

# Ruderal vegetation of the Šumava National Park: preliminary results

## Ruderální vegetace Národního parku Šumava: první výsledky

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### Abstract

Almost fifty plant communities (associations, basal communities, derivate communities *sensu* KOPECKÝ & HEJNÝ 1971) were recorded in the Šumava National Park, and their phytosociological evaluation was carried out. They belong to the following phytosociological classes: *Bidentetea tripartiti*, *Chenopodietea*, *Artemisietea vulgaris*, *Galio-Urticetea*, *Plantaginetea majoris*, *Sedo-Scleranthetea*, *Nardo-Callunetea*, *Molinio-Arrhenatheretea*, *Mulgedio-Aconitetea*. Twelve associations, basal communities and derivate communities belong to the most common class *Galio-Urticetea*. Distribution of some dangerous expansive and invasive species is also described. Ruderal vegetation of the Šumava National Park is established in 22 habitats that can be ranked into four main groups of ruderal sites: (1) settlements, (2) margin of communications, (3) arable land and (4) military training centres.

*Key words:* nitrophilous, trampled and turf plant communities, ruderal habitats, expansive and invasive plants

### Introduction

In mountain regions, evaluation of synanthropic vegetation became an important procedure because their indigenous flora and plant cover tend to be seriously altered by the increasing spreading of ruderal vegetation, and by the import of new alien species. At the population and plant community level, indigenous floristic diversity is threatened by the newly established allochthonous species. Changing land use, different landscape management, and enhanced tourism and recreation endanger the status of indigenous flora by increasing transport of diaspores. Upon including the Šumava mountains into the world's network of biosphere reserves, the problem of their synanthropic alteration becomes very acute.

### Methods

Usual Braun-Blanquet's (1964) methodology has been used for the phytosociological analysis of vegetation. In addition, the vegetational relevés were evaluated by the deductive method of syntaxonomic classification (KOPECKÝ & HEJNÝ 1971, 1980, KOPECKÝ, DOSTÁLEK & FRANTÍK 1995). The latter method is appropriate for classification of species-poor plant communities that cannot be typified at the rank of associations. The basal and derivate communities, described by the deductive method, are complementary units to traditionally described associations.

Nomenclature of syntaxons follows the latest list of ruderal vegetation of the Czech Re-

public by KOPECKÝ & HEJNÝ (1992); the names of plants are given according to NEUHÄUSLOVÁ & KOLBEK (1982).

## Ruderal plant communities

Like in other mountains, the ruderal vegetation of Šumava is marked by specific features (HUSAČOVÁ 1984). Respective studies have started not long ago: In western Šumava, ruderal vegetation of villages and plant communities along the margin of the road Sušice-Modrava have been studied by PÝSEK (1975, 1981) and ŠANDOVÁ (1976, 1978a, 1978b, 1979, 1981). In the eastern part of Šumava, the ruderal communities of the military training zones were studied by HUSAČOVÁ & KOPECKÝ (1985), and KOPECKÝ & HUSAČOVÁ (1985).

The following survey of ruderal vegetation, including a list of syntaxonomic units, is based on the analysis of phytosociological relevés sampled mostly in 1992 and 1993. For a more detailed informations about associations (As.), basal communities (Bc.) and derivate communities (Dc.) see HUSAČOVÁ (1992, 1996).

## List of syntaxonomic units

- Class *Bidentetetea tripartiti* TX., LOHM. & PRSG. in TX. 1950  
Order *Bidentetalia tripartiti* BR.-BL. & TX. 1943  
Alliance *Chenopodium glauci* TX. in POLI & J.TX. corr. HEJNÝ 1974  
As. *Chenopodietum glauco-rubri* LOHM. in OBERD. 1957  
Class *Chenopodietea* BR.-BL. in BRAUN-BLANQUET & NEGRE 1952 em. LOHM. & J.TX., R.TX. ex MATUSZKIEWICZ 1962  
Bc. *Chenopodium album*-[*Chenopodietea* / *Secalinetea*] (KEPCZYNSKA-RIJKEN 1977) KOPECKÝ 1981  
Dc. *Tripleurospermum inodorum*-[*Secalinetea*/*Chenopodietea*] KEPCZYNSKI 1975  
Community with *Stellaria media*  
Order *Sisymbrietalia* J.TX. ex MATUSZKIEWICZ 1962 em. GÖRS 1966  
Dc. *Capsella bursa-pastoris*-[*Sisymbrietalia*/*Plantagnetalia majoris*] GRÜLL & KOPECKÝ 1983  
Class *Artemisietea vulgaris* LOHM., PRSG. & TX. in TX. 1950 em KOPECKÝ in HEJNÝ & al. 1979  
Order *Onopordetalia acanthii* BR.-BL. & TX. 1943 em. GÖRS 1966  
Alliance *Dauco-Melilotion* GÖRS 1966  
Bc. *Tussilago farfara*-[*Dauco-Melilotion*/*Agropyro-Rumicion crispis*] KOPECKÝ 1982  
Class *Galio-Urticetea* PASSARGE ex KOPECKÝ 1969  
Bc. *Urtica dioica-Aegopodium podagraria*-[*Galio-Urticetea*] KOPECKÝ & HEJNÝ 1971  
Dc. *Petasites hybridus*-[*Galio-Urticetea*] KOPECKÝ & HEJNÝ 1971  
Dc. *Petasites albus*-[*Galio-Urticetea*] KOPECKÝ & HEJNÝ 1971  
Dc. *Chaerophyllum hirsutum*-[*Galio-Urticetea*] KOPECKÝ & HEJNÝ 1971  
Dc. *Chaerophyllum aureum*-[*Galio-Urticetea*]  
Dc. *Anthriscus sylvestris*-[*Galio-Urticetea*] KOPECKÝ 1984  
Dc. *Phalaris arundinacea*-[*Galio-Urticetea*] GODDE 1986  
Dc. *Reynoutria sachalinensis*-[*Galio-Urticetea*]  
Dc. *Chamerion angustifolium*-[*Galio-Urticetea*/*Epilobietalia*]  
Dc. *Stellaria nemorum*-[*Galio-Urticetea*]  
Community with *Impatiens noli-tangere*  
Community with *Galeopsis tetrahit*  
Order *Lamio albi-Chenopodietalia boni-henrici* KOPECKÝ 1969  
Bc. *Rumex obtusifolius*-[*Lamio albi-Chenopodietalia boni-henrici*] (Passarge 1964 KOPECKÝ & HEJNÝ 1992  
Bc. *Chenopodium bonus-henricus*-[*Lamino-albi-Chenopodietalia boni-henrici*] (TH. MÜLLER in SEYBOLD et MÜLLER 1972) KOPECKÝ et HEJNÝ 1992  
Bc. *Imperatoria ostruthium*-[*Lamio albi-Chenopodietalia boni-henrici*]  
Community with *Hesperis matronalis*  
Alliance *Galio-Alliarion* LOHM. & OBERD. in OBERD. & al. 1967  
As. *Epilobio-Geranietum robertiani* LOHM. ex GORS & MULLER 1969  
Dc. *Impatiens parviflora*-[*Galio-Alliarion*] KOPECKÝ & HEJNÝ 1973

- Class *Plantaginetea majoris* TX. et PRSG. in TÜXEN 1950  
 Order *Agrostietalia stoloniferae* OBERD. in OBERDORFER & al. 1967  
 Bc. *Agrostis stolonifera* ssp. *prorepens*-[*Agrostietalia stoloniferae*] KOPECKÝ (1978) 1983  
 Bc. *Ranunculus repens*-[*Agrostietalia stoloniferae*] (OBERD. in OBERD. & al. 1967) MUCINA 1982 n.n.  
 Order *Plantaginetalia majoris* TX. & PRSG. in TX. 1950 em. OBERD. in OBERD. & al. 1967  
 Bc. *Poa annua*-[*Plantaginetalia majoris*] (GAMS 1927) OBERD. & al. 1988  
 Dc. *Lolium perenne*-[*Plantaginetalia majoris*] (BEGER 1930) P. & A. PYŠEK 1988  
 Alliance *Polygonion avicularis* BR.-BL. 1931  
 Bc. *Polygonum arenastrum*-[*Polygonion avicularis*] (GAMS 1927) P. & A. PYŠEK 1988  
 Bc. *Chamomilla suaveolens*-[*Polygonion avicularis*] VIŠŇÁK 1986 n.n.  
 As. *Alchemillo-Poetum supinae* AICHINGER 1933 nom. inv.  
 Dc. *Poa pratensis*-[*Polygonion avicularis*] (BORNKAMM 1974) KOPECKÝ 1978  
 As. *Prunello-Plantaginatum majoris* FALINSKI 1963
- Class *Sedo-Scleranthetea* BR.-BL. 1955 em. MORAVEC 1967  
 Order *Trifolio arvensi-Festucetalia ovinae* MORAVEC 1967  
 Community with *Rumex acetosella* s.l.
- Class *Nardo-Callunetea* PRSG. 1949  
 Order *Nardetalia* PRSG. 1949  
 Dc. *Deschampsia caespitosa*-[*Nardetalia*] HUSÁKOVÁ 1986  
 Community with *Agrostis capillaris*  
 Alliance *Violion caninae* SCHWICKERATH 1944  
 As. *Carici leporinae-Agrostietum tenuis* HADAČ & SÝKORA 1971
- Class *Molinio-Arrhenatheretea* TX. 1937  
 Bc. *Alopecurus pratensis*-[*Molinio-Arrhenatheretea*] KOPECKÝ 1978  
 Community with *Brachypodium pinnatum*  
 Dc. *Dactylis glomerata*-[*Molinio-Arrhenatheretea*] KOPECKÝ 1978  
 Dc. *Agrostis tenuis*-[*Molinio-Arrhenatheretea*] KOPECKÝ 1978  
 Dc. *Lupinus polyphyllus*-[*Molinio-Arrhenatheretea*]  
 Order *Arrhenatheretalia* PAWLOWSKI 1928  
 Bc. *Festuca rubra*-[*Arrhenatheretalia*] KOPECKÝ 1978  
 Dc. *Calamagrostis villosa*-[*Arrhenatheretalia/Epilobietalia angustifolii*] KOPECKÝ 1978
- Class *Mulgedio-Aconitetea* HADAČ & KLIKA 1944  
 Order *Adenostyletalia* G.BR.-BL. 1931  
 Dc. *Petasites albus*-[*Adenostyletalia*] KOPECKÝ & HEJNÝ 1971
- Class *Epilobietea angustifolii* TX. & PREISING 1937 in TX. 1950  
 Order *Epilobietalia angustifolii* (VIEGER 1937) TX. 1950  
 Dc. *Calamagrostis villosa*-[*Epilobietalia angustifolii*] KOPECKÝ 1978
- Divisio *Convolvulo-Chenopodia* KRIPPELOVÁ 1978  
 Dc. *Agropyron repens*-[*Convolvulo-Chenopodia*] KOPECKÝ 1986

**Table 1.** Presence of expansive species in communities of the Galio-Urticetea (Bc. – basal community, Dc. – derivate community)

expansive species	community
<i>Aegopodium podagraria</i>	Bc. <i>Urtica dioica</i> – <i>Aegopodium podagraria</i> – [ <i>Galio-Urticetea</i> ] KOPECKÝ et HEJNÝ 1971 (syn. <i>Agropyron repentis-Aegopodietum podagrariae</i> TX. 1967 p. p.)
<i>Anthriscus sylvestris</i>	Bc. <i>Anthriscus sylvestris</i> – [ <i>Galio-Urticetea</i> ] KOPECKÝ 1984
<i>Chaerophyllum aureum</i>	Dc. <i>Chaerophyllum aureum</i> – [ <i>Galio-Urticetea</i> ] (syn. <i>Chaerophylletum aurei</i> OBERD. 1957 p. p.)
<i>Phalaris arundinacea</i>	Dc. <i>Phalaris arundinacea</i> – [ <i>Galio-Urticetea</i> ] GÖDDE 1986
<i>Petasites hybridus</i>	Dc. <i>Petasites hybridus</i> – [ <i>Galio-Urticetea</i> ] KOPECKÝ et HEJNÝ 1971
<i>Rumex obtusifolius</i>	Bc. <i>Rumex obtusifolius</i> – [ <i>Lamio albi-Chenopodietalia boni – henrici</i> ] (PASSARGE 1964) KOPECKÝ et HEJNÝ 1992
<i>Urtica dioica</i>	Bc. <i>Urtica dioica</i> – <i>Aegopodium podagraria</i> – [ <i>Galio-Urticetea</i> ] KOPECKÝ et HEJNÝ 1971

**Table 2.** Expansive and invasive<sup>s</sup> species in the *Molinio-Arrhenatheretea* communities. (Bc. – basal community, Dc. – derivate community)

expansive species invasive species	community
<i>Alopecurus pratensis</i>	Bc. <i>Alopecurus pratensis</i> – [ <i>Molinio-Arrhenatheretea</i> ] KOPECKÝ 1978
<i>Calamagrostis villosa</i>	Dc. <i>Calamagrostis villosa</i> – [ <i>Epilobietalia angustifolii</i> ] KOPECKÝ 1978
	Dc. <i>Calamagrostis villosa</i> – [ <i>Arrhenatheretalia/Epilobietalia angustifolii</i> ] KOPECKÝ 1978
<i>Carex brizoides</i>	community with <i>Carex brizoides</i>
<i>Dactylis glomerata</i>	Dc. <i>Dactylis glomerata</i> – [ <i>Molinio-Arrhenatheretea</i> ] KOPECKÝ 1978
<i>Holcus mollis</i>	community with <i>Holcus mollis</i>
<i>Lupinus polyphyllus</i> <sup>s</sup>	Dc. <i>Lupinus polyphyllus</i> – [ <i>Molinio-Arrhenatheretea</i> ]
<i>Phalaris arundinacea</i>	Dc. <i>Phalaris arundinacea</i> – [ <i>Molinio-Arrhenatheretea</i> ]

**Table 3.** Distribution of invasive species in the Šumava (L – local, T – in the entire territory)

Species	distribution	stands
<i>Chamomilla suaveolens</i>	T	+
<i>Epilobium ciliatum</i>	T	+
<i>Heracleum mantegazzianum</i>	T	
<i>Impatiens parviflora</i>	L	+
<i>Impatiens glandulifera</i>	L	
<i>Imperatoria ostruthium</i>	L	+
<i>Juncus tenuis</i>	T	
<i>Lupinus polyphyllus</i>	T	+
<i>Mimulus guttatus</i>	L	
<i>Physocarpus opulifolius</i>	L	
<i>Reynoutria sachalinensis</i>	L	+
<i>Rumex longifolius</i>	L	
<i>Sarothamnus scoparius</i>	L	
<i>Trifolium hybridum</i>	T	

Most common ruderal vegetation is represented by nitrophilous tall-herb communities of the class *Galio-Urticetea* with 18 associations, basal communities, and derivate communities. They occupy wide belts adjacent to recently cultivated arable meadows and pastures mainly in the eastern part of Šumava. They appear on most destructed sites and are the most conspicuous ruderal vegetation of Šumava. A case study of this class was carried out near Chalupská slat Peatbog (HUSAČOVÁ in prep.) Tall herb communities of this class are species-poor, marked by strong dominance of one expansive species (Table 1).

Another common group of ruderal communities, the class *Plantaginetea majoris* (with 9 associations, basal communities, and derivate communities), accompanies trampled habitats.

They are usually spread on small spots. Their larger species-poor stands were observed in the ancient military region Dobrá Voda, prior to 1992.

Intruding communities of the class *Molinio-Arrhenatheretea* (with 6 associations, basal communities, and derivate communities) are frequently encountered. Their most frequent dominant species are the expansive *Holcus mollis*, *Phalaris arundinacea* and *Carex bri-zoides*.

Apart from the above mentioned expansive ruderal species (Table 1, 2), *Chamaerion angustifolium*, a common species of forest clearings, is successively spreading in non-forest habitats. This species, notable in July and August, has established in the old ruins of abandoned-farms; its competition threatens natural the oligotrophic communities of the alliances *Violion caninae* Schwickerath 1944 and *Genistion* Böcher 1943 (e.g., locality Bučina).

Among the invasive species (Table 3) *Epilobium ciliatum* penetrates far into the core zone of the national park (clearings above the Vltava Springs, road margins near Březník). Occasionally it forms little stands – on margins of new parkings (e.g., Modrava).

## Habitats of ruderal vegetation

Ruderal vegetation in the Šumava National Park occurs mainly in the following habitats:

### Settlements

1. Ruderal vegetation of villages (mostly III zone, partly II z.)
2. Ruderal vegetation of remote dwellings (mostly II z.)
3. Vegetation of old ruin sites (scattered everywhere)
4. Ruderal vegetation of recreation chalets (mostly II z.)
5. Ruderal vegetation of localities disturbed by building activity (I-III z.)
6. Ruderal vegetation of camps (mostly II z.)
7. Vegetation of sand and gravel pits (I – III z.)

### Communications

8. Vegetation of hiking and biking rest-sites (I, II z.)
9. Vegetation of canoeing rest-sites (I, II z.)
10. Vegetation along tracks (mostly I and II z.)
11. Ruderal vegetation of parking sites (mostly II z.)
12. Ruderal vegetation along ways (I-III z.)
13. Ruderal vegetation along roads (mostly II nad III z.)
14. Vegetation along railways and railway stations (mostly II z.)

### Rural habitats

15. Ruderal vegetation of dumps (II z.)
16. Ruderal vegetation of dung and compost heaps (II z.)
17. Ruderal vegetation around cow-houses (III z.)
18. Vegetation of extensive clearcuts (II z.)

### Disturbed military grounds

19. Vegetation of „iron curtain“ (I, II z.)
20. Vegetation of localities disturbed by military training (II z.)
21. Vegetation after destruction of military equipments (II z.)
22. Ruderal vegetation of former military grounds (mostly II z.)

From the viewpoint of diversity, the most interesting ruderal flora appears in villages marked by a variety of habitats. The nitrophilous herbaceous stands (*Galio-Urticetea*) and trampled communities (*Plantaginetea majoris*) are most common.

Road margins are an important migration route, namely for species from lower altitudes. Analysing vegetation on margins of roads with medium and little traffic, the following species have been found as frequent dominants: *Trifolium repens*, *Calamagrostis villosa*, *Agrostis capillaris*, *Ranunculus repens*, *Veronica chamaedrys*. Moreover, expansive and invasive species were recorded: *Aegopodium podagraria*, *Alopecurus pratensis*, *Anthriscus sylvestris*, *Calamagrostis villosa*, *Carex brizoides*, *Chaerophyllum aureum*, *Chamerion angustifolium*, *Chamomilla suaveolens*, *Cirsium arvense*, *Elytrigia repens*, *Epilobium ciliatum*, *Lupinus polyphyllus*, *Petasites albus*, *Polygonum bistorta*, *Rubus idaeus*, *Rumex obtusifolius*, *Phalaris arundinacea*, *Trifolium hybridum*, *Urtica dioica*.

Roads and tracks represent a rather heterogeneous category – ranging from old tracks covered by stabilized vegetation cover (*Agrostis capillaris*, *Calamagrostis villosa*, *Carex ovalis*, *Poa supina*) to new military communications that provide habitats similar to the highways. Their network penetrates even the most strictly protected area of the national park (Zone I). The surface of some of these roads has been paved with calcareous gravel transported from the Šumava foothills, which resulted in introduction of many calciphilous plant species into the central part of Šumava (e.g., already VANĚČEK 1972). In addition, calcareous gravel creates suitable habitat for the establishment of other allochthonous ruderal species (e.g., *Carduus nutans*, *Chaenorhinum minus*, *Coronilla varia*, *Gentiana ciliata*, *Erysimum pannicum*, *Melilotus albus*, *Sanguisorba minor*, *Sarothamnus scoparius*, *Tragopogon pratensis*). From this point of view, gradual removal of calcareous gravel would be desirable in the Zone I, and in its neighbourhood.

The parking sites represent dispersal centres namely for eutrophic ruderal species (e.g., *Alopecurus pratensis*, *Dactylis glomerata*, *Leontodon autumnalis*, *Trifolium repens*, *T. pratense*, *Tussilago farfara*, *Veronica chamaedrys*) and nitrophilous ruderal species (e.g., *Anthriscus sylvestris*, *Chaerophyllum aromaticum*, *Petasites hybridus*, *Ranunculus repens*, *Urtica dioica*). With regard to the spreading of alien species, location of parking sites inside the Zone I or in its close vicinity (e.g., Jezerní Mire) is hardly acceptable.

## References

- BRAUN-BLANQUET J., 1964: Pflanzensoziologie. Grundzüge der Vegetationskunde. 3. Aufl. Wien et New York.
- HUSÁKOVÁ J., 1984: On the synanthropic flora and vegetation of mountain regions. *Acta Bot. Slov. Acad. Sci Slovacae, ser.A, suppl. 1:81–88*.
- HUSÁKOVÁ J., 1992: Výskyt, funkce a dynamika synantropní flóry a vegetace Národního parku Šumava [Occurrence, function and dynamics of the synanthropic flora and vegetation of the Šumava National Park]. *Ms. Závěreč. zpr. (I. etapa), depon. ČÚOP Praha, 47 p. + přílohy*.
- HUSÁKOVÁ J., 1993: Výskyt, funkce a dynamika synantropní flóry a vegetace Národního parku Šumava [Occurrence, function and dynamics of the synanthropic flora and vegetation of the Šumava National Park]. *Ms. Závěreč. zpr. (II. etapa), depon. ČÚOP Praha, 29 p. + přílohy*.
- HUSÁKOVÁ J., 1996: Ruderální vegetace Šumavy – předběžný přehled [Ruderal vegetation of Šumava – preliminary results]. *Ms. (in press)*.
- HUSÁKOVÁ J. & KOPECKÝ K., 1985: *Alchemillo-Poetum supinae* Aichinger 1933 v horské sku-

- pině Knížecího stolce (jihovýchodní Šumava) [*Alchemillo-Poetum supinae* Aichinger 1933 in the Knížecí Stolec Ridge (southeastern Šumava)]. *Sborn. Jihočes. Muz. v Čes. Budějovicích, ser. Přír. Vědy, Č. Budějovice, 25: 12–16.*
- KOPECKÝ K. & HEJNÝ S., 1971: Nitrofilní lemová společenstva víceletých rostlin severovýchodních a středních Čech [Nitrophilous fringe communities of perennial plants in the northeastern and central Bohemia]. *Rozpr. Čs. Akad. Věd, Ser. Math.-Nat., Praha, 81/9: 1–126.*
- KOPECKÝ K. & HEJNÝ S., 1980: Deduktivní způsob syntaxonomické klasifikace rostlinných společenstev [Deductive method of syntaxonomic classification of plant communities]. *Zpr. Čs. Bot. Společ., Praha, 15, Mater. 1: 43–51.*
- KOPECKÝ K. & HEJNÝ S., 1992: Ruderální společenstva bylin České republiky [Ruderal communities of herbs in Czech republic]. *Studie ČSAV, Praha, 1992/1: 1–128.*
- KOPECKÝ K. & HUSÁKOVÁ J., 1985: Proces apofytizace *Anthriscus nitida* v oblasti Knížecího stolce (jihovýchodní Šumava) [The apophytisation process in *Anthriscus nitida* in the region of Knížecí stolec Ridge (southeastern Šumava)]. *Preslia, Praha, 57: 31–39.*
- KOPECKÝ K., DOSTÁLEK J. & FRANTÍK T., 1995: The use of the deductive method of syntaxonomic classification in the system of vegetational units of the Braun-Blanquet approach. *Veg-etatio 117: 95–112.*
- NEUHÁUSOVÁ Z. & KOLBEK J., 1982 (ed): Seznam vyšších rostlin, mechorostů a lišejníků střední Evropy užitých v bance geobotanických dat BÚ ČSAV [The list of vascular plants, bryophytes and lichens in central Europe applied in the database of geobotany inputs]. *Průhonice, 1–224.*
- PYŠEK A., 1975: Vegetace šumavské obce Srní [Vegetation of Srní, a Šumava village]. *Sborn. Jihočes. Muz. v Čes. Budějovicích, ser. Přír. Vědy, Č. Budějovice, 15: 175–186.*
- PYŠEK A., 1981: Übersicht über die westböhmisches Ruderalvegetation. *Fol. Mus. Rer. Natur. Bohem. Occident., ser. Bot., Plzeň, 15: 1–23.*
- ŠANDOVÁ M., 1976: Lemová společenstva centrální části Šumavy a Předšumaví [Fringe communities in the central Šumava and of the foothills]. 1–116, Ms. (Dipl. pr., depon in: Knih. kat. bot. přírod. fak. Univ. Karlovy, Praha).
- ŠANDOVÁ M., 1978a: Lemová společenstva centrální části Šumavy a Předšumaví [Fringe communities in the central Šumava and of the foothills]. 1–178, Ms. (Rig. pr., depon. in: Knih. kat. bot. přír. fak. Univ. Karlovy, Praha).
- ŠANDOVÁ M., 1978b: Ein Beitrag zur Charakteristik der anthropogene nitrophilen Saumgesellschaften im mittleren Böhmerwald und seinem Vorgebirge. *Acta Bot. Slov. Acad. Sci. Slovacae, ser. A, Bratislava, 3: 353–362.*
- ŠANDOVÁ M., 1979: Indikationseigenschaften der Vegetation am Beispiel der Pflanzengesellschaften entlang der Strasse Sušice – Modrava (Böhmerwald). *Folia Mus. Rer. Natur. Bohem. Occident., ser. Bot. Plzeň, 13: 1–35.*
- ŠANDOVÁ M., 1981: Übersicht über die Ruderalvegetation der westböhmisches landwirtschaftlichen Betriebe. *Fol. Mus. Rer. Natur. Bohem. Occident., ser. Bot., Plzeň, 16: 1–34.*
- VANEČEK J., 1972: Zavlečené rostliny v chráněné krajinné oblasti Šumava [Species dragged to the Protected Landscape Area of Šumava]. *Chrán. kraj. Obl. Šumava – Zprav., České Budějovice – Plzeň, 13: 28–31.*