

# DISTRIBUTION OF *NEPETA PARVIFLORA* BIEB. (*LAMIACEAE*) IN ROMANIA WITH ECOLOGICAL AND PHYTOCOENOLOGICAL CONSIDERATIONS

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The paper presents the geographical distribution, ecological and phytocoenological aspects of the *N. parviflora* populations. *N. parviflora* is a rare species on the Romanian Red List of Vascular Plants with a restricted areal only in Dobrudja. Although the species is not immediately in danger of extinction its habitat continues to be severely altered indirectly by man, herbivores and repeatable droughts. It is very important to know these aspects to rise the species into a higher zoological threatened category for this beautiful species from Romania.

*Key words:* distribution, *N. parviflora*, *Lamiaceae*, ecology, phytocoenology, red list, site.

## INTRODUCTION

The genus *Nepeta* L. from *Lamiaceae* (subfam. *Nepetoideae*, sect. *Oxynepete* Benth.) consists from four extant species in Romania. Two of them are rare, with restricted area only in Transylvanian Plain (*N. ucranica* L.) and Dobrudja (*N. parviflora* Bieb.) and the last two are common species: *N. cataria* L. and *N. nuda* L. ssp. *nuda*.

*N. parviflora* is a perennial herb, stems 18–70 cm, erect, strong branching, tomentose to lanate, at least below; leaves serrate with larger teeth, the lowest cordate at base, distinctly petiolate, bracts sessile, cymes 3–5 pairs, dense; calyx 6–7 mm, usually green, rare bluish; corolla 5–6 mm, blue-azure, shorter or as long as calyx, nutlets dark brown, ellipsoid, usually covered with hairs (Pojarkova 1954, Turner 1972).

*N. parviflora* is a typical steppe species occurring from Caspian Lake and the Lower Volga through the Southern Russian and Ukrainian steppes to Eastern Dobrudja. The species is described from Crimea and N Caucasus. According to Flora Europaea, the species grows in SE and W Europe: Bulgaria, Romania and Russia. The western most known localities of the species are in Dobrudja and around Galați (Răvăruț 1961, Pojarkova 1954), although Pojarkova also mentions Central Hungary citing Kerner. The species was collected for the first time in Hungary by Tauscher in 1871. His five data were questioned by later botanists, and the species has never been recognized as a member of the flora of Hungary (Lendvai 1993).

*N. parviflora* was rediscovered by Lendvai in 1992, during a vegetation survey in central Hungary and the author's argument is that *N. parviflora* should be considered a typical relic species of the loess vegetation in Hungary (Lendvai 1993). Lendvai did not completely rule out the possibility of human introduction due to the isolated occurrence of *N. parviflora* in Hungary far removed from its genetic center.

The Romanian areal limit of steppe plant is covering in different localities from Dobrudja (Tulcea, Constanța and Galați Counties), where *N. parviflora* was found and referred by Brandza (1898), Prodan (1931, 1939), Borza (1947), Resmeriță (Basarabi, Dobromiru din Deal, Jurilovca, Constanța, Cișmele pe Dealul Nanților, 1961), Beldie (1979), Dihoru & Doniță (1970), Cristurean & Ionescu-Țeculescu (1970), Ciocârlan (2000), Pădure & Negrean (2001), Pădure 2003 (Hagieni, Cotu Văii, Basarabi). Two new sites for *N. parviflora* was discovered of the first time by G. Negrean (2001, pers. comm.) in Cotu Văii (S, Valea Mare), and Vâlcele (S, Vâlcele), near Negru Vodă town, Constanța County. Cotu Văii site was confirmed in May 2003 by the author.

*N. parviflora* is a rare xerophytic species in Romania. Different authors introduced it on the Vascular Plant Red List of Romania as a vulnerable (Boșcaiu et al. 1994), vulnerable/rare (Oltean et al. 1994) or rare (Beldie 1979, Moldovan et al. 1984, Dihoru & Dihoru 1994, Coldea et al. 2001) species. The species is protected only in two precious reservations: Fântânița-Murfatlar (Basarabi) and Pădurea Hagieni in Constanța County.

This taxon differs from the related species of the *Nepeta* L. genus from our country in the following respects:

- 1a Calyx-teeth shorter than the tube; flowers hermaphrodite; leaves subsessile or petiolate; nutlets smooth or tuberculate .....2
- 1b Calyx-teeth longer than the tube; flowers unisexual (rarely dioecious); central flowers of each cyme female, the stamens represented by staminodes; outer flowers male, with a rudimentary pistil; all leaves petiolate; nutlets tuberculate .....3
- 2a Leaves ovate, cordate at the base, all petiolate; corolla white with small purple spots; nutlets smooth .....*N. cataria*
- 2b Leaves ovate-oblong, the middle and the upper ones sessile; corolla pale violet or white; nutlets tuberculate ..... *N. nuda*
- 3a Plant glabrescent, leaves elongated ovate-lanceolate, crenate-serrate; cymes 3- to 5- flowered, lax ..... *N. ucranica*
- 3b Plant with stem and leaves dense tomentose to lanate (at least below), leaves triangular ovate, serrate, with larger teeth; cymes dense ..... *N. parviflora*

Dobrudja region consists of numerous xerophytic and xero-mesophytic phytocoenosis with many steppic and woodland-steppic species. *N. parviflora* occurs mainly in carbonic chernozem, loess and calcareous soils. It is most

frequent in the pH range from 7.6–8.2. It occurs on sites with a wide range of slopes, with different orientations (south, south-west and north-west). The altitudinal range is up to about 15(20)–70(90) m.

*N. parviflora* is a rare species widespread in ten sites in Dobrudja, in only four the species was recovered, two of these sites have been recently discovered. Its relic species status is still uncertain and discussed. The species reaches its northernmost Balkan limit in southern part of Dobrudja. The species was cited or confirmed by different authors in Basarabi (Resmeriță 1961, Pădure & Negrean 2001, Pădure 2003), Hagieni (Cristurean *et al.* 1970, Arcuș 1998, Negrean 2001, Pădure 2003), Cișmele on Dealul Nanților (Resmeriță 1961), Jurilovca-Istria region (Resmeriță 1961), Dobromiru din Deal (Resmeriță 1961, Pădure 2003-not confirmed site), Cotu Văii (Negrean 2001, Pădure 2003), Vâlcele (Negrean 2001).

Historically, the first herbal sheet was introduced in CL by Sintenis G. (?) in 1874. Other botanists reported or confirmed later new sites in Dobrudja: D. Brandza, A. Borza, E. Pop, I. Prodan, M. Răvărăuț, C. Zahariadi & I. Țucra, G. Dihoru, I. Cristurean & V. Ionescu-Țeulescu, G. Negrean, and recently M. Arcuș and I. Pădure (for details please see *Table 1*). Some of these sites mentioned above were not confirmed by author (e.g., Dobromiru din Deal, Limanu) but new sites were checked: Esechioi, Ostrov, Dumbrăveni, Albești, Cobadin, etc.

The main reasons of our research are the following facts:

- the restricted habitat of this species in Romania;
- the uncertain status on Romanian Red List of Vascular Plants;
- recent bibliographical data lacks information regarding its chorology;
- the lack of herbaria specimens in the most important Herbaria from Romania.

We focused our research on numerical assessments of *Nepeta* populations and we tried to find the stations where the species are still available. *N. parviflora* requires a great attention especially due to human impact acting: red pine plantations increasing, picnic and agreement zones due to free access in natural reserves. Moreover, we considered in our research the following aspects: finding out and describing of doubtless stations with *N. parviflora*, gathering of herbaria and transplanted materials and updating references and topographical data.

## MATERIAL AND METHODS

In order to register the species from these sites and to study the populations, ecological and phytocoenological examinations were carried during the months May-June (2001–2003). Numerical and ecological assessments of *N. parviflora* populations were achieved in the recovered stations from Dobrudja. Details about

the collection sites are presented in next section. Voucher specimens were introduced in collection from BUAG, BUC and BUCA. The paper presents two tables (Tables 1, 2) with localities enumeration and their ecological characteristics, also several photos of *N. parviflora* (Figs. 1, 2) and with distribution sites (Fig. 3A–F). Many publications were consulted and correlated with information from Romanian Herbaria. For each herbarium sheet are indicated the year, name of harvester and herbarium code grouped by counties. Description and details of distribution of taxa are based on herbaria collection from BNHM, BUAG, BUC, BUCA, BV\_5, CL, CRAI, CRHM, FOHM, GLHM, I, IASI, ICAS\_2, PLHM, SIB, TLHM, TMHM (codes according to Index Herbariorum, cited [http://scisun.nybg.org:8890/searchdb/owa/wwwih.search\\_list](http://scisun.nybg.org:8890/searchdb/owa/wwwih.search_list)).

Table 1

Distribution of *Nepeta parviflora* Bieb. in Romania

Distribution	Herbarium / sheet no.	Year	Name of harvester
1	2	3	4
Agigea, Constanța County	BNHM / #	1931	Nyarady E. I.
Cotu Văii, Constanța County	BUAG / 23187	2001	Negrean G. & Pădure I.
Fântânița-Murfatlar, Constanța County	BUAG / 23188-89	2001	Pădure I.
Vâlcele, Constanța County	BUC / #	2001	Negrean G.
Ciualnic Liman, Constanța County	BUCA / #	1918	Grințescu G.
Agigea, Constanța County	BUCA / 30599	1949	undecipherable
Cișmele (on Dealul Nanților), Galați County	BUCA / 30612	1946	Răvăruț M.
Murfatlar, Constanța County	BUCA / 56460	1958	Zahariadi C.
Murfatlar, Constanța County	BUCA / 62887	1922	Borza A.
Jurilovca, Tulcea County	BUCA / 68737	1912	Prodan I.
Murfatlar, Constanța County	BUCA / 72726	1922	Borza A.
Murfatlar, Constanța County	BUCA / 88631-88632	1916	Grințescu G.
Murfatlar, Constanța County	BUCA / 89034	1915	Grințescu G.
Techirghiol, Constanța County	BUCA / 89043	1925	Grințescu G.
Gagebinski Liman, Constanța County	BUCA / 89044-45, 89053-54	1918	Grințescu G.
Liman (on Andriejvski), Constanța County	BUCA / 89046-89047	1918	Grințescu G.
Agigea, Constanța County	BUCA / 89143-89144	1930	Grințescu G.
Murfatlar, Constanța County	BUCA / 89145	1922	Grințescu G.
Basarabi, Constanța County	BV_5 / #	1963	Morariu I.
Suatu, Cluj County *	CL / #	1926	Pop E. & Vicol E.



Fig. 1 – Natural habit of *Nepeta parviflora* Bieb. in Fântânița-Murfiatlar, Constanța County (orig.).

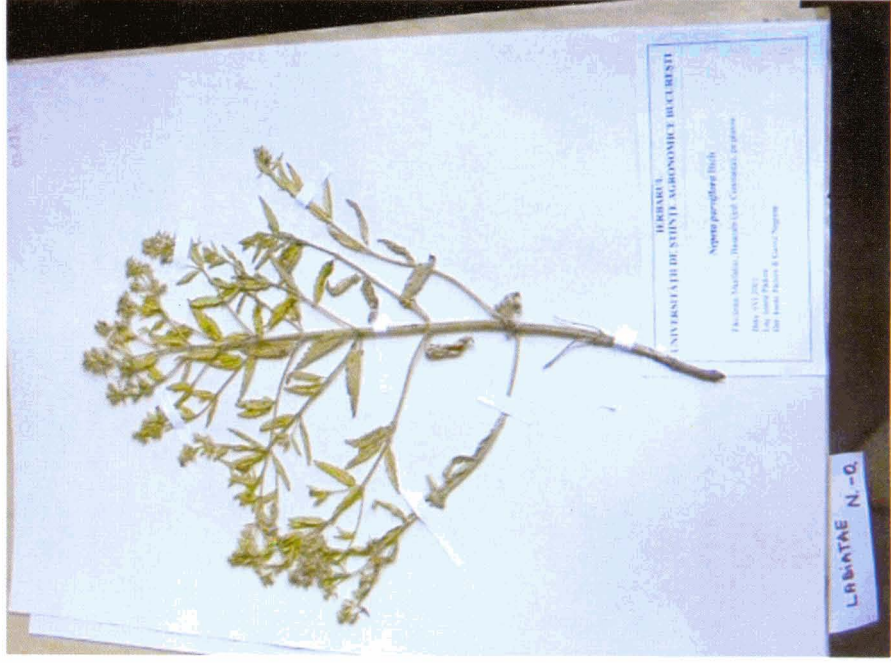


Fig. 2 – Herbal sheet (no. 23188) of *Nepeta parviflora* Bieb. from BUAG Herbarium (orig.).



Fig. 3 A-D.



Fig. 3 – Original photos from different localities with *Nepeta parviflora* Bieb. from Dobruđja, Romania (May 2003): A. Pleasure zones and parking in Fântânița-Murfatlar Natural Reservation, B. General view of red pine plantation (left) from Fântânița-Murfatlar, C, D. Destructive factors (due to human acting) in Fântânița-Murfatlar: car parking on the basis of plateau reservation (C) and pleasure zones and fireplaces (D), E. Trodden paths by the feet of tourists due to free acces in Natural Reservation area (left), F. General chorology in Constanța County.

Table 1  
(continued)

1	2	3	4
Murfatlar, Constanța County	CL / 124696-97	1922	Borza A. & Grințescu I.
Murfatlar, Constanța County	CL / 149280	1922	Borza A.
Murfatlar, Constanța County	CL / 194008	1933	Nyarady E. I.
Tariverde (Cogealac village), Constanța County	CL / 35200	1874	Sintenis G. (?)
Fântânița (Basarabi town), Constanța County	CL / 543475, 623535	1962	Vicol E.
Craiova, Dolj County *	CRHM / #	1984	Năstase A.
Hagieni, Constanța County	CRAI / #	1964	Zanoschi V.
Agigea, Constanța County	FOHM / #	1968	Horeanu C.
Palazu Mic (Mihail Kogălniceanu, CT)	FOHM / #	1971	Horeanu C.
Agigea, Constanța County	GLHM / #	1968	Horeanu C.
Murfatlar, Constanța County	GLHM / #	1969	Horeanu C.
Fântânița-Murfatlar (Basarabi town, CT)	I / #	1971	Sârbu I.
Hagieni, Constanța County	I / #	1971	Sârbu I.
Fântânița-Murfatlar, Constanța County	I / #	1922	Borza A.
Fântânița-Murfatlar, Constanța County	I / #	1908	Enculescu P.
Jurilovca (Istria region), Tulcea County	I / #	1912	Prodan I.
Hagieni, Constanța County	IASI / #	1967	Țopa E.
Murfatlar (Basarabi town), Constanța County	IASI / #	1922	Borza A.
Hagieni, Constanța County	IASI / #	1964	Zanoschi V.
Çișmele (Smârdan village), Galați County (GL)	IASI / #	1946	Răvăruiț M.
Agigea, Constanța County	IASI / #	1959	Pascal P.
Murfatlar, Constanța County	ICAS_5 / #	1922	Borza A.
Hagieni, Constanța County	PLHM / #	1963	Negrean G.
Basarabi, Constanța County	PLHM / #	1963	Morariu I.
Basarabi, Constanța County	SIB / #	1963	Pop I.
Murfatlar, Constanța County	SIB / #	1922	Borza A.
Jurilovca, Tulcea County (TL)	TLHM / #	1991	Popescu A.
Basarabi, Constanța County (CT)	TMHM / #	1976	Vlaicu N.

# No sheet numbers are available.

\* The species was wrong identified by confusion with another species of *Nepeta* genus.



Table 2

Characteristic of habitats with *Nepeta parviflora* Bieb.

No. habit.	Characteristic of habitat	
	Locality	Ecological characteristic
1	2	3
1	Agigea (CT)	# Gentle slope, dune and steppe reservation, lightening 70 %, altitude 16 m, sandy soil (BUCA 30599)
2	Cișmele, Dl. Nanșilor, N (GL)	# Slope, calcareous soil (BUCA 30612)
3	Cotu Văii (CT)	* Plane relief on plateau, aride, lightening 100 %, stony soil, altitude 80 m
4	Cotu Văii (CT)	# Rolling stone slope, south, incline 45 %, aride, lightening 80 %, chalky soil
5	Fântânița-Murfatlar (CT)	* Slope, south, incline 45 %, aride, lightening 100 %, altitude 70 m, chalky soil
6	Fântânița-Murfatlar (CT)	* Gentle slope, south-westside, incline 20 %, aride, lightening 80 %, altitude 40-50 m, chalky soil
7	Fântânița-Murfatlar (CT)	* Red pine plantation area, south-westside, incline 10-15 %, lightening 10 %, altitude 40-80 m, acidophil soil
8	Fântânița-Murfatlar (CT)	Different sloped relief, stony slopes, Lat. 44°10'N, Long. 28°25'W, about 20 km from the seacoast of the Black Sea, brown rendsina, pH range from 7,6-8,2 (Zahariadi 1965)
9	Fântânița-Murfatlar (CT)	Calcareous plateau of reservation, altitude 150 m (CL 124697, 194008)
10	Jurilovca (TL)	No ecological characteristics are available (BUCA 68737)
11	Pădurea Hagieni (CT)	* Stony slope, incline 20-45 %, aride, lightening 70 %, altitude 15-70 m, chernozem, loess and calcareous soils (Cristurean & Ionescu-Țeculescu 1967)
12	Techirgiol (CT)	No ecological characteristics are available (BUCA 89043)
13	Vâlcele (CT)	No ecological characteristics are available

\* Personal characterization of habitats with *N. parviflora* Bieb.

# Ecological characteristics from herbal sheets (BUAG, BUCA, CL)

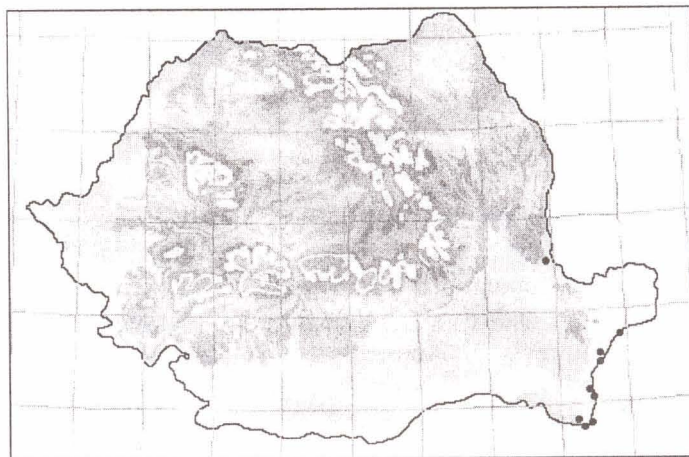


Fig. 4 – Distribution of *Nepeta parviflora* Bieb. in Romania.

#### RESULTS AND DISCUSSION

Dobruja region is the doubtless and singular area with *N. parviflora* in Romania (Table 1). The species is protected indirectly in two natural reserves: Pădurea Hagieni due to following plants which grow only in a single habitat in our country in this wood: *Astragalus spruneri* Boiss., *Salvia ringens* Sibth. et Sm., *Ziziphora capitata* L., *Plumbago europaea* L., *Genista sessilifolia* DC. etc. and in Fântânița-Murfatlar due to *Paeonia tenuifolia* L., *Adonis volgensis* Steven, *Euphorbia glareosa dobrogensis* Pallas ex Bieb. (Prodan) Ciocârlan, *Linum pallasianum* Schultes ssp. *borzaeanum* (E. I. Nyarady) Petrova, etc.

*N. parviflora* grows in steppe on chalky and sunny slopes being preferentially associated with *Stipa ucrainica* P. Smirnov, *Festuca valesiaca* Schleicher ex Gaudin, *Marrubium peregrinum* L., *Linum pallasianum* Schultes ssp. *borzaeanum* (E. I. Nyarady) Petrova, *Convolvulus cantabricus* L., *Achillea coarctata* Poir., *A. clypeolata* Sibth. et Sm., *Thymus zygioides* Griseb., *Euphorbia glareosa* Pallas ex Bieb. ssp. *dobrozensis* (Prodan) Ciocârlan, *Polygala major* Jack., *Veronica multifida* L. ssp. *capsellicarpa* (Dubovnik) A. Jelen., *Scorzonera hispanica* L., *Carduus thoermeri* Weinm., *Althea hirsuta* L., *Ferulago confusa* Velen., *Tanacetum millefolium* (L.) Tzvelev. Its syntaxonomy belongs to *Festuco-Brometea* Br.-Bl. et Tx. 1963, Ord. *Festucetalia valesiaca* Br.-Bl. et Tx. 1943, Al. *Stipion lessingianae* Soó, As. *Stipetum cappillae* auct. div. 20 IV 1964 or Al. *Festicion sulcatae* Soó (1929 n.n.) 1940, As. *Festucetum valesiaca* Burduja et colab. 1956 (Cristurean 1970) where it is a minor component. *N. parviflora* has a limited capacity to persist under tall herbs, growing in full sunlight zones with accidental slopes.

*N. parviflora* sites in Dobruđja are listed below with some ecological and phytocenological aspects of each sites (Table 2).

### CONCLUSION

We concluded that from the ten stations that were recorded and cited in different bibliographical resources, the species was found only in six of them. Almost in all sites, the populations are in evident decline. We have made some corrections of the located and recorded sites from bibliography, in accordance with topographical maps and revision of herbal specimens are made.

The species is threatened by extinction if we did not take some measures to preserve this rare and beautiful plant in natural reserves. The species is protected only in Fântânița-Murfatlar and Pădurea Hagieni Natural Reserves. Destructive factors of *N. parviflora* population are represented by pastoral pressure (mainly in Cotu Văii), trodden paths on the slopes (in Fântânița-Murfatlar), repeatable droughts, agricultural fields extending (in Hagieni), overgrazing and especially due to human impact acting: red pine plantations increasing, picnic and leisure areas due to free access in natural reserves (mainly in Fântânița-Murfatlar where new fireplaces, leisure areas and car parking appeared).

Finally, we are going to propose new natural reserves founding and to rise *N. parviflora* into a higher zoological threatened category for this rare species from Romania. It is important to cultivate specimens *ex situ* for understanding its ecology and reproductive biology or to increase the numbers of natural populations using replantations method with seedlings and to enlarge the areal of this species.

With the ever accelerating destruction of Dobruđja's natural vegetation (due to unfavorable ecological factors mentioned above), such treatments become vital, not only as a future document of what is lost but to help saving what remains.

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