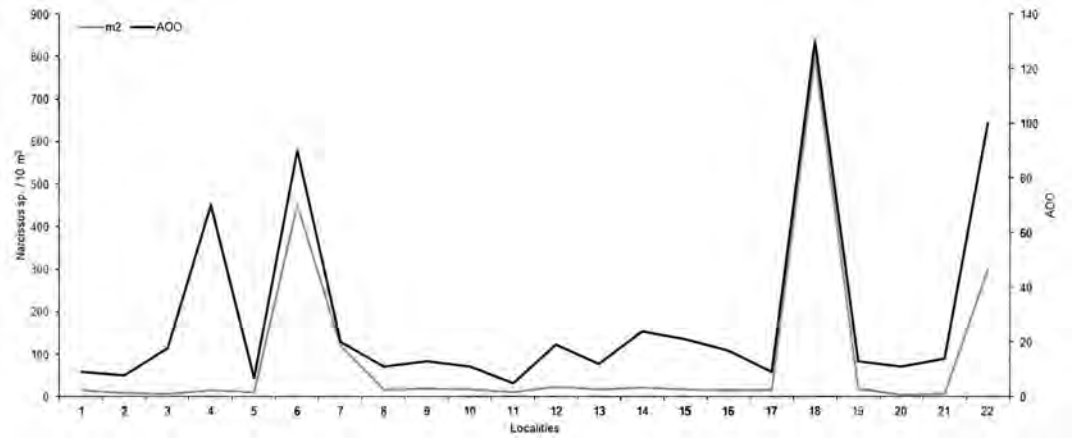

Figure 4. *Narcissus* species density per m^2 versus the Area of Occupancy (AOO) along all 22 studied localities.

obviously most destructive factors, in Livadhishtë (11) – [*Narcissus poeticus* subsp. *radiiflorus* and *Narcissus poeticus* subsp. *poeticus*], with overcollection of plants for trade purposes and in Maja e Vjellakut (20) – [*Narcissus poeticus* subsp. *radiiflorus*] that has a very restricted natural range.

Conclusions

Narcissus taxa are increasingly under threat because of over-collection and there are continuous threats towards their natural habitats by urban development, alien species, climate change and agriculture. Globally, many species of the genus have already become extinct, requiring increased vigilance in the conservation of wild species (Mathew 2003). From our studied subspecies in Kosovo, *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker is already enlisted in the Kosovarian Red Book of Vascular Flora (Millaku 2013) as well as in the Red List of Plant Species (Anonymous 2014) as Endangered (EN). On European level, it is listed as 'strictly protected' in the 1st Annex of the Bern Convention (Anonymous 1979) (with synonymous name *Narcissus angustifolius* Curtis ex Haw.), as well as in the European Red List of Vascular Plants (Bilz et al. 2011) as DD (Data Deficient) species.

Unlike other localities, *Narcissus poeticus* subsp. *radiiflorus* populations in Brezovica are in good condition and have not been threatened by any disturbing factor so far. Its populations in the Albanian Alps of Kosovo (Pekleni Mt & Maja e Vjellakut) deserve continuous monitoring and protection measures, as they are very small and fragile. We believe also that there might be additional small populations of *Narcissus poeticus* subsp. *radiiflorus* in the surrounding mountain massifs in the Albanian Alps of Kosovo and inside the Montenegrin part of the mountains. *Narcissus poeticus* subsp. *radiiflorus* population in Llabjan (10) nearby Artana shall be put under conservation priority due to the fact that its being threatened directly by construction of roads and urbanisation.

Main threats affecting natural populations of *Narcissus* subpecies across Kosovo (Table 4) depicts three localities in Kosovo valley (14, 15 and 16) as being more prone to a variety of threats. Main threats are summarized in Fig. 5, where wild collection of *Narcissus* plants along with road construction appear to be the most serious.

Narcissus poeticus L. subsp. *poeticus* has a very small AOO of only 250 ha in the whole country, and its populations are spread across twelve localities. Subspecies populations are generally well

Table 4. Main registered threats towards *Narcissus* populations across 22 studied localities.

Threats	Localities																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Wildfires	•	•															•	•	•	•	•	•
Road construction	•	•	•	•						•				•	•	•						
Urban development										•				•	•	•						
Water scarcity							•							•	•	•	•					
Collection			•		•	•	•	•	•		•	•	•									•
Settlements	•	•		•				•	•													
Agriculture								•						•	•	•						
Restricted range																				•	•	
Water pollution							•							•	•	•	•					

adapted and in good condition, compared to the other subspecies. But yet, its population has very narrow distribution of only 5 ha, counting 11 individuals per 10 m^2 in Livadhishtë (11) .

Therefore, we would highly recommend to start immediately conservation measures in these critical sites where the taxon is more fragile, and also combine it with education and proper information of local people, guiding them to halt its wild collection.

Taking into account all of the information collected concerning the distribution and the degree of present and foreseen threat of two *Narcissus* subspecies, we would highly recommend the beginning of a conservation program. In that program, attention shall be given to properly selecting the translocation sites, determining minimum viable populations, monitoring the dynamics of the population and taking corrective actions if necessary.

Acknowledgements

The authors would like to thank the anonymous reviewers for their helpful and constructive comments that greatly contributed towards improving the final version of the paper. We thank

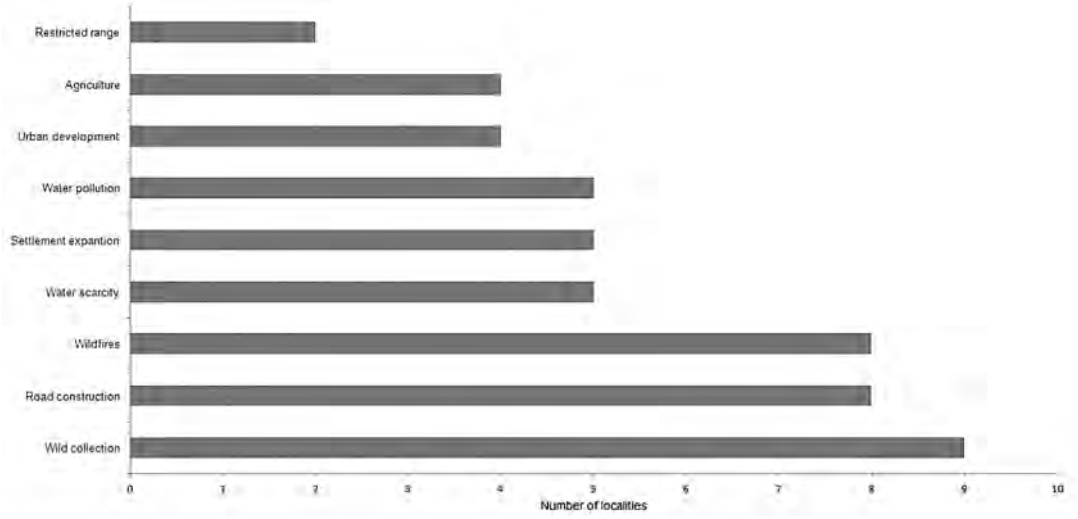

Figure 5. Main registered threats affecting *Narcissus* populations across Kosovo.

Prof. Ferim Gashi (University of Prishtina, Department of Geography) for provided help with the map. Eventually, we are thankful to senior botany Prof. Ferat Rexhepi † (University of Prishtina) for many helpful suggestions and critical discussion of the work.

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Appendix 1. Table of phytosociological relevés. ▶

Number of locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Constan.
Plot area (m²)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	400	
Inclination in degree	8	5	8	5	3	5	3	15	12	5	0	5	7	4	5	0	20	18	10	20	15	40	
Exposition	NE	S	NE	S	SE	N	S	N	NE	N	SE	E	S	E	E	O	NW	NW	SE	NE	S	N	
Altitude (m a.s.l.)	645	621	598	575	568	659	719	693	684	830	615	611	673	576	536	545	930	1400	542	1710	1630	910	
Covering (%)	95	98	100	98	95	97	100	95	98	97	100	98	100	100	100	98	95	100	95	98	95	90	
Substrate	Silicate	Silicate	Limestone	Silicate	Limestone	Limestone	Limestone	Serpentine	Serpentine	Limestone	Limestone	Limestone	Limestone	Limestone	Limestone	Limestone	Serpentine	Limestone	Limestone	Limestone	Limestone	Silicate	
Locality name	Arllat	Krojmir	Komoran	Poklek	Dobroshec	Qirez	Prellovc	Flamuras	Mirenë	Llabjan	Livadhishtë	Dumnicë	Dobërdol	Harilaç	Henc	Miradi	Golesh	Brezovicë	Kaçanik	M. Vjellak	B. Peklen	Rogozna	
Date	03.05.2018	03.05.2018	03.05.2018	05.05.2018	05.05.2018	07.05.2018	07.05.2018	10.05.2018	10.05.2018	12.05.2018	13.05.2018	13.05.2018	13.05.2018	14.05.2018	14.05.2018	14.05.2018	10.05.2018	15.05.2018	16.05.2018	18.05.2018	20.05.2018	12.05.2012	
GPS Coordinates	N 42 32.889 E 20 49.402	N 42 29.513 E 20 56.225	N 42 34.230 E 20 54.747	N 42 37.544 E 20 54.472	N 42 39.496 E 20 56.486	N 42 42.516 E 20 54.023	N 42 44.208 E 20 52.072	N 42 34.523 E 20 56.463	N 42 33.522 E 20 57.469	N 42 34.435 E 21 20.946	N 42 56.772 E 21 11.217	N 42 59.343 E 21 12.557	N 42 58.140 E 21 08.740	N 42 35.223 E 21 00.537	N 42 34.949 E 21 02.518	N 42 35.772 E 21 04.520	N 42 34.353 E 20 59.031	N 42 12.855 E 20 57.969	N 42 14.908 E 21 15.127	N 42 41.681 E 20 13.895	N 42 40.911 E 20 13.803	N 42 36.700 E 30 20.583	
Hordeum secalinum Schreb.	+	+	2	1	+		+	1	1	+	3	3	2	1	2	+	+	+	+	1			V
Inula britannica L.	1	1	+	1	+	+	+	+	+	+	1	1	+	1	1	1	+	+	+		+	+	V
Plantago lanceolata L.	2	1	2	1	1	1		+	+	1	1	1	1	1	+	+	+	+	+		+	+	V
Oenanthe silaifolia M. Bieb.	+	+	+	+	+		+	1	+	+	+	2	1	1	+	1	1		+			1	V
Schedonorus pratensis (Huds.) P. Beauv.		1	1	1		+		+	+	2	2	2	2	1	1	1	+		1				IV
Carex distans L.	+	+	+	+	+		+		+		3	1	2	+	+	+							IV
***Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker**			**2**		**3**	**1**	**+**	**1**	**2**	**1**	**2**	**2**	**1**		**+**		**1**	**2**	**2**	**3**	**2**	**4**	IV
Alopecurus pratensis L.		+	+				+	+	+	+	+	1	+	1	1	+	+	+	+	+			IV
Silene flos-cuculi (L.) Clairv.	+		+	+	+	1	+	+	+	+	+	+	+		+			+	+				IV
Filipendula vulgaris Moench	+	+		+	+	+	+			+	+	+	+	+	+		+	1		+	+	2	IV
Phleum pratense L.	1	1	1	1	1	+	+	+	+		+	+	+				+		+		+		IV
Trifolium fragiferum L.	1	+	3	+	1	1	1		+	+	2	2	2	2	2	2			2				IV
Lotus corniculatus L.	+	1	2	1	2	1	1	+	+	+	+	+		+	+	+	+		+				IV
Poa trivialis subsp. *sylvicola* (Guss.) H. Lindb.	+	+	+	+	+	+		+	+	+	2	+	2	2	2	2	+		+				IV
Cynosurus cristatus L.	+	+	+		+	+	+	+	+		1	1	2	+		+	+	+	+				IV
Achillea millefolium L.	+	+		+	+	+	+	+	+				+		+	+	+	+	+	+			IV

Number of locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Agrostis stolonifera L.	1	1		2	+	+	+	+	+			1	+	1	+	1	+		+	+			IV
Trifolium pratense L.	3	3	2	3	2	1	2			2	1	1	+	1		+		1	+		+		IV
Trifolium repens L.	+	+		+	+	+	+		+		2	1	+		+	1		+	+		+		IV
Juncus articulatus L.	+	+	+	+	+	+	+				+	+	+	+	+	+	+		+				IV
Poa pratensis L.	+	+	2	+	3	4	3	+	+			+	+		+	+	+		+		+		IV
Crepis biennis L.			+	+	+	+	+	+	+		1	+		+	+	+	+		+				IV
Taraxacum officinale F.H. Wigg.	1	2	1	2	+			+	+		1	+	+	1	1		+	+	+	+	+		IV
Anthoxanthum odoratum L.	+	+	+	+		+	+				2	1	+		+			2	2	1	2		IV
Briza media L.		+		+		+	+	1	1			+	1		+		1	+	+	+	+		IV
Leucojum aestivum L.	+	+	+	+	1	1	1	+	+					1	+	1	+		+				IV
Crocus chrysanthus Herb.								2	2								2						IV
Narcissus poeticus* L. subsp. *poeticus	**2**	**2**	**+**	**2**	**+**	**+**	**2**							**2**	**2**	**2**							III
Serratula tinctoria L.	+	+		+		+					+	+	+	+	+	+		+		+			III
Trifolium subterraneum L.		+		+				+			2	1	1	1	1	1	+						III
Ranunculus velutinus Ten.		+	+		+	+	+	+	+		1	1	1		+		+		+				III
Trifolium resupinatum L.	+			+			+			+	+	+	1	3	1	3		+		+			III
Carex hirta L.	+	+	+	+	+	+	+				+		1	+	+				+		+		III
Ranunculus sardous Crantz			+		1	1	1		+			+		+	+			+	+				III
Bromus racemosus L.					+		+	+	+		2	2	2	1	+	+		+					III
Potentilla reptans L.		+		+						+	+		1	+	+	1		+	+		+		III
Prunella vulgaris L.		+	+	+	+	+	+				+		1		+			+	+				III
Rhinanthus minor L.				+	+		+				1	+	+	1	1	+		+	+	+	+		III
Tragopogon pratensis subsp. *orientalis* (L.) Čelak.		+	1			+	+	1	1		+	+	+	1	+	+			+				III
Lysimachia nummularia L.	+	+		+	+	+					+		+	+		+		+			+		III
Anacamptis palustris (Jacq.) R.M. Bateman, Pridgeon & M.W. Chase				+	+	+	+	+	+	2		+	+		+			+	+	+			III
Lathyrus pratensis L.	+	+	+		+						+			+	1	+		+				1	III
Taraxacum palustre (Lyons) Symons	+	+	+	+		+	+				1	1	+			1							III
Daucus carota L.	+	1				+	+	+	+			+		+	+	+	+		+				III
Scutellaria hastifolia L.	+	+		+				+	+			+			+	+	+						III
Equisetum palustre L.	+		+		+		+			+	1		+		+			+					III
Cerastium fontanum subsp. *vulgare* (Hartm.) Greuter & Burdet		+		+		+				+		+	1	+	+	+			+				III
Stellaria graminea L.	+	+	+	+			+				+	+	+	+					+		+		III
Lolium perenne L.		+		+		+	+				1	+	2	1	2	1			+				III
Ranunculus polyanthemos L.					+	+	+			+		1	+	1	1	1			+				III

Number of locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Ranunculus repens L.		+	+	+	+			+	+		1	1	+					+					III
Elytrigia repens (L.) Nevski	+	+	+					+	+			+	+	+	+	+		+	+				III
Juncus compressus Jacq.				+		+	+				1	1	+		+	+			+		+		III
Allium vineale L.	+	+	+	+							1	+	1	+	+	1							III
Lythrum salicaria L.			+			+	+	1	1		1	1	1				1	+	1	+	+		III
Galium verum L.						+	+					+		+				+	+	+	+	1	III
Rumex crispus L.	+	+	+	+	+						+				+	+		+	+				III
Rorippa sylvestris (L.) Besser	+	+	+			+	+	+	+				+	1	1	1	+		+				III
Cichorium intybus L.				+				+	+			+	+		+		+	+	+		+		III
Equisetum arvense L.	1	1	1	1	+		+				+	+				+			+				III
Mentha pulegium L.						+	+	+			+			+		+	+	+	+				III
Crepis setosa Haller f.	+	+	+	+			+	+	+						+	1	+						III
Holcus lanatus L.		+	+					1	1					+	1	+	1		+				III
Plantago major L.	+	+		+	+		+							+	+	+		+	+	+	+		III
Cirsium canum (L.) All.	+	+	+	+		+								2	+				1	+			III
Cirsium arvense (L.) Scop.	2	2	+	2	+	+	+	+	+	+							+	+	2				III
Trifolium campestre Schreb.	2	2	1	2	+			+	+								+		1		+		III
Poa bulbosa L.	1	1	1	2	+	+	+			2								+	2	2			III
Plantago media L.	+	+	1	+		+		2	2	1								+	+				III
Sedum ochroleucum Chaix.					1	1	2	1	1	+							1	+	+		+		III
Luzula forsteri (Sm.) DC.					+		+	+	+								+	1	1	+	2		III
Sedum acre L.					+	+	+	+	+	+							+	+	+	+			III
Sanguisorba minor Scop.					1	+	1	+		+							+	+	+	+	+		III
Rumex acetosa L.	+	+		+		+									+							1	II
Trifolium patens Schreb.		1	1	+		+	+					1		1	+								II
Alopecurus utriculatus Sol.	1	1						+	+		+	+	+		+								II
Leucanthemum vulgare Lam.	+	+		+							1	+	1	+				+		+			II
Trifolium michelianum var. *balansae* (Boiss.) Azn.			+			+					+		+	2	2	3							II
Stachys officinalis (L.) Trevis.		+	+			+	+				+	+		+					+				II
Ononis spinosa L.					+	+	+				+	+		+	+				+				II
Sanguisorba officinalis L.		+	+			+	+					+	1									+	II
Gratiola officinalis L.		+		+	+						+	+	+	+	+								II
Medicago lupulina L.		+		+							+	+	+		+				+				II
Rhinanthus angustifolius C.C. Gmel.			+	+			+				+		+		+								II
Ranunculus acris L.			+						+					+		+						2	II
Trifolium micranthum Viv.					+		+	+	+					1	1		+						II

Number of locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Ranunculus polyanthemos subsp. *nemorosus* (DC.) Schüb. & G. M.			+	+		+								+	1								II
Rumex conglomeratus Murray		+			+		+							+	+				+				II
Ranunculus millefoliatus Vahl	2	2	2	1			+			2									2				II
Ornithogalum umbellatum L.	1	+	+	+	1	1	1			2													II
Salvia verticillata L.	1	2		2	1	+	+												+				II
Klasea lycopifolia (Vill.) Á. Löve & D. Löve	1	1	2	+														+	+	+			II
Allium sphaerocephalon L.						+	+	3	2								3	1			+		II
Luzula multiflora (Ehrh.) Lej.					+	+		2	3								2	1	1		+		II
Agropyron cristatum subsp. *pectinatum* (M. Bieb.) Tzvelev						+	+	2	2								2			+			II
Bromus squarrosus L.								1	1	+							1	1					II
Melica ciliata L.								1	2								1		+		+		II
Helianthemum nummularium (L.) Mill.							+	1	1								1	+	+	2	+		II
Trifolium alpestre L.						+	+	1	1								1	+					II
Crocus biflorus Mill.					+	+		+	+								+						II
Allium flavum L.					+	+	+	+	+								+		+				II
Hippocrepis emerus (L.) Lassen subsp. *emerus*					+	+	+	+	+								+						II
Potentilla micrantha DC.									+								+	+	1	+	1		II
Thalictrum minus L.							+			+										+	+	2	II
Ajuga genevensis L.					1	1	1												+			1	II
Veronica austriaca L.										+								+	+	+	+	+	II
Plantago argentea Chaix						+	+													1	2	+	II
Anacamptis morio (L.) R.M. Bateman, Pridgeon & M.W. Chase										1								+	+	+	+	+	II
Polygala comosa Schkuhr					+	+				+									+	+	+	+	II
Potentilla erecta (L.) Räusch.					+	+	+			+								+		+	+	+	II
Melampyrum arvense L.					3	2	2												+		+		II
Sorbus graeca (Spach) Schauer																				1	+		II
Vicia cracca L.			+								+		+						+				I
Galium debile Desv.			+											+	+	1							I
Ranunculus millefoliatus Vahl.						+											+		+				I
Euphorbia glabriflora Vis.								+	+	+							+						I
Erodium cicutarium (L.) L'Her.								+	+								+						I
Pedicularis palustris L.					+	+	+												+				I
Eleocharis palustris (L.) R. Br.						+													+			1	I
Mercurialis ovata Sternb. & Hoppe																						+	I

Number of locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Carex filiformis L.							+											+	+			+	I
Quercus petraea (Matt.) Liebl.						+	+														+	+	I
Saxifraga bulbifera L.										2								+	+				I
Luzula pilosa (L.) Willd.										1								+	+	+			I
Inula salicina L.										1									+		+		I
Hypochaeris maculata L.										1													I
Carex caryophyllea Latourr.																		1	+	1			I
Alnus glutinosa (L.) Gaertn.																		+					I
Geum montanum L.																		1	1	1	2		I
Veratrum album L.																		1		+	+		I
Geum coccineum Sibth. & Sm.																		1	+				I
Juniperus communis subsp. *nana* Syne																		1	+				I
Dactylorhiza cordigera (Fr.) Soó																		1	1				I
Bromopsis erecta (Huds.) Fourr.																		1	1	1	2		I
Phleum montanum Koch.																		1	+				I
Anemonastrum narcissiflorum (L.) Holub.																		+	+	+			I
Salix caprea L.																		1					I
Anthyllis vulneraria L.																		2			+		I
Viola aetolica Boiss & Heldr.																		2	+	+	+		I
Onobrychis montana subsp. *scardica* Griseb.																		2			+		I
Lilium albanicum Griseb.																				2	+		I
Fritillaria messanensis subsp. *gracilis* (Ebel) Rix.																				2	3		I
Asphodelus albus Mill.																				3	+		I
Iris reichenbachii Heuff.																				1	2		I
Achillea abrotanoides (Vis.) Vis.																				+			I
Gentiana lutea L.																				1			I
Pinus heldreichii H. Christ.																				+	+		I
Acer pseudoplatanus L.																				+			I
Fagus sylvatica L.																				+			I
Laser trilobum (L.) Borkh.																				1			I
Genista radiata (L.) Scop.																				+	+		I
Sorbus austriaca (Beck) Prain et al.																				+			I
Fraxinus ornus L.																					+		I