

DISTRIBUTION AND HABITAT CHARACTERISTICS OF VELEBIT CLOVER (*TRIFOLIUM VELEBITICUM* DEGEN, *FABACEAE*)

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Velebit clover, *Trifolium velebiticum* was described by Degen and till recently, only three localities in Croatia and one locality in Slovenia have been published, suggesting that this endemic plant of western Croatia and southern Slovenia is very rare. Recent, more detailed surveys, showed that the plant is rather abundant in Croatia, and many new localities have been detected. Single localities have been noted in the paper, accompanied by short habitat descriptions. Based on our observations *Trifolium velebiticum* grows at very different altitudes, in different habitat types, while optimally and the most abundantly on the temporarily flooded grasslands of poljes.

Key words: *Trifolium velebiticum*, distribution, Croatia, Slovenia

Topić, J. & Ilijanić, Lj.: Rasprostranjenost i značajke staništa velebitske djeteline (*Trifolium velebiticum* Degen, *Fabaceae*). *Nat. Croat.*, Vol. 21, No. 1., 119–127, 2012, Zagreb.

Premda je velebitsku djetelinu (*Trifolium velebiticum*) opisao Degen još prije jednoga stoljeća, sve do u najnovije vrijeme bila su poznata samo tri točno određena lokaliteta u Hrvatskoj te jedan lokalitet u Sloveniji. Istraživanja posljednjih godina u Hrvatskoj pokazala su da je ta biljka mnogo češća nego što bi se iz dotadašnjih nalaza moglo zaključiti. U tekstu ovoga priloga navedeni su pojedinačno novi lokaliteti s kratkim opisom staništa. Vidljivo da ta biljka raste na različitim nadmorskim visinama i različitim staništima, najčešće i obilno na povremeno poplavljenim travnjacima krških polja.

Ključne riječi: *Trifolium velebiticum*, rasprostranjenost, Hrvatska, Slovenija

INTRODUCTION

Degen found a peculiar clover »In humosis inter saxa aridissima montis Velebit inter Podprag et Mali Halan alt. c. 900 M.s.m. sol. calc. detexi die 6. Jul. 1905«. Six years later (DEGEN, 1911: 113) he described it as new species *Trifolium velebiticum*, adding also the new taxon, *Trifolium velebiticum* var. *gackae* (originally »Gačkae«), the latter found in 1910 on meadows between lower Švica lake and the settlement of Ponori. As early as 1912, Hirc cited Degen's text about two taxa of *T. velebiticum*, while 25 years later, in the second volume of *Flora Velebitica*, DEGEN (1937: 332–333) repeated both Latin diagnoses as well as the localities cited in 1911.

Although DOMAC (1950) does not list *T. velebiticum* in the first edition of the excursion flora »Flora za određivanje i upoznavanje bilja«, the species was included in next two editions (DOMAC, 1967: 236 and 1994: 207). Obviously, according to

Degen's research, COOMBE in *Flora Europaea* (Vol. 2. 1968, repr. 1978: 170), cited »Rocky places, N. W. Jugoslavia, Ju«.

The first time after Degen, a new locality for *Trifolium velebiticum* was noted by ŠUGAR & PLAZIBAT (1988: 393), positioning it phytosociologically as one of the differential species of the community *Bromo-Plantaginetum* subass. *scorzoneretosum* at Bjelopolje, whence the only herbarium specimen in existence derives (9.VII. 1986 leg. I. Šugar, det. M. Plazibat) (ZA).

Soon after that, FORENBACHER (1990: 454) mentioned *T. velebiticum* from Velebit but as a special type of *T. pratense*, growing in rocky grasslands of a mountain area, without mentioning any locality. According to the data of DEGEN (l.c.) and ŠUGAR & PLAZIBAT (l.c.), Velebit clover was included in *Index florae Croaticae* (LOVAŠEN-EBERHARDT, 1997: 85).

Accordingly, only three exactly defined localities were previously recorded in Croatia: Potprag-Halan (Alan), Ponori and Bjelopolje. The species was noted as endemic to Croatia or even Velebit Mountain (ILJANIĆ, 1995: 100).

The area of distribution was »considerably widened« by the finding of the species at Cerkniško jezero lake, an intermittent lake on a polje in Slovenia, thus changing the phytogeographical position of the species. The finding was published by T. WRABER (1995: 38–39), according to a herbarium specimen (LJU 120071) collected by his father, M. Wraber, in 1971. Consequently, MARTINČIČ (1999: 268) included the species in the third edition of »Mala flora Slovenije«.

ZOHARY (1972: 121) revised the species of *Trifolium* sect. *Trifolium*, and included *T. velebiticum*. There, in addition to Degen's findings, he mentioned one of Rechner fil. et al. 1933 for Visoki Dečani (today Republic of Kosovo) in *Castanea*-forest, although neither *Flora Europaea* (COOMBE, 1968, 1978), nor the *Flora of Serbia* (CINCOVIĆ, 1972: 424–471) notes the species for this region.

Plant nomenclature in this paper is according to *Index Florae Croaticae* (Nikolić).

RESULTS AND DISCUSSION

During recent research into *Trifolium velebiticum* in Croatia, several new localities were detected (Tab. 1).

1. We found *T. velebiticum* for the first time on June 15, 2007 on Krbavsko polje, in a meadow of the association *Molinio-Lathyretum pannonicum* H-ić, and then on August 1, 2007 in a stand of the association *Deschampsietum mediae illyricum* (Zeidler) H-ić (associations as described by GAŽI-BASKOVA, 1963 a, b). However, in their phytosociological papers, among the clover taxa, Gaži-Baskova and Trinajstić (GAŽI-BASKOVA, 1963 a, b; GAŽI & TRINAJSTIĆ, 1970) quoted only *Trifolium patens*, *T. repens*, *T. montanum* and *T. pratense* although *T. velebiticum* grows there abundantly. One may conclude that *T. velebiticum* was probably mistaken for *T. pratense* (although they can easily be distinguished because *T. velebiticum* has petioles usually entirely adnate to the stipules, see Fig. 1).
2. Soon after the finding at Krbavsko polje, we found *T. velebiticum* in a dry bed of Suvaja rivulet (a temporary stream, with short periods of drought) on July 6, 2007, on August 9, 2008 and July 7, 2010, at a few localities between Lovinac and Smokrić, mostly abundant as patches in the river bed, on dry soil between

Tab. 1. Localities of *Trifolium velebiticum* in Croatia.

No.	Locality	GPS (X,Y)
1	Krbavsko polje	5554475, 4940790
2	Suvaja	5555514, 4940780
3	Donjolapačko polje	5577859, 4931458
4	old road D. Lapac-Udbina	5571261, 4931458
5	Drežničko polje	5508691, 5000241 5508208, 5001308 5508178, 5001255
6	Opalić- Komić	5558842, 4923776
7	Vranik	5554047, 4921069
8	Račići	5551032, 4911572
9	Bruvno	5571848, 4921069
10	Medak-Mogorić	5544161, 4925604 5546379, 4927145
11	Lička Plješivica	5559758, 4960816
12	Lička Plješivica (foot)	5555322, 4962194
13	Bjelopoljsko polje	5561562, 4950614
14	Latići (Sv. Rok)	5552053, 4910012 5551649, 4910818
15	Rudanovac	5554283, 4959131 5554371, 4959732

rocks with the accompanying flora: *Gratiola officinalis*, *Mentha aquatica*, *Lythrum salicaria*, *Oenathe aquatica*, *Agrostis* sp. *Teucrium scordium*, *Ranunculus flammula*, *Carex distans*, *Lotus tenuifolius*, *Cyperus fuscus*.

- On Donjolapačko polje (on July 13, 2007) we found only a few specimens within stands of the community *Schoenetum nigricantis*. There, GAŽI-BASKOVA (1963 b), in two phytocenological records, most probably erroneously, noted only *Trifolium medium*.
- At the margin of an old road between D. Lapac and Udbina, near the mountain pass, we found *T. velebiticum* on July 13, 2007, growing at the edge of a road, on dry, gravel substrate, on the margin of a dry meadow, accompanied by the species *Bromus erectus*, *Carex humilis*, *Brachypodium pinnatum*, *Scorzonera villosa*, *Trifolium montanum*, *Carlina acanthifolia*, *Danthonia alpina*, *Cirsium pannonicum* *Carlina simplex*, *Anthericum ramosum*, *Prunella grandiflora*, *Campanula glomerata*, *Lilium martagon*, *L. bulbiferum*, *Salvia pratensis*, *Gentiana utriculosa*, *Thesium* sp., *Scabiosa* sp., *Festuca* sp.
- Over the area of Drežničko polje *Trifolium velebiticum* grows very abundantly (Fig. 2), blanketing considerable areas. The flora and vegetation of Drežničko polje were investigated by HULINA (2007), however she did not record *T. velebiticum*. Instead, she made a remark regarding *T. pratense* (l.c. p. 260) giving to the meadows a red summer aspect. Obviously, *T. velebiticum* was mistaken for



Fig. 1. *Trifolium velebiticum*

T. pratense. This can easily happen, since the similar red inflorescences may lead to false identification. Here, we first noted a few specimens of *T. velebiticum* on August 3, 2007, near a forest of pedunculate oak (*Quercus robur*), within a vegetation of tall herbs, dominated by *Filipendula ulmaria*, *Deschampsia cespitosa*, *Valeriana officinalis* and *Pseudolysimachion longifolium*. In spring and summer 2009 we found additional specimens on May 28, and July 3, where, in addition to a specimen-rich population of *Trifolium velebiticum*, the main aspect was given by *Peucedanum coriaceum* ssp. *pospichalii*. Those stands could be marked by the neutral name of »*Trifolium velebiticum*-*Peucedanum pospichalii* – community«, because we did not make any detailed comparative phytosociological analysis. Among the more abundant and characteristic species, there grew *Filipendula ulmaria*, *Valeriana officinalis*, *Centaurea jacea* s.l., *Sanguisorba officinalis*, *Phleum pratense*, *Viola elatior*, *Galium verum*, *Pseudolysimachion longifolium*, *Carex pallescens*, *C. tomentosa*, *C. hirta*, *Lysimachia vulgaris*, *Ophioglossum vulgatum*, *Deschampsia cespitosa*, *Genista tinctoria*, mostly species of communities of the order *Molinietalia*.

6. In the area of Opalić-Komić (July 3, 2008), *T. velebiticum* grew on dry grassland together with *Bromus erectus*, *Danthonia alpina*, *Dorycnium pentaphyllum*, *Eryngium amethystinum*, *Lotus corniculatus*, *Plantago holosteum*, *Trifolium montanum*, *Onobrychis arenaria*, *Rhinantus minor*.



Fig. 2. Dense carpet of *T. velebiticum* (Drežničko polje)

7. At Vranik village between G. Ploča and Lovinac, *T. velebiticum* was found on May 6 and June 2, 2009, in dry as well as somewhat wet stands. More attention must be paid to those specimens since they are morphologically atypical, similar to hybrids or transitional types. In addition to *Trifolium velebiticum*, *Bromus erectus*, *Lotus corniculatus*, *Poa pratensis*, *Filipendula vulgaris*, *Sanguisorba muricata*, *Campanula rapunculus*, *Allium scorodoprasum*, *Agrimonia eupatoria*, *Leontodon hispidus* and *Galium mollugo* grew abundantly.
8. At Račići village *T. velebiticum* was found on September 24, 2009 in a wet meadow, dominated by *Molinia caerulea* and *Chouardia litardierei*.
9. At Bruvno (leg. on June 3 and July 28, 2009) *T. velebiticum* predominated in a moderately dry meadow, accompanied by *Trifolium montanum* (aspect), *Bromus erectus*, *Peucedanum coriaceum* ssp. *pospichalii*, *Filipendula vulgaris*, *Euphorbia verrucosa*, *Briza media*, *Lotus corniculatus*, *Plantago media*, *Dorycnium pentaphyllum*, *Danthonia alpina* and *Campanula rapunculus*.
10. *Trifolium velebiticum* was found on June 23, 2009, at two localities, a few kilometers apart, in dry beds of temporary streams between Medak and Mogorić. In addition to *T. velebiticum* we recorded *Galium palustre*, *Oenanthe fistulosa*, *Teucrium scordium*, *Juncus* sp., *Convolvulus arvensis* and *Poa trivialis*.
11. On Lička Plješivica mountain *T. velebiticum* was found on July 10, 2010 along a gravel road at an altitude of about 1500 m a.s.l., together with *Myosotis suaveolens* and *Acinos alpinus*.
12. On Lička Plješivica, along the forest road leading from Kapela Korenička toward the top, *T. velebiticum* was found on August 16, 2010, on the dry habitat of

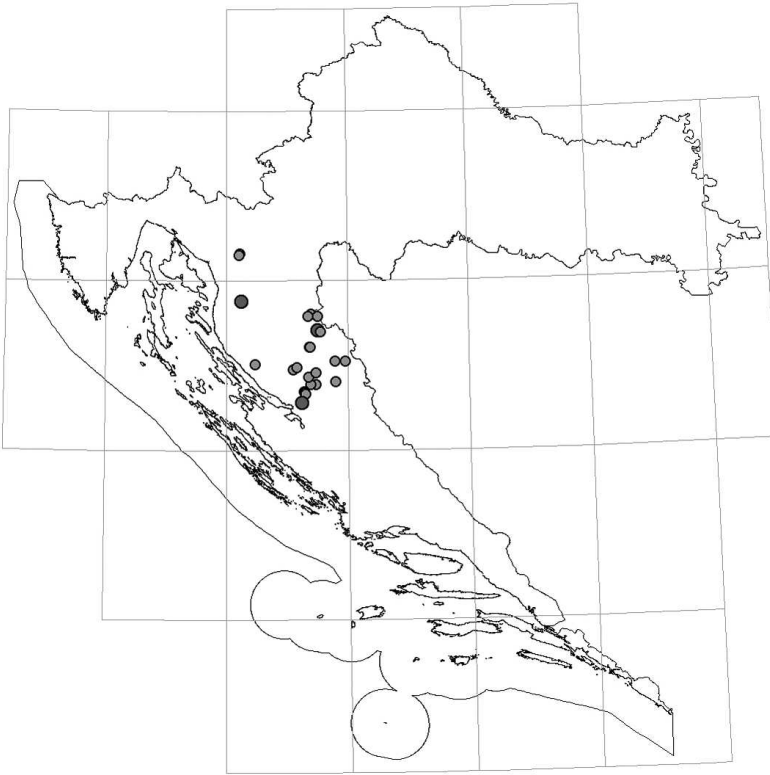


Fig. 3. Distribution map of *Trifolium velebiticum* in Croatia

a trunk depot as well as in a wet (temporarily flooded) depression nearby. Also growing there were *Carex tomentosa*, *C. panicea*, *Chouardia litardierei*, *Lysimachia nummularia*, *Agrostis stolonifera*, *Colchicum autumnale*, *Festuca pratensis*, *Phleum pratense* and *Juniperus communis* (vegetation succession).

13. As mentioned before, the plant was previously recorded at the Bjelopoljsko polje area by ŠUGAR & PLAZIBAT (l.c.) sporadically in the surroundings of Bjelopolje, within dry grasslands of the community *Bromo-Plantaginietum scorzonerosum villosae*. Nevertheless, the surroundings of Bjelopolje are a more important area for *T. velebiticum* than could be concluded from the finding cited. Namely, the ecological optimum of this plant is not on dry grasslands, but, according to all findings within its known distribution area, on temporarily flooded habitats, particularly those of poljes. One of those is Bjelopoljsko polje, where *T. velebiticum* is the predominant species in many stands of the lowest, and for the longest time flooded, part of the field. There, observed on August 16, 2010, it was found growing among some other characteristic plants of wet grasslands, sometimes very abundant, such as *Peucedanum coriaceum* ssp. *pospichalii* and *Chouardia litardierei* (endemic plants, Illyrian floristic element), as well as *Gentiana pneumonanthe*, *Carex tomentosa*, *Carex panicea*, *Ophioglossum vulgatum*, *Sesleria uliginosa*, *Taraxacum palustre*, *Thalictrum flavum*, *Lysimachia vulgaris*, *Dan-*

thonia alpina, *Phleum pratense*, *Potentilla reptans*, *Galium verum*, most of them characteristic plants of the order *Molinietalia*. On slightly dryer sand-gravel soil, flooded for a shorter period of time, *T. velebiticum* was abundantly accompanied by *Inula britannica* and *Stachys annua*.

14. At Latići near Sv. Rok, at the foot of the northern slopes of Velebit Mountain, some specimens of *T. velebiticum* were found on August 18, 2010, in wet meadows with *Molinia caerulea* (aspect), *Gentiana pneumonanthe*, *Iris sibirica*, *Serratula tinctoria*, *Succisa pratensis*, *Chouardia litardierei*, *Carex pallescens*, *Lysimachia vulgaris*, *Carex tomentosa*, *Deschampsia cespitosa*, *Gratiola officinalis*, *Ranunculus acris*, *Juncus conglomeratus*, *Ranunculus repens*, *Carex hirta*, *Lythrum salicaria* and *Potentilla erecta*.
15. On July 11, 2011, specimens of *T. velebiticum* were noted on the verge of the path between Rudanovac and Vrelo (surroundings of Plitvička jezera), within stands of *Pinus nigra* and *Juniperus communis* and on nearby wet grassland.

In the close vicinity of this locality, as well as in the vicinity of Brušane (surroundings of the city of Gospić) on the eastern slope of Velebit Mountain, *T. velebiticum* was found by a group of flora mappers in 2006 within the IPA project (Flora Croatica Database), but no habitat data are available.

Since recent investigations have shown that *Trifolium velebiticum* is rather a widespread taxon, particularly in the region of Lika (Fig. 3), it is necessary to survey marginal areas, to see the border of its distribution area, and to establish whether some »geographical bond« exists between the core distribution area in Croatia and the disjunction in Slovenia (where since the finding in 1971 it has not been confirmed).

The selection of different habitats, ranging from wet to dry, from loam to gravel, from long- to short-term flooded, indicate the wide ecological amplitude of *Trifolium velebiticum*. It seems that a long term soaking, for example, the six months flood at Bjelopoljsko polje in the years 2008/2009 does not affect the plant much more than the previous 16 years without flood.

To that end, *T. velebiticum* findings in the Suvaja rivulet, where the specimens were found in a dry phase with the dry water moss *Fontinalis antipyretica*, show that it can withstand extreme water conditions. It seems that it is enough for the plant to have a summer drought to grow, flower and fructify.

CONCLUSION

According to recent findings, one can conclude that Velebit clover (*Trifolium velebiticum*) is more frequent and widely distributed than known so far (Fig. 3). A better insight into the ecological characteristics of this plant will certainly be obtained from the new findings. Additionally, it would be necessary to establish its phytosociological characteristics, which were not ascertained systematically during our surveys.

Considering the fact that the morphologically distinct variety of *T. velebiticum* (var. *gackae*), was described, as well as some systematists' opinion that the taxon *T. velebiticum* is only a variation of *T. pratense* (Forenbacher), it would be interesting to undergo additional taxonomical analysis of the taxon.

The new data about the distribution and ecological characteristics of sites of *Trifolium velebiticum* contribute to knowledge about the biogeographical characteristics of the Dinaric karst as well, particularly of karstic fields – poljes. Their specifics in hydrology enable the development of specific flora and vegetation. River engineering and the abandoning of the traditional agriculture very often result in vegetation succession and grasslands being overgrown, many heliophytes, including *Trifolium velebiticum*, being thus endangered.

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REFERENCES

- CINCOVIĆ, T., 1972: *Trifolium*. In JOSIFOVIĆ, M. (ed.) Flora SR Srbije IV, 424–471. Srpska akademija Nauka i umetnosti Beograd.
- COOMBE, D. E., 1968 (reprinted 1978): *Trifolium*. In T. G. TUTIN *et al.* (eds.): Flora Europaea, Vol. 2, 157–172, Cambridge Univ. Press, Cambridge.
- DEGEN, A., 1911: Bemerkungen über einige orientalische Pflanzenarten. Magyar Bot. Lapok 10, 107–115.
- DEGEN, A., 1937: Flora Velebitica. Bd. 2. Verl. Ungar. Akad. Wissenschaft. Budapest.
- FORENBACHER, S., 1990: Velebit i njegov biljni svijet. Školska knjiga, Zagreb.
- GAŽI-BASKOVA, V., 1963 a: Zajednica beskoljenke *Molinio-Lathyretum pannonicum* u Lici i Krbavi. Agronom. glasnik 3, 165–175.
- GAŽI-BASKOVA, V., 1963 b: Prilog poznavanju livadne vegetacije na močvarnim tlima Krbavskog i Donjolapačkog polja. Zemljište i biljka 12 (1/3), 247–252.
- GAŽI, V. & TRINAJSTIĆ, I., 1970: Fitocenološko raščlanjivanje, sindinamsko-singenetski odnosi i geografska rasprostranjenost asocijacije *Deschampsietum mediae illyricum* (Zeidler) H-ić 1963. Acta Bot. Croat. 29, 149–156.
- HIRC, D., 1912: *Trifolium*. In: Revizija Hrvatske flore (Revisio florae Croatiae), sv. II, snopić 4, 214–227.
- HULINA, N., 2007: Flora i vegetacija Drežničkog polja. Agronom. glasnik 4, 255–276.
- ILJANIĆ, Lj., 1995: Biljni pokrov Hrvatske (Flora i vegetacija). In: D. ZDUNIĆ (ed.): Prirodna baština Hrvatske, pp. 97–116, Buvina d.o.o., Zagreb.
- LOVAŠEN-EBERHARDT, Ž., 1997: *Fabaceae*. In: T. NIKOLIĆ (ed.): Flora Croatica. Index florae Croatiae, Pars 2. Nat. Croat. 8, suppl. 1., 60–89.
- MARTINČIĆ, A., 1999: *Fabaceae*. In: A. MARTINČIĆ (ed.): Mala flora Slovenije. Ključ za određivanje praprotnic in semenk, 3. izd. Tehniška založba Slovenije, Ljubljana.
- ŠUGAR, I. & PLAZIBAT, M., 1988: Vegetacija gornjega Pounja – Biljnogeografski položaj i raščlanjenost. Zbornik referata naučnog skupa »Minerali, stijene, izumrli i živi svijet BiH«, pp. 387–397. Sarajevo, 7–8 oktobar 1988. Zemaljski muzej Bosne i Hercegovine, Sarajevo.
- WRABER, T., 1995: Notulae ad floram Sloveniae. Hladnikia 4, 37–40.
- ZOHARY, M., 1972: A revision of the species of *Trifolium* sect. *Trifolium* (*Leguminosae*). II. Taxonomic treatment. Candollea 27 (1), 99–158.

S A Ž E T A K

**Rasprostranjenost i značajke staništa velebitske djeteline
(*Trifolium velebiticum* Degen, *Fabaceae*)**

J. Topić & Lj. Ilijanić

Velebitsku djetelinu otkrio je A. Degen između Podpraga i Malog Alana (Halana) na južnom Velebitu još godine 1905., a opisao ju 1911. kao novu vrstu *Trifolium velebiticum* (l.c. p. 113). U istom je radu opisao i *T. v.* var. *gackae* («Gačkae») na temelju primjeraka sabranih (god. 1910) između Švičkog jezera i naselja Ponori u široj okolini Otočca u Lici.

Premda opisana prije jednoga stoljeća, ta je biljka sve do pred kraj prošloga stoljeća bila »zapostavljena«, jer se o njezinoj rasprostranjenosti i ekološkim značajkama zaključivalo jedino na temelju Degenovih nalaza. Tek su nalaz u okolici Bjelopolja (ŠUGAR & PLAZIBAT, 1988: 399) u Lici, i onaj s Cerknickog jezera u Sloveniji (T. WRABER, 1992), podaci iz novijeg razdoblja.

Vrstu *T. velebiticum* našli smo godine 2007. u velikom obilju na vlažnim livadama Krbavskoga polja. Budući da se u dotadašnjoj fitocenološkoj literaturi u opisu travnjačke vegetacije iz tog polja ne nalazi velebitska djetelina, držimo da je najvjerojatnije zamijenjena s vrstom *T. pratense*, koja se u tim radovima navodi. Zato smo velebitskoj djetelini posvetili posebnu pozornost u daljnjim istraživanjima i odmah upozorili naše istraživače da na terenu obrate pažnju na dotad često previđenu vrstu.

U engleskom dijelu teksta ovoga priloga pojedinačno su navedeni lokaliteti ili uža područja na kojima je ta biljka zabilježena, kao i kratak opis staništa, popis najvažnijih vrsta s kojima je rasla, i GPS koordinate. Na temelju prijašnjih saznanja i ovdje iznesenih podataka može se zaključiti sljedeće:

1. Velebitska djetelina (*Trifolium velebiticum* Degen) mnogo je rasprostranjenija nego što je do nedavno bilo poznato.
2. Suprotno prijašnjim navodima po kojima je ta vrsta u prvom redu biljka suhih gorskih travnjaka, većina novih nalaza pokazuje da ona svoj optimum postiže na povremeno poplavnim staništima, osobito u vlažnim travnjacima reda Molinietalia na nekoliko krških polja u Hrvatskoj, što je značajno i za jedini objavljeni nalaz (T. Wraber, l.c.) na Cerknickom jezeru u Sloveniji.
3. Spomenuti nalaz u Sloveniji pokazuje da je areal velebitske djeteline veći nego što se prije smatralo, pa se mijenja i njen biljnogeografski položaj. Naime, više se ne može smatrati hrvatskim endemom kao prije, već biljkom nešto šireg areala (ilirski florni element) s težištem na području između Velebita, Plješevice, Velike i Male Kapele u Hrvatskoj.
4. U daljnjim istraživanjima valja posvetiti pozornost toj biljci, osobito u rubnim područjima, kako bi se što potpunije utvrdile granice njena areala, a u Sloveniji istražiti gdje još raste, jer nakon objavljivanja nalaza na Cerknickom jezeru biljka tamo nije više nađena (T. Wraber, l.c.).
5. S obzirom na veliku ekološku amplitudu vrste postoji i problem taksonomske diferencijacije unutar vrste, što proizlazi već iz Degenova opisa varijeteta *T. velebiticum* var. *gackae*, kao i moguća hibridizacija sa srodnim vrstama. Tim se problemom nismo bavili, pa to ostaje zanimljiv zadatak za buduća taksonomska istraživanja.