

## **Ruderal plant communities of north-eastern Slovakia II. *Chenopodietea*, *Plantaginetea***

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JAROLÍMEK I. & ZALIBEROVÁ M. (1995): Ruderal plant communities of north-eastern Slovakia II. *Chenopodietea*, *Plantaginetea*. - Thaiszia - J. Bot., Košice, 5: 61-79. - ISSN 1210-0420.

**Abstract:** The second part of the results of phytocoenological study of ruderal vegetation in the north-eastern Slovakia is presented. 15 associations and communities of classes *Chenopodietea* and *Plantaginetea* are briefly characterized from the point of view of floristic composition, ecological conditions, and distribution in the territory studied. Phytocoenological tables of these syntaxa are added.

**Keywords:** ruderal plant communities, *Chenopodietea*, *Plantaginetea*, north-eastern Slovakia

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This paper follows up the foregoing article (ZALIBEROVÁ & JAROLÍMEK 1995, Thaiszia - J. Bot. 5: 31-59.). The chapters Introduction, and Material and methods are brought in that article.

### **Syntaxonomical survey of plant communities**

*Chenopodietea* BR.-BL. ex BR.-BL. et al. 1952 em. LOHMEYER et al. 1962

*Sisymbrietalia* J. TX. ex W. MATUSZKIEWICZ 1962

*Malvion neglectae* (GUTTE 1972) HEJNÝ 1978

*Matricario-Anthemitetum cotulae* DIHORU ex MUCINA 1987

*Malvetum neglectae* FELFÖLDY 1942

*Atriplici-Sisymbriion* HEJNÝ 1978

*Atriplex patula*-community

*Sisymbrietum sophiae* KREH 1935

*Chenopodietum stricti* (OBERD. 1957) GUTTE 1966

*Matricaria perforata*-community

- Plantaginea majoris* R. TX. et PREISING in R. TX. 1950  
*Plantaginealia majoris* R. TX. et PREISING in R. TX. 1950 em. OBERD. in  
 OBERD. et al. 1967  
*Polygonum avicularis* BR.-BL. 1931  
*Lolietum perennis* GAMS 1927  
*Prunello-Ranunculetum repentis* WINTERHOFF 1963  
*Matricario-Polygonetum arenastri* T. MÜLLER in OBERD. 1971  
*Herniarietum glabrae* (HOHENESTER 1960) HEJNÝ et JEHLÍK 1975  
*Poa annua*-community  
*Chamomilla suaveolens*-community  
*Chamomilla recutita*-community  
*Agrostietalia stoloniferae* OBERD. in OBERD. et al. 1967  
*Lolio-Potentillion* R. TX. 1947  
*Potentilla anserina*-community  
*Potentilla reptans*-community

## Description of plant communities

### *Matricario-Anthemitetum cotulae* (Tab.14)

Species rich plant community of low aromatic therophyte herbs with optimum of development in late summer. In this time the most abundant species *Anthemis cotula* is in flower. Stands of the community regularly contain *Chamomilla suaveolens* and the group of trampled species such as *Plantago major*, *Poa annua*, *Polygonum arenastrum*, and *Potentilla anserina*. They often play role of subdominants. The community occurs in villages on moister poultry pastures and along foot-paths. Soils are enriched with nutrient from poultry mutes. *Matricario-Anthemitetum* is relatively frequent in the territory studied though it is rare in the other parts of Slovakia. Phytocoenological relevés were made mainly in Ondavská vrchovina highlands and Busov Mts. The community seldom occurs in some other orographic units.

### *Malvetum neglectae* (Tab.14)

Low therophyte herbs prevail in the plant community medium rich in species. Beside dominant species *Malva neglecta* the nitrophilous species *Lamium album*, *Urtica dioica*, *U. urens*, and trampling tolerant species *Polygonum arenastrum* and *Plantago major* are frequent. *Malvetum neglectae* is typical rustic archeophyte plant community occurring on small areas in sunny to semishaded moist habitats enriched by liquid rubbish and poultry mutes. In comparison with the other regions of Slovakia the community is more frequent in the territory studied thanks to traditional way of life. Phytocoenological relevés were made in Beskydské predhorie foothills, Laborecká vrchovina and Ondavská vrchovina highlands and Spišsko-šarišské medzihorie basin.

### *Atriplex patula*-community (Tab.15)

Rare, species rich plant community of tall therophyte herbs. Abundantly branched species *Atriplex patula* dominates the stands. *Chenopodium strictum* and *Matricaria perforata* play the role of subdominants. The community prefers habitats on recent

ruins and dumps of building material rests or nitrogen rich places near dung-heaps. Phytocoenological relevés were made in Ondavská vrchovina highlands.

*Sisymbrietum sophiae* (Tab.15)

Species poor plant community of therophyte herbs with dominant species *Descurainia sophia*. It was registered on two localities: 1. new bank near city fortification in Bardejov (Ondavská vrchovina highlands); 2. humus wastage from the farm in Nová Lubovňa (Spišsko-šarišské medzihorie basin). The community belongs to rare plant communities in the territory studied like the majority of communities of alliance *Atriplici-Sisymbriion*. Its stands are short of winter therophyte grasses.

*Chenopodietum stricti* (Tab.15)

Species rich plant community of tall therophyte herbs with dominant species *Chenopodium strictum*. Only one relevé was made in the village Zborov in Ondavská vrchovina highlands on recent dump of building material rests. Probably it occurs in other orographic units.

*Matricaria perforata*-comm. (Tab.15)

Species poor plant community of middle tall therophyte herbs with optimum of development at the beginning of summer, when the dominant species *Matricaria perforata* is in flower. In recent years the community spreads on bank substratum of various composition over all Slovakia, mainly in warmer regions. In the territory studied it is not abundant till this time. Phytocoenological relevés were made only in Spišsko-šarišské medzihorie basin.

*Lolietum perennis* (Tab.16)

Mostly dense closed trampled lawns abundant in perennial grasses and herbs. Physiognomy of stands with height 15-25 cm mainly determines dominant species *Lolium perenne* together with the most frequent species, such as *Plantago major*, *Trifolium repens*, *Taraxacum officinale* agg., and *Poa annua*. The community occurs on trampled habitats of medium intensity of trampling on playgrounds, cemeteries and courtyards, and along roads and paths. *Lolietum perennis* is the most common trampled plant community in the region studied.

*Prunello-Ranunculetum repentis* (Tab.17)

Moderately trampled, medium rich in species plant community of hemicryptophyte herbs and grasses. Stands of the community are characterized by group of species, such as *Prunella vulgaris*, *Plantago major*, *Ranunculus repens*, *Bellis perennis*, *Agrostis stolonifera* and *Juncus tenuis*. They occur on semishaded to sunny habitats on forest roads. They occur less in villages on moderately shaded habitats along walls and houses. Soils are fresh moist, clayey, in villages with admixture of anthropogenic skeleton. Phytocoenological relevés were made in Čergov Mts., Busov Mts., Ondavská vrchovina highlands, and Spišsko-šarišské medzihorie basin, but we assume the community is common on suitable habitats in all studied territory.

Tab. 14 Communities of alliance *Malvion neglectae*.

A - *Matricario-Anthemitetum cotulae*

B - *Malvetum neglectae*

Community	A	A	A	A	A	A	A	Const.	B	B	B	B
No. of relevé	1	2	3	4	5	6	7	(%)	8	9	10	11
Sampled area (m <sup>2</sup> )	12	16	18	10	10	6	15		16	5	15	10
Cover of herb layer (%)	90	95	100	95	95	80	80		100	100	95	90
No. of species	33	36	28	21	14	31	52		25	15	16	18
<b>Matricario-Anthemitetum:</b>												
<i>Chamomilla suaveolens</i>	1	A	1	1	1	+	1	100	.	.	.	1
<i>Anthemis cotula</i>	3	3	3	4	3	3	3	100	.	.	1	.
<b>Malvetum neglectae:</b>												
<i>Urtica urens</i>	.	.	.	.	.	.	+	14	+	1	+	.
<i>Malva neglecta</i>	.	.	.	1	.	.	.	14	5	4	4	4
<b>Malvion, Sisymbrietalia, Chenopodietae:</b>												
<i>Capsella bursa-pastoris</i>	+	1	.	+	1	1	1	86	+	+	.	+
<i>Geranium pusillum</i>	+	.	A	A	.	A	.	57	A	.	1	A
<i>Stellaria media</i>	+	+	+	.	.	.	+	57	+	1	+	.
<i>Veronica persica</i>	.	.	+	.	.	.	+	43	+	.	+	R
<i>Conyza canadensis</i>	+	+	.	.	.	.	+	43	.	.	.	.
<i>Anagallis arvensis</i>	+	+	.	.	.	.	+	43	+	.	.	.
<i>Galinsoga parviflora</i>	.	.	+	.	.	.	A	29	.	1	.	.
<b>Others:</b>												
<i>Plantago major</i>	A	A	A	+	B	+	A	100	1	+	.	+
<i>Poa annua</i>	1	A	3	1	3	+	A	100	1	.	.	.
<i>Polygonum arenastrum</i>	+	+	1	B	1	.	1	86	1	+	+	+
<i>Urtica dioica</i>	+	.	+	+	+	1	+	86	+	.	+	1
<i>Portentilla anserina</i>	3	3	.	B	1	1	A	86	1	.	.	1
<i>Taraxacum officinale</i> agg.	+	+	1	+	.	.	1	71	+	1	.	.
<i>Ranunculus repens</i>	+	1	1	.	.	1	+	71	.	+	.	.
<i>Plantago lanceolata</i>	1	+	+	.	.	1	+	71	.	.	.	.
<i>Prunella vulgaris</i>	A	1	1	.	.	+	+	71	.	+	.	A
<i>Trifolium repens</i>	A	+	1	.	.	.	A	57	.	+	R	.
<i>Galinsoga ciliata</i>	.	+	.	.	+	A	+	57	.	+	R	.
<i>Lamium album</i>	.	+	+	+	+	.	.	57	1	1	A	.
<i>Rumex obtusifolius</i>	+	+	+	.	.	.	+	57	+	.	.	R
<i>Artemisia vulgaris</i>	+	+	.	.	+	.	+	57	.	.	.	.
<i>Anthriscus sylvestris</i>	.	+	R	+	.	+	.	57	.	.	.	.
<i>Agrostis stolonifera</i>	1	+	.	.	.	1	B	57	.	.	.	.
<i>Glechoma hederacea</i>	.	1	.	.	.	A	A	43	+	.	1	.
<i>Rumex crispus</i>	+	+	.	.	.	+	.	43	.	.	.	.
<i>Veronica chamaedrys</i>	+	.	.	.	+	.	+	43	.	.	.	.
<i>Medicago lupulina</i>	+	1	.	.	.	.	+	43	.	.	.	.
<i>Lycopus europaeus</i>	.	.	+	.	.	+	+	43	.	.	.	.
<i>Polygonum hydropiper</i>	+	.	+	.	.	.	+	43	+	.	.	.
<i>Cerastium holosteoides</i>	+	+	.	.	.	.	+	43	.	.	.	.

Tab. 14 Continued

Community	A	A	A	A	A	A	A		B	B	B	B
No. of relevé	1	2	3	4	5	6	7	Const.	8	9	10	11
<i>Bellis perennis</i>	+	+	1	.	.	.	.	43	.	.	.	.
<i>Galeopsis pubescens</i>	.	.	+	.	.	+	+	43	.	.	.	.
<i>Scrophularia scopolii</i>	.	.	1	+	.	.	1	43	+	.	.	.
<i>Dactylis glomerata</i>	+	1	.	.	.	.	+	43	+	.	.	.
<i>Arctium lappa</i>	.	.	.	+	.	+	.	29	.	.	+	+
<i>Lolium perenne</i>	.	.	.	.	1	.	1	29	.	B	.	.
<i>Mentha arvensis</i>	.	.	.	.	.	+	+	29	.	.	.	+
<i>Epilobium montanum</i>	.	.	+	.	.	.	+	29	.	.	.	.
<i>Ballota nigra</i>	.	+	.	.	.	+	.	29	+	.	.	.
<i>Veronica serpyllifolia</i>	.	.	+	.	.	.	+	29	.	.	.	.
<i>Verbena officinalis</i>	.	+	.	.	.	+	.	29	.	.	.	.
<i>Carex hirta</i>	.	+	.	+	.	.	.	29	.	.	.	.
<i>Cirsium arvense</i>	.	.	+	+	.	.	.	29	+	.	.	.
<i>Carduus acanthoides</i>	+	+	.	.	.	.	.	29	.	.	.	.
<i>Sagina procumbens</i>	.	+	.	+	.	.	.	29	.	.	.	.
<i>Chenopod. polyspermum</i>	.	.	.	.	.	+	+	29	.	.	.	.
<i>Juncus tenuis</i>	.	.	.	+	+	.	.	29	.	.	.	.
<i>Filaginella uliginosa</i>	.	+	.	.	.	.	+	29	.	.	.	.
<i>Polygonum lapathifolium</i>	.	.	.	+	.	.	+	29	.	.	.	.
<i>Polygonum minus</i>	.	.	.	.	.	+	A	29	.	.	.	.
<i>Atriplex patula</i>	.	.	.	.	.	.	+	14	.	.	+	.
<i>Chenopodium album</i>	.	.	R	.	.	.	.	14	.	.	+	.
<i>Sisymbrium officinale</i>	.	.	.	+	.	.	.	14	R	.	.	1
<i>Senecio vulgaris</i>	.	.	.	.	.	.	.	0	.	+	.	+
<i>Oxalis corniculata</i>	.	.	.	.	.	.	.	0	.	R	.	.
<i>Achillea millefolium</i>	+	.	.	.	.	.	.	14	+	.	.	.

In one relevé:

*Aegopodium podagraria* + (7), *Aethusa cynapium* + (7), *Alchemilla sp.* + (2), *Barbarea vulgaris* + (7), *Bidens tripartita* + (7), *Calystegia sepium* + (6), *Chelidonium majus* + (7), *Chenopodium strictum* Roth + (6), *C. glaucum* + (7), *Daucus carota* + (3), *Descurainia sophia* R (11), *Festuca pratensis* + (11), *Juncus bufonius* 1 (7), *Lamium purpureum* 1 (10), *Leonurus cardiaca* + (8), *Melandrium album* + (7), *Mentha longifolia* + (6), *Odontites verna* + (7), *Oxalis dillenii* + (7), *Pastinaca sativa* + (6), *Polygonum persicaria* + (2), *Potentilla reptans* + (1), *Rorippa sylvestris* + (7), *Scrophularia nodosa* 1 (6), *Sonchus asper* + (1), *S. oleraceus* + (9), *Tussilago farfara* + (1), *Veronica arvensis* + (1), *V. beccabunga* + (7), *V. hederifolia* + (2).

Tab. 14 Continued

Community	A	A	A	A	A	A	A		B	B	B	B
No. of relevé	1	2	3	4	5	6	7	Const.	8	9	10	11
<i>Bellis perennis</i>	+	+	1	.	.	.	.	43	.	.	.	.
<i>Galeopsis pubescens</i>	.	.	+	.	.	+	+	43	.	.	.	.
<i>Scrophularia scopolii</i>	.	.	1	+	.	.	1	43	+	.	.	.
<i>Dactylis glomerata</i>	+	1	.	.	.	.	+	43	+	.	.	.
<i>Arctium lappa</i>	.	.	.	+	.	+	.	29	.	.	+	+
<i>Lolium perenne</i>	.	.	.	.	1	.	1	29	.	B	.	.
<i>Mentha arvensis</i>	.	.	.	.	.	+	+	29	.	.	.	+
<i>Epilobium montanum</i>	.	.	+	.	.	.	+	29	.	.	.	.
<i>Ballota nigra</i>	.	+	.	.	.	+	.	29	+	.	.	.
<i>Veronica serpyllifolia</i>	.	.	+	.	.	.	+	29	.	.	.	.
<i>Verbena officinalis</i>	.	+	.	.	.	+	.	29	.	.	.	.
<i>Carex hirta</i>	.	+	.	+	.	.	.	29	.	.	.	.
<i>Cirsium arvense</i>	.	.	+	+	.	.	.	29	+	.	.	.
<i>Carduus acanthoides</i>	+	+	.	.	.	.	.	29	.	.	.	.
<i>Sagina procumbens</i>	.	+	.	+	.	.	.	29	.	.	.	.
<i>Chenopod. polyspermum</i>	.	.	.	.	.	+	+	29	.	.	.	.
<i>Juncus tenuis</i>	.	.	.	+	+	.	.	29	.	.	.	.
<i>Filaginella uliginosa</i>	.	+	.	.	.	.	+	29	.	.	.	.
<i>Polygonum lapathifolium</i>	.	.	.	+	.	.	+	29	.	.	.	.
<i>Polygonum minus</i>	.	.	.	.	.	+	A	29	.	.	.	.
<i>Atriplex patula</i>	.	.	.	.	.	.	+	14	.	.	+	.
<i>Chenopodium album</i>	.	.	R	.	.	.	.	14	.	.	+	.
<i>Sisymbrium officinale</i>	.	.	.	+	.	.	.	14	R	.	.	1
<i>Senecio vulgaris</i>	.	.	.	.	.	.	.	0	.	+	.	+
<i>Oxalis corniculata</i>	.	.	.	.	.	.	.	0	.	R	.	.
<i>Achillea millefolium</i>	+	.	.	.	.	.	.	14	+	.	.	.

In one relevé:

*Aegopodium podagraria* + (7), *Aethusa cynapium* + (7), *Alchemilla sp.* + (2), *Barbarea vulgaris* + (7), *Bidens tripartita* + (7), *Calystegia sepium* + (6), *Chelidonium majus* + (7), *Chenopodium strictum* Roth + (6), *C. glaucum* + (7), *Daucus carota* + (3), *Descurainia sophia* R (11), *Festuca pratensis* + (11), *Juncus bufonius* 1 (7), *Lamium purpureum* 1 (10), *Leonurus cardiaca* + (8), *Melandrium album* + (7), *Mentha longifolia* + (6), *Odontites verna* + (7), *Oxalis dillenii* + (7), *Pastinaca sativa* + (6), *Polygonum persicaria* + (2), *Potentilla reptans* + (1), *Rorippa sylvestris* + (7), *Scrophularia nodosa* 1 (6), *Sonchus asper* + (1), *S. oleraceus* + (9), *Tussilago farfara* + (1), *Veronica arvensis* + (1), *V. beccabunga* + (7), *V. hederifolia* + (2).

Tab. 15 Communities of alliance *Atriplici-Sisymbriion*

- A - *Atriplex patula* - community  
 B - *Sisymbrietum sophiae*  
 C - *Chenopodietum stricti*  
 D - *Matricaria perforata* - community

Community	A	A	B	B	C	D	D
No. of relevé	1	2	3	4	5	6	7
Sampled area (m <sup>2</sup> )	25	15	20	10	50	18	25
Cover of herb layer (%)	95	80	90	90	90	100	95
No. of species	31	31	21	12	49	15	15
<b><i>Atriplex patula</i>-community:</b>							
<i>Atriplex patula</i>	4	4	A	+	.	+	B
<b><i>Sisymbrietum sophiae</i>:</b>							
<i>Descurainia sophia</i>	.	.	4	5	+	1	+
<b><i>Chenopodietum stricti</i>:</b>							
<i>Chenopodium strictum</i> Roth	B	1	+	.	4	.	.
<b><i>Matricaria perforata</i> - community:</b>							
<i>Matricaria perforata</i>	B	A	+	1	+	5	4
<b><i>Atriplici-Sisymbriion, Sisymbrietalia, Chenopodietea</i>:</b>							
<i>Capsella bursa-pastoris</i>	A	.	1	1	+	A	+
<i>Sinapis arvensis</i>	.	+	.	+	.	1	+
<i>Chenopodium album</i>	.	.	3	.	.	1	A
<i>Stellaria media</i>	.	1	.	1	+	.	.
<i>Lactuca serriola</i>	.	.	+	.	+	.	.
<i>Thlaspi arvense</i>	.	+	.	.	1	.	.
<i>Bromus hordeaceus</i>	.	.	.	.	.	1	+
<i>Sonchus oleraceus</i>	A	.	.	.	+	.	.
<i>Chenopodium polyspermum</i>	A	.	.	.	1	.	.
<i>Galinsoga ciliata</i>	1	.	.	.	A	.	.
<i>Papaver rhoeas</i>	.	.	.	.	.	+	+
<b>Others:</b>							
<i>Artemisia vulgaris</i>	+	+	+	.	1	+	+
<i>Elytrigia repens</i>	+	A	.	+	1	+	1
<i>Polygonum arenastrum</i>	.	1	+	+	+	.	.
<i>Polygonum lapathifolium</i>	+	.	R	.	+	.	.
<i>Rumex obtusifolius</i>	.	1	.	.	+	1	A
<i>Chamomilla suaveolens</i>	.	.	.	.	.	.	.
<i>Ballota nigra</i>	A	.	+	.	1	.	.
<i>Chelidonium majus</i>	+	.	+	.	1	.	.
<i>Cirsium arvense</i>	.	1	+	.	.	1	.
<i>Plantago major</i>	1	+	.	.	1	.	.
<i>Urtica dioica</i>	1	.	.	1	1	.	.
<i>Tussilago farfara</i>	+	+	.	.	.	.	.
<i>Galium aparine</i>	1	.	.	+	+	.	.
<i>Arcetium lappa</i>	.	+	.	.	+	.	R

Tab. 15 Continued

Community	A	A	B	B	C	D	D
No. of relevé	1	2	3	4	5	6	7
<i>Melandrium album</i>	.	.	.	.	+	+	+
<i>Taraxacum officinale</i> agg.	+	+	.	.	1	.	.
<i>Agrostis stolonifera</i>	+	+	.	.	+	.	.
<i>Carduus acanthoides</i>	.	1	.	.	1	+	.
<i>Dactylis glomerata</i>	1	.	.	.	.	+	+
<i>Lolium perenne</i>	.	.	+	.	+	.	.
<i>Trifolium hybridum</i>	+	+	.	.	.	.	.
<i>Trifolium repens</i>	1	.	.	.	+	.	.
<i>Symphytum officinale</i>	+	.	.	.	+	.	.
<i>Chaerophyllum aromaticum</i>	+	.	.	.	+	.	.
<i>Poa annua</i>	.	+	.	.	+	.	.
<i>Anthriscus sylvestris</i>	+	.	.	.	+	.	.
<i>Ranunculus repens</i>	+	A	.	.	.	.	.
<i>Heraclium sphondylium</i>	+	+	.	.	.	.	.
<i>Galeopsis tetrahit</i>	.	.	.	1	+	.	.

In one relevé:

*Achillea millefolium* + (5), *Aethusa cynapium* + (5), *Alliaria petiolata* + (5), *Anagallis arvensis* + (1), *Arctium tomentosum* + (1), *Armoracia rusticana* + (5), *Barbarea vulgaris* + (2), *Bidens tripartita* + (2), *Calystegia sepium* + (5), *Carduus personata* + (3), *Cerastium holosteoides* + (3), *Chenopodium glaucum* + (2), *Clinopodium vulgare* + (3), *Echinochloa crus-galli* + (2), *Epilobium collinum* + (1), *Erysimum cheiranthoides* + (2), *Fallopia convolvulus* + (3), *Festuca pratensis* + (5), *Galinsoga parviflora* + (5), *Geranium pyrenaicum* + (5), *Glechoma hederacea* + (1), *Glyceria fluitans* + (2), *Lamium album* + (4), *Leontodon autumnalis* + (2), *Leonurus cardiaca* + (5), *Lepidium ruderales* 1 (3), *Malva neglecta* 1 (5), *Medicago sativa* R (3), *Melilotus alba* + (5), *Mentha longifolia* + (5), *Myosoton aquaticum* + (2), *Phalaris arundinacea* + (1), *Poa compressa* + (3), *Polygonum hydropiper* + (2), *P. minus* + (5), *Potentilla anserina* + (5), *Rubus caesius* 1 (5), *Rumex crispus* + (2), *Urtica urens* + (5).



*Matricario-Polygonetum arenastrum* (Tab.18)

Community with dominant species *Polygonum arenastrum* builds up carpet stands with small or bigger gaps on the most intensively trampled open and sunny habitats in cities and villages. Soils are clay-and-sand, often loose and quickly drying with high content of anthropogenic skeleton, such as gravel and slag. The community occurs more rare in the studied territory than in the other, especially south regions of Slovakia. It was found in Ondavská and Laborecká vrchovina highlands, Beskydské predhorie foothills and in Spišská Magura Mts.

*Herniarietum glabrae* (Tab.17)

Medium rich to rich in species, two layer plant community. Spread and creeping herbs such as *Herniaria glabra*, *Medicago lupulina*, *Trifolium repens*, and *Potentilla argentea* dominate the stands of the community. In the gaps among them species *Arenaria serpyllifolia*, *Acinos arvensis*, *Cerastium holosteoides*, and some species of class *Plantaginetea majoris* grow. Habitats of the community are sunny and warm. Soils are dry, light, sandy with high content of skeleton. The stands were found on gravel terraces near streams, on field roads on dams along streams, seldom on fine gravel covered public grounds. The community is rare in the territory studied. It was found only in Spišsko-šarišské medzihorie basin and in Ondavská vrchovina highlands.

*Poa annua*-community (Tab.19)

Therophyte grass *Poa annua* dominates fresh green carpet trampled low and thin lawns. Besides it the species *Plantago major*, *Trifolium repens* and *Taraxacum officinale* agg. were found with highest constancy in the stands. The community occurs on trampled places near family houses, on courtyards, on public grounds, and near roads mainly in villages, less in cities. Habitats are semishaded, scarcely ever sunny. Fresh moist clayey to clay-and-sand soils seldom contain admixture of slag or fine gravel. *Poa annua*-community belongs to the most common ruderal plant communities in north-east part of Slovakia. Phytocoenological relevés were made almost in all orographic units of the territory studied.

*Chamomilla suaveolens*-community (Tab.20)

Low therophyte herbs and grasses build up a thin stands on trampled habitats on periphery of playgrounds, along field roads, on farm courtyards and on public places mainly in villages. Soils are fresh moist to dry, clayey, sometimes with admixture of gravel. Dominant species *Chamomilla suaveolens* determines a physiognomy of stands. Some species are present with high constancy such as *Capsella bursa-pastoris*, *Plantago major*, and *Taraxacum officinale* agg. The community occurs in the territory studied, in comparison with southern part of Slovakia, rather frequently. Phytocoenological relevés were made in Spišsko-šarišské medzihorie basin and Ondavská vrchovina highlands.

*Chamomilla recutita*-community (Tab.17)

Seldom seen plant community with dominant species *Chamomilla recutita*. Its stands occur on trampled habitats on moist to dry soils, sometimes with admixture of sand and gravel. They are tolerant to pasture of poultry. The community is limited to villages. It

was found on two localities in Ondavská vrchovina highlands and in Spišsko-šarišské medzihorie basin. Occurrence on other places inside closed courtyards is probable.

#### *Potentilla anserina*-community (Tab.21)

Species medium rich plant community of low (3-10 cm) perennial herbs and grasses forms usually compact, dense silver-green carpet stands. *Potentilla anserina* determines their appearance. *Plantago major*, *Taraxacum officinale* agg., *Trifolium repens*, and *Rumex obtusifolius* occur in the stands with lower cover and high constancy. They are optimally developed on goose pastures. Soils are saturated with nutrient from poultry mutes. Stands are selectively affected by pasture of poultry. They are less frequent in moister trampled habitats in microdepressions or along roads and lawns. The community is typical in villages. In towns it occurs seldom in periphery. Phytocoenological relevés were made in Ondavská and Laborecká vrchovina highlands and in Spišsko-šarišské medzihorie basin.

#### *Potentilla reptans*-community (Tab.17)

Moderately trampled, species poor plant community with dominant species *Potentilla reptans* was found on semishaded moist habitats along walls and brooks on two localities in Spišsko-šarišské medzihorie basin and Ondavská vrchovina highlands. Syntaxonomic classification is makeshift and it needs next study.

## Discussion

The list of communities and their characteristics show that the ruderal vegetation is relatively diversified in north-eastern Slovakia. 38 associations and communities belonging to five classes were found. Trampled communities of the order *Plantagine-talia* (e.g. *Lolietum perennis*, *Poa annua*-community, *Potentilla anserina*-community) unambiguously prevail during the whole vegetation season (cf. ZALIBEROVÁ 1994). In spring and early summer tall-herb plant communities of the order *Lamio albi-Chenopodietalia boni-henrici* (e.g. *Chaerophylletum aromatici*, *Anthriscus sylvestris*-community, *Urtico-Aegopodietum*) stand out. In the summer the communities of *Onopordetalia* have their symphenological optimum (e.g. *Arctietum lappae*, *Tanaceto-Artemisietum*). In late summer and autumn the *Polygono-Bidentetum* (*Bidentetalia*) and the *Aegopodio-Geranium pratense* (*Lamio albi-Chenopodietalia boni-henrici*) dominate.

On the base of phytocoenological relevés we can intimate that thermophilous plant communities of the order *Onopordetalia*, especially of alliances *Onopordion acanthii* and *Dauco-Melilotion* peter out in the territory studied (*Onopordetum acanthii*, *Potentillo argenteae-Artemisietum absinthii*, *Echio-Melilotetum*). Moister climate and prevailing of clayey soils cause that the communities lack xerothermophilous species of winter grasses such as *Bromus tectorum*, *B. sterilis*, *Hordeum murinum*. The species *Reseda lutea* is also missing. Species composition of *Sisymbrietum sophiae* (order *Sisymbrietalia*) was changed similarly. Low presence and abundance of *Arction*- and *Onopordetalia*- species and higher occurrence of *Galio-Urticetea*- species such as *Urtica dioica*, *Glechoma hederacea*, *Lamium album* and *Heracleum sphondylium* in

the *Tanaceto-Artemisietum* complicates the classification of the association into higher syntaxa.

Climatic conditions and traditional way of life of inhabitants allow the development and relatively frequent occurrence of communities which are rare or absent in other regions of Slovakia, such as *Matricario-Anthemitetum cotulae* and *Malvetum neglectae* from the alliance *Malvion neglectae* and *Herniarietum glabrae* and *Chamomilla recutita*-community from alliance *Polygonion avicularis*.

Communities *Urtico urentis-Chenopodietum boni-henrici* (Arction), *Alliario-Chaerophylletum temuli* (Galio-Alliarion), *Sisymbrietum strictissimi* (*Aegopodion podagrariae*), *Bidentetum cernui* (*Bidenton tripartiti*) were found rarely in north-eastern Slovakia. They are rare or in retreat throughout Slovakia. The association *Catabroso-Polygonetum hydropipers* is the most interesting one of the last mentioned alliance. It is very rare in the warmest regions of southern and eastern Slovakia (OŤAHELOVÁ & al., 1984). In the territory studied it occurs more frequently. Following the recent knowledge we assume that community is related just to flysh region of north-eastern Slovakia.

We registered only two taxa included into the Red list of ferns and flowering plants of Slovakia (MAGLOCKÝ & FERÁKOVÁ 1993) among all species building ruderal plant communities. *Geum aleppicum* (category vulnerable) occurs in the stands of *Chelidonium majus*-community and *Poa annua*-community in the villages Bodružal, Jakubany, and Stará Ľubovňa. *Lythrum hyssopifolia* (category indeterminate) was registered in the stand of association *Polygono-Bidentetum* in the village Dlhé nad Cirochou.

## Acknowledgements

Authors are indebted to Dr. T. KRIPPELOVÁ, CSc. for providing unpublished phytocoenological relevés, to Dr. S. KVARTEKOVÁ and Dr. J. ZLINSKÁ, CSc. for help in the field, and to K. KRAJČOVIČOVÁ and B. WOLFOVÁ for technical assistance. The study has been supported by Slovak Academy of Sciences, Grant no. 1178.

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Tab. 16 *Lolietum perennis*

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Con
Sampled area (m <sup>2</sup> )	16	16	8	16	25	24	25	16	7	15	8	15	15	8	15	12	10	16	25	16	6	25	st.
Cover of herb layer (%)	100	100	90	100	90	90	95	100	80	100	90	80	90	90	90	100	95	90	95	100	70	85	(%)
No. of species	19	16	8	22	11	15	17	12	9	15	9	22	16	14	10	10	16	14	26	32	6	21	
<b><i>Lolietum perennis</i>:</b>																							
<i>Plantago major</i>	A	B	3	1	3	A	A	A	3	.	B	3	3	3	4	B	B	A	1	3	3	3	91
<i>Lolium perenne</i>	4	4	3	1	A	4	1	4	1	4	3	1	1	1	3	4	4	4	B	3	1	3	100
<b>Polygonion, Plantaginetalia, Plantaginetea:</b>																							
<i>Trifolium repens</i>	A	+	A	3	B	A	1	1	B	+	1	+	A	A	1	A	+	1	3	A	+	B	100
<i>Poa annua</i>	.	.	A	+	A	1	A	1	B	B	1	3	A	A	1	+	1	B	A	A	A	A	86
<i>Potentilla anserina</i>	+	1	.	1	+	1	A	+	1	.	.	+	1	+	1	.	1	+	B	+	.	B	77
<i>Chamomilla suaveolens</i>	.	.	B	.	+	+	.	+	+	.	1	1	+	1	+	.	.	+	+	+	.	1	64
<i>Polygonum arenastrum</i>	.	.	.	.	.	.	.	.	B	+	A	+	+	+	B	+	1	1	.	.	3	1	55
<b>Others:</b>																							
<i>Taraxacum officinale</i> agg.	+	+	B	1	1	1	+	1	B	+	1	1	1	1	R	B	+	+	1	+	+	1	100
<i>Festuca pratensis</i>	A	1	1	+	1	.	A	+	.	.	.	1	A	1	.	.	.	.	.	.	.	+	50
<i>Plantago lanceolata</i>	+	+	.	3	.	A	.	.	.	+	.	+	.	.	.	1	R	.	3	1	.	1	50
<i>Ranunculus repens</i>	+	+	+	+	+	.	.	.	.	.	+	+	+	+	.	.	.	.	.	1	.	+	50
<i>Bellis perennis</i>	.	+	+	.	.	1	.	.	+	.	.	.	.	.	.	.	.	+	+	A	1	.	45
<i>Medicago lupulina</i>	1	.	.	A	.	1	+	1	.	+	+	.	.	.	.	.	.	R	+	+	.	45	
<i>Achillea millefolium</i>	+	B	.	1	.	.	+	+	.	.	+	.	.	.	+	.	+	+	A	+	.	36	
<i>Capsella bursa-pastoris</i>	.	.	+	.	.	.	.	.	B	A	1	+	+	.	.	+	.	.	.	+	.	36	
<i>Geranium pusillum</i>	.	.	.	.	.	.	.	+	3	.	+	.	.	.	.	.	.	+	.	.	.	27	
<i>Agrostis stolonifera</i>	.	+	.	+	1	.	+	.	.	.	1	.	.	.	.	.	.	.	A	.	.	27	
<i>Leontodon autumnalis</i>	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	A	+	.	23	
<i>Artemisia vulgaris</i>	R	R	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	23	
<i>Dactylis glomerata</i>	.	.	.	.	.	.	.	+	.	+	.	.	.	.	+	.	.	.	+	.	.	23	
<i>Trifolium pratense</i>	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	18	
<i>Glechoma hederacea</i>	+	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	+	.	.	.	.	18	
<i>Cynosurus cristatus</i>	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	18	
<i>Alchemilla vulgaris</i>	+	1	.	.	.	1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	18	
<i>Cerastium holosteoides</i>	.	.	.	.	.	+	+	.	.	.	.	+	.	.	.	.	.	.	.	.	+	18	
<i>Carum carvi</i>	+	+	.	.	.	1	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	18	
<i>Cirsium arvense</i>	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	14	
<i>Rumex obtusifolius</i>	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	14	
<i>Bromus hordeaceus</i>	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	14	
<i>Galinsoga ciliata</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	+	14	
<i>Odontites verna</i>	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	14	

Less than three relevés:

*Alchemilla* sp. + (20), *Anagallis arvensis* + (22), *Anthemis cotula* R (15), *Arctium* sp. R (20), *Artemisia absinthium* + (10), *Daucus carota* A (16), 1 (19), *Echinochloa crus-galli* + (17), *Galinsoga parviflora* + (17), *Geranium pratense* + (8), *Hypericum perforatum* + (19, 20), *Juncus articulatus* 1 (3), *J. bufonius* + (17), *J. tenuis* + (19, 20), *Lamium album* + (10), *Lepidium ruderales* R (18), *Leucanthemum vulgare* + (19), *Lotus corniculatus* 1 (6), A (19), *Matricaria perforata* + (20), *Mentha longifolia* + (4), *Pheum pratense* + (12), *Pimpinella major* R (7), *Plantago media* 1 (2), *Poa pratensis* + (1), 1 (13), *Polygonum arenastrum* + (19), 1 (20), *P. hydropiper* + (20), *P. mite* R (17), *Potentilla argentea* + (6), R (18), *P. reptans* + (20), *Prunella vulgaris* A (4), + (19), *Ranunculus acris* + (7, 13), *Rorippa sylvestris* + (22), *Rumex crispus* + (4), *Sagina procumbens* + (20), *Senecio vulgaris* R (10), *Stellaria graminea* + (20), *Stenactis annua* + (19), *Trisetum flavescens* + (22), *Veronica arvensis* + (4, 12), *V. chamaedrys* R (1), 1 (4), *V. persica* R (1), *Veronica* sp. + (20).

Tab. 17 Communities of class *Plantaginetea majoris*

- A - *Potentilla reptans*-community (rels. 1,2)  
 B - *Prunello-Ranunculetum repentis* (rels. 3 - 6)  
 C - *Chamomilla recutita*-community (rels. 7,8)  
 D - *Herniarietum glabrae* (rels. 9 - 12)

Community	A	A	B	B	B	B	C	C	D	D	D	D
No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12
Sampled area (m <sup>2</sup> )	4	3	32	8	8	5	13	6	6	12	8	16
Cover of herb layer (%)	100	100	95	85	100	100	85	90	75	80	85	60
No. of species	13	10	34	21	20	30	28	6	22	27	16	64
<b><i>Potentilla reptans</i>-community:</b>												
<i>Potentilla reptans</i>	5	5	+	1	.	.	.	.	.	1	.	+
<b><i>Prunello-Ranunculetum repentis</i>:</b>												
<i>Prunella vulgaris</i>	.	.	A	4	4	3	.	.	.	.	.	+
<i>Bellis perennis</i>	.	.	A	+	B	A	.	.	.	.	.	+
<i>Ranunculus repens</i>	1	.	A	1	1	+	.	.	.	.	.	.
<i>Veronica chamaedrys</i>	.	.	1	.	1	+	+	.	.	.	.	.
<i>Juncus tenuis</i>	.	.	.	A	1	.	.	.	.	.	.	.
<b><i>Chamomilla recutita</i>-community:</b>												
<i>Chamomilla recutita</i>	.	.	+	.	.	.	4	B	.	.	.	+
<b><i>Herniarietum glabrae</i>:</b>												
<i>Herniaria glabra</i>	.	.	.	.	.	.	.	.	3	4	4	3
<i>Arenaria serpyllifolia</i>	.	.	.	.	.	.	.	.	1	+	A	A
<i>Viola arvensis</i>	.	.	.	.	.	.	.	.	1	1	+	.
<i>Acinos arvensis</i>	.	.	.	.	.	.	.	.	1	+	1	.
<i>Myricaria germanica</i> juv.	.	.	.	.	.	.	.	.	.	+	R	.
<b><i>Plantaginetea</i>:</b>												
<i>Poa annua</i>	1	+	.	+	1	1	1	3	+	+	.	+
<i>Plantago major</i>	.	.	1	B	1	3	B	A	1	+	.	+
<i>Trifolium repens</i>	.	.	1	A	.	B	1	.	3	1	1	1
<i>Agrostis stolonifera</i>	.	+	A	1	B	+	.	.	.	1	.	1
<i>Potentilla anserina</i>	A	.	1	+	B	+	+	.	.	.	.	+
<i>Lolium perenne</i>	.	+	4	.	1	A	+	.	+	+	.	.
<i>Chamomilla suaveolens</i>	.	.	.	.	.	+	1	B	1	+	.	+
<i>Polygonum arenastrum</i>	.	.	.	.	.	+	+	.	.	.	.	+
<i>Sagina procumbens</i>	.	.	.	.	.	.	+	.	.	.	.	+
<b>Others:</b>												
<i>Taraxacum officinale</i> agg.	+	1	+	+	.	1	+	.	+	+	+	+
<i>Plantago lanceolata</i>	.	.	A	+	1	A	+	.	+	+	.	+
<i>Medicago lupulina</i>	.	.	A	.	+	A	.	.	3	3	B	1
<i>Cerastium holosteoides</i>	.	.	+	.	.	+	A	.	+	+	1	1
<i>Alchemilla vulgaris</i>	+	.	+	1	+	1	.	.	.	.	.	+
<i>Achillea millefolium</i>	1	+	+	+	.	.	+	.	.	.	.	+
<i>Artemisia vulgaris</i>	.	.	+	.	.	.	R	.	+	R	.	1
<i>Lotus corniculatus</i>	.	.	+	+	.	.	.	.	+	1	.	+
<i>Odontites verna</i>	.	.	1	.	.	.	.	.	1	+	.	+

Tab. 17 Continued

Community	A	A	B	B	B	B	C	C	D	D	D	D
No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12
<i>Geranium pusillum</i>	.	.	+	.	R	+	+	.	.	.	.	.
<i>Senecio vulgaris</i>	.	.	.	.	.	.	+	+	.	.	1	1
<i>Festuca pratensis</i>	+	.	.	+	.	+	+	.	.	.	.	.
<i>Anthriscus sylvestris</i>	+	.	R	.	+	.	.	.	.	.	.	.
<i>Glechoma hederacea</i>	.	+	+	.	A	.	.	.	.	.	.	.
<i>Galium album</i>	.	.	.	.	.	.	.	.	+	1	+	.
<i>Linaria vulgaris</i>	.	.	.	.	.	.	.	.	+	+	1	.
<i>Cirsium arvense</i>	.	.	+	.	.	+	.	.	.	.	.	+
<i>Urtica dioica</i>	+	.	.	.	.	+	+	.	.	.	.	.
<i>Leontodon autumnalis</i>	.	.	.	.	+	+	.	.	.	.	.	+
<i>Lamium album</i>	+	1	.	.	.	.	+	.	.	.	.	.
<i>Ranunculus acris</i>	+	.	+	.	.	+	.	.	.	.	.	.
<i>Daucus carota</i>	.	.	+	.	.	.	.	.	R	+	.	.
<i>Capsella bursa-pastoris</i>	.	.	.	.	.	+	+	B	.	.	.	+
<i>Rumex obtusifolius</i>	.	.	+	.	.	.	.	.	.	.	.	+
<i>Potentilla argentea</i>	.	.	.	.	.	.	.	.	+	+	.	R
<i>Verbascum densiflorum</i>	.	.	.	.	.	.	.	.	.	.	R	+
<i>Mentha longifolia</i>	.	.	+	.	.	.	.	.	.	.	.	+
<i>Thymus pulegioides</i>	.	.	.	.	.	.	.	.	.	1	.	+
<i>Ballota nigra</i>	.	.	+	.	+	.	.	.	.	.	.	.
<i>Carum carvi</i>	.	.	.	+	.	+	.	.	.	.	.	.
<i>Poa compressa</i>	.	.	.	.	.	.	.	.	.	+	1	.
<i>Carduus acanthoides</i>	.	.	+	.	.	.	.	.	.	.	.	+
<i>Plantago media</i>	.	.	.	1	.	.	+	.	.	.	.	.
<i>Cynosurus cristatus</i>	.	.	.	+	.	+	.	.	.	.	.	.
<i>Conyza canadensis</i>	.	.	.	.	.	.	+	.	.	.	.	A
<i>Scleranthus annuus</i>	.	.	.	.	.	.	.	.	+	.	.	+

In one relevé:

*Aegopodium podagraria* +(9), *Anagallis arvensis* 1 (12), *A. foemina* +(12), *Arctium* sp. R (3), *Artemisia absinthium* R (11), *Aster* sp. R (12), *Atriplex patula* +(12), *Bidens tripartita* +(12), *Bromus \*hordeaceus* +(10), *Chaenorhinum minus* +(12), *Chenopodium album* +(3), *C. strictum* Roth +(12), *Cirsium vulgare* R (6), *Dactylis glomerata* +(3), *Echium vulgare* R (11), *Epilobium hirsutum* 1 (12), *Equisetum* sp. +(12), *Euphorbia cyparissias* +(12), *Filaginella uliginosa* +(12), *Fragaria vesca* +(5), *Galeopsis pubescens* +(9), *Heracleum sphondylium* +(1), *Juncus articulatus* +(4), *J. inflexus* +(3), *Leucanthemum vulgare* +(12), *Malva neglecta* +(7), *Matricaria perforata* +(12), *Melandrium album* +(12), *Melilotus alba* +(9), *Pastinaca sativa* +(2), *Pimpinella saxifraga* R (6), *Poa pratensis* +(6), *Polygonum hydropiper* +(5), *P. lapathifolium* +(12), *Potentilla supina* +(9), *Salix caprea* +(12), *S. purpurea* R (12), *Salvia verticillata* R (10), *Sanguisorba minor* +(12), *Scrophularia scopolii* +(9), *Setaria pumilla* +(2), *Sonchus oleraceus* +(7), *Spergularia rubra* R (9), *Stellaria media* M (7), *S. uliginosa* +(4), *Tanacetum vulgare* +(6), *Tussilago farfara* +(9), *Verbena officinalis* +(12), *Veronica anagallis-aquatica* +(9), *V. arvensis* +(7), *V. hederifolia* +(9), *V. beccabunga* +(12), *V. polita* +(7), *V. tricolor* +(12).

Tab. 18 *Matricario-Polygonetum arenastri*

No. of relevé	1	2	3	4	5	Const.
Sampled area (m <sup>2</sup> )	10	12	8	6	8	(%)
Cover of herb layer (%)	90	80	80	80	60	
Cover of moos layer (%)	-	-	-	10	-	
No. of species	13	10	11	14	14	
<b>Matricario-Polygonetum arenastri:</b>						
<i>Polygonum arenastrum</i>	4	4	5	4	A	100
<b>Polygonion, Plantaginetaia, Plantaginetea:</b>						
<i>Plantago major</i>	3	3	1	1	1	100
<i>Chamomilla suaveolens</i>	+	+	+	+	+	100
<i>Lolium perenne</i>	A	B	1	A	.	80
<i>Poa annua</i>	A	B	+	.	A	80
<i>Trifolium repens</i>	B	A	1	1	.	80
<i>Potentilla anserina</i>	1	+	R	.	+	80
<b>Others:</b>						
<i>Taraxacum officinale</i> agg.	1	+	1	+	+	100
<i>Capsella bursa-pastoris</i>	+	+	+	+	1	100
<i>Plantago lanceolata</i>	.	.	.	+	+	40

In one relevé:

*Arctium lappa* R (1), *Arctium* sp. R (4), *Artemisia vulgaris* R (4), *Barbarea vulgaris* R (1), *Bellis perennis* + (3), *Bryum argenteum* A (4), *Chenopodium album* + (5), *Conyza canadensis* + (1), *Galinsoga ciliata* R (3), *Glechoma hederacea* + (5), *Leontodon autumnalis* R (4), *Lepidium ruderales* + (1), *Medicago lupulina* + (4), *Polygonum hydropiper* + (5), *Ranunculus repens* + (2), *Sherardia arvensis* R (5), *Sonchus oleraceus* + (4), *Stellaria media* + (5), *Veronica persica* R (5).

Tab. 19 *Poa annua*-community

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Const.
Sampled area (m <sup>2</sup> )	6	10	8	16	20	15	15	15	16	9	25	8	15	12	25	25	5	16	15	7	18	(%)
Cover of herb layer (%)	80	95	85	95	95	80	100	95	95	75	90	80	90	80	95	80	95	95	90	90	95	
No. of species	11	12	12	15	25	11	19	17	14	19	28	15	10	15	13	24	7	26	12	10	15	
<b><i>Poa annua</i>-community:</b>																						
<i>Poa annua</i>	5	5	4	4	4	4	4	4	5	3	3	4	4	4	3	3	5	4	4	4	4	100
<b>Polygonion, Plantaginetea:</b>																						
<i>Plantago major</i>	A	1	B	3	3	A	B	A	A	B	A	3	A	A	3	3	1	3	3	3	B	100
<i>Trifolium repens</i>	+	.	.	+	1	1	A	+	1	1	A	+	1	A	A	1	.	1	B	+	A	86
<i>Chamomilla suaveolens</i>	R	1	+	+	+	1	.	+	.	3	+	A	A	1	1	1	+	.	1	.	.	76
<i>Lolium perenne</i>	+	.	A	+	.	+	B	A	.	1	+	+	A	+	+	+	+	A	B	B	.	71
<i>Potentilla anserina</i>	.	.	.	+	1	.	B	1	+	.	1	+	.	1	1	1	+	3	+	+	.	67
<i>Polygonum arenastrum</i>	.	.	.	1	A	+	B	1	B	.	1	+	.	+	+	+	+	B	B	1	.	67
<i>Agrostis stolonifera</i>	.	.	.	.	.	.	B	+	.	.	A	1	.	.	1	1	.	.	.	.	+	33
<i>Herniaria glabra</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	10

Tab. 19 Continued

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Const.
<b>Others:</b>																						
<i>Taraxacum officinale</i> agg.	+	+	1	+	+	.	.	+	1	+	1	1	+	A	+	1	+	1	1	R	.	86
<i>Capsella bursa-pastoris</i>	1	+	+	A	+	1	.	+	+	1	.	A	.	1	1	+	+	.	+	+	+	81
<i>Ranunculus repens</i>	.	+	1	+	1	.	1	.	+	+	1	+	+	.	.	+	.	1	.	.	.	57
<i>Plantago lanceolata</i>	.	.	.	.	.	.	1	.	+	+	+	+	.	.	.	1	.	A	.	+	1	43
<i>Bellis perennis</i>	.	+	.	+	.	A	+	.	+	.	+	.	.	.	.	+	.	+	1	+	.	43
<i>Alchemilla</i> sp.	.	.	.	+	+	+	+	+	.	+	+	.	.	.	.	.	.	1	.	.	.	33
<i>Rumex obtusifolius</i>	R	1	.	1	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	29
<i>Veronica chamaedrys</i>	.	.	.	+	+	.	1	.	.	.	+	+	.	.	.	.	.	1	.	.	.	29
<i>Glechoma hederacea</i>	.	.	.	+	.	A	+	.	.	+	.	.	.	.	.	.	.	A	.	.	.	24
<i>Geranium pusillum</i>	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	+	R	.	+	24
<i>Potentilla reptans</i>	.	.	.	.	.	1	.	.	.	.	+	.	.	+	.	+	A	.	.	.	.	24
<i>Daucus carota</i>	.	.	.	+	.	.	.	.	.	.	R	.	.	.	.	.	.	+	+	.	.	19
<i>Chamomilla recutita</i>	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	B	.	.	.	19
<i>Carum carvi</i>	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	.	.	.	19
<i>Stellaria media</i>	.	+	.	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	19
<i>Festuca pratensis</i>	.	+	.	.	.	.	.	.	.	.	.	1	.	+	.	+	.	.	.	.	.	19
<i>Prunella vulgaris</i>	.	.	.	.	.	A	1	.	.	+	.	.	.	.	.	.	.	+	.	.	.	19
<i>Rumex crispus</i>	.	.	.	.	R	.	.	.	.	+	.	.	.	.	.	.	.	R	.	.	.	14
<i>Leontodon autumnalis</i>	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	+	.	.	.	.	.	14
<i>Senecio vulgaris</i>	R	.	R	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14
<i>Medicago lupulina</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	+	14
<i>Cerastium holosteoides</i>	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	14
<i>Rorippa sylvestris</i>	.	.	.	+	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	10
<i>Veronica persica</i>	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	10
<i>Potentilla argentea</i>	.	.	.	.	.	.	.	.	.	.	.	.	R	.	B	.	.	.	.	.	.	10
<i>Veronica hederifolia</i>	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	10
<i>Veronica arvensis</i>	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	10
<i>Geum urbanum</i>	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	10
<i>Geum aleppicum</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	+	.	.	.	.	10
<i>Odontites verna</i>	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	10
<i>Dactylis glomerata</i>	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	10
<i>Mentha longifolia</i>	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	10
<i>Anthemis cotula</i>	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	10
<i>Galinsoga ciliata</i>	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	10
<i>Achillea millefolium</i>	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	10

In one relevé:

*Aegopodium podagraria* R (5), *Aethusa cynapium* + (9), *Alchemilla vulgaris* + (16), *Arctium tomentosum* + (18), *Arenaria serpyllifolia* 1 (16), *Artemisia vulgaris* + (7), *Bidens tripartita* R (18), *Bryum argenteum* 1 (1), *Chenopodium album* R (1), *C. bonus-henricus* + (15), *Cirsium arvense* R (3), *C. vulgare* R (3), *Conyza canadensis* R (21), *Cynosurus cristatus* + (11), *Epilobium roseum* + (7), *Galium mollugo* + (11), *Galinsoga parviflora* + (10), *Hieracium pilosella* + (11), *Juncus tenuis* + (11), *Lamium album* + (5), *Lepidium ruderales* + (21), *Leucanthemum vulgare* + (10), *Matricaria perforata* + (8), *Mentha x piperita* + (5), *Plantago media* + (13), *Polygonum minus* 1 (7), *Sagina procumbens* A (12), *Scleranthus annuus* 1 (16), *Scrophularia scopolii* R (5), *Sinapis arvensis* R (10), *Sonchus oleraceus* + (6), *Spergularia rubra* A (21), *Trifolium pratense* + (18), *Urtica dioica* R (1), *U.* + (10), *Veronica anagallis-aquatica* + (2), *V. officinalis* + (11), *V. serpyllifolia* + (10).



Tab. 20 *Chamomilla suaveolens*-community

No. of relevé	1	2	3	4	5	Const.
Sampled area (m <sup>2</sup> )	9	15	25	16	10	(%)
Cover of herb layer (%)	80	80	95	80	90	
No. of species	16	32	10	15	22	
<b><i>Chamomilla suaveolens</i>-community:</b>						
<i>Chamomilla suaveolens</i>	4	4	3	4	4	100
<b><i>Polygonion, Plantaginetales, Plantagineae:</i></b>						
<i>Poa annua</i>	1	A	3	A	1	100
<i>Plantago major</i>	1	1	A	1	1	100
<i>Polygonum arenastrum</i>	B	+	B	.	1	80
<i>Lolium perenne</i>	.	A	+	+	B	80
<i>Trifolium repens</i>	1	+	.	.	1	60
<b>Others:</b>						
<i>Taraxacum officinale</i> agg.	R	1	1	1	1	100
<i>Capsella bursa-pastoris</i>	+	3	A	1	+	100
<i>Artemisia vulgaris</i>	.	+	.	.	+	40
<i>Veronica arvensis</i>	.	+	.	+	.	40
<i>Melandrium album</i>	.	R	.	.	+	40
<i>Medicago lupulina</i>	.	.	.	1	A	40
<i>Stellaria media</i>	B	+	.	.	.	40
<i>Matricaria perforata</i>	.	+	.	+	.	40
<i>Malva neglecta</i>	+	.	.	.	+	40
<i>Poa pratensis</i>	.	A	.	1	.	40

In one relevé:

*Agrostis gigantea* + (5), *A. stolonifera* 1 (2), *Anagallis arvensis* R (2), *Anthemis arvensis* + (5), *Apera spica-venti* + (2), *Arabidopsis thaliana* R (2), *Arctium lappa* R (1), *Arenaria serpyllifolia* + (2), *Armoracia rusticana* + (2), *Bromus hordeaceus* + (2), *Cerastium holosteoides* + (4), *Cerastium* sp. R (2), *Chamomilla recutita* B (5), *Chenopodium glaucum* + (1), *C. strictum* ROTH + (2), *Convolvulus arvensis* + (5), *Conyza canadensis* + (2), *Elytrigia repens* + (2), *Equisetum arvense* + (4), *Festuca pratensis* + (3), *Geranium pratense* + (5), *G. pusillum* + (2), *Juncus bufonius* R (2), *Lactuca serriola* + (2), *Lamium album* + (1), *Leontodon autumnalis* + (5), *Myosotis arvensis* + (4), *M. sylvatica* R (2), *Papaver rhoeas* + (2), *Pastinaca sativa* + (5), *Plantago lanceolata* 1 (5), *Poa trivialis* + (5), *Potentilla anserina* 1 (4), *P. reptans* + (5), *Ranunculus repens* + (2), *Rorippa sylvestris* 1 (3), *Rumex obtusifolius* R (1), *R. \* transiens* R (3), *Senecio vulgaris* 1 (1), *Sisymbrium officinale* R (1), *Trifolium pratense* 1 (2), *Urtica urens* + (1), *Vicia cracca* + (4).

**Tab. 21 *Potentilla anserina*-community**

No. of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Const.
Sampled area (m <sup>2</sup> )	6	12	12	13	7	12	6	16	25	6	14	10	14	16	15	25	5	12	10	(%)
Cover of herb layer (%)	90	95	100	100	100	100	100	100	100	90	100	100	100	100	95	95	100	95	100	
No. of species	13	22	17	13	16	14	15	41	34	13	22	16	18	35	17	15	17	13	17	
<b><i>Potentilla anserina</i>-community:</b>																				
<i>Potentilla anserina</i>	5	4	4	5	5	5	5	4	5	5	4	4	4	3	4	5	5	5	5	100
<b><i>Lolio</i>-<i>Potentillion</i>, <i>Agrostietalia</i>, <i>Plantaginetea</i>:</b>																				
<i>Poa annua</i>	+	3	1	A	1	B	A	1	A	+	3	B	B	A	A	A	A	1	B	100
<i>Plantago major</i>	A	A	B	.	+	+	+	A	1	A	1	1	A	B	3	.	1	1	1	89
<i>Trifolium repens</i>	+	.	1	1	1	1	+	+	A	1	+	1	A	A	A	.	1	+	+	74
<i>Lolium perenne</i>	+	+	+	.	+	+	.	A	.	+	A	1	B	B	.	.	.	.	A	63
<i>Chamomilla suaveolens</i>	+	1	1	.	A	.	A	+	.	+	.	.	+	+	+	B	.	.	.	58
<i>Polygonum arenastrum</i>	+	.	.	.	.	.	.	+	+	+	.	1	.	.	1	1	.	.	+	42
<i>Agrostis stolonifera</i>	.	.	.	.	.	.	.	+	1	.	+	.	A	3	.	.	.	.	.	26
<b>Others:</b>																				
<i>Taraxacum officinale</i> agg.	1	1	+	.	+	+	R	1	+	1	.	.	+	A	A	.	1	1	+	79
<i>Rumex obtusifolius</i>	.	.	.	+	1	1	+	+	+	.	.	+	+	+	1	1	+	1	.	74
<i>Glechoma hederacea</i>	.	1	1	1	1	1	+	+	A	.	1	A	1	A	3	.	.	.	.	68
<i>Ranunculus repens</i>	.	1	+	+	.	.	.	+	+	.	1	1	.	A	A	.	+	+	.	58
<i>Plantago lanceolata</i>	.	+	.	+	.	.	.	A	1	.	A	.	+	+	1	.	.	.	+	47
<i>Veronica chamaedrys</i>	.	+	.	.	1	.	.	+	A	.	+	+	+	.	.	1	.	.	.	42
<i>Capsella bursa-pastoris</i>	R	+	+	.	+	.	.	.	+	+	.	.	.	.	.	+	.	.	+	42
<i>Lamium album</i>	.	.	R	+	.	.	+	.	.	.	.	.	.	.	.	+	.	1	+	37
<i>Bellis perennis</i>	.	.	.	.	+	.	.	A	+	.	.	.	.	1	.	.	.	+	+	37
<i>Achillea millefolium</i>	R	+	.	.	.	.	.	+	+	R	+	.	.	.	.	.	.	.	.	32
<i>Anthriscus sylvestris</i>	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	+	+	+	.	32
<i>Urtica dioica</i>	.	.	.	.	.	+	.	.	+	.	.	+	+	.	.	.	.	+	1	32
<i>Prunella vulgaris</i>	.	1	.	+	.	.	.	+	+	.	+	.	.	1	.	.	.	.	.	32
<i>Rumex crispus</i>	.	1	1	.	.	.	.	+	+	.	.	.	.	+	.	+	.	.	.	32
<i>Arctium lappa</i>	.	.	+	R	+	.	.	.	.	.	.	+	.	.	.	.	.	.	R	26
<i>Alchemilla</i> sp.	.	.	.	.	.	.	.	+	+	.	+	.	1	.	.	+	.	.	.	26
<i>Artemisia vulgaris</i>	.	.	R	+	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	26
<i>Geranium pusillum</i>	.	.	.	.	.	.	.	+	+	.	+	+	.	.	.	.	.	.	.	21
<i>Stellaria media</i>	.	+	+	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	21
<i>Ballota nigra</i>	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	+	.	.	21
<i>Veronica hederifolia</i>	.	.	.	.	.	.	.	+	+	.	.	.	.	.	+	.	.	+	+	21
<i>Odontites verna</i>	.	.	.	.	+	.	.	+	+	.	B	.	.	.	.	.	.	.	.	21
<i>Daucus carota</i>	.	.	.	.	.	.	.	+	.	.	+	.	.	A	.	.	.	.	+	21
<i>Anthemis cotula</i>	.	.	.	+	.	.	.	.	.	.	1	B	.	.	.	.	.	.	+	21
<i>Carex hirta</i>	1	.	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	.	.	16
<i>Potentilla reptans</i>	.	.	.	.	.	.	.	+	+	.	.	1	.	.	.	.	.	.	.	16
<i>Polygonum hydropiper</i>	.	.	.	.	.	.	.	+	+	.	.	.	.	+	.	.	.	.	.	16
<i>Medicago lupulina</i>	.	.	.	.	.	.	.	A	.	.	.	.	+	+	.	.	.	.	.	16
<i>Chenopodium bonus-henricus</i>	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	16
<i>Festuca pratensis</i>	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	+	.	16
<i>Cerastium holosteoides</i>	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	+	.	16
<i>Dactylis glomerata</i>	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	16

Less than three relevés:

*Alchemilla vulgaris* 1 (2), + (17), *Anagallis arvensis* + (2), *Angelica sylvestris* R (14), *Arctium tomentosum* + (7, 8), *Armoracia rusticana* + (8), *Atriplex patula* + (6, 19), *Carum carvi* R (2), + (6), *Chaerophyllum aromaticum* + (14), *Chamomilla recutita* + (8, 9), *Cirsium arvense* + (14), *C. vulgare* R (11), + (14), *Conyza canadensis* + (9), *Cynosurus cristatus* + (2), *Elytrigia repens* A (1, 10), *Galeopsis tetrahit* + (17), *Galinsoga ciliata* + (16), *G. parviflora* + (14), *Geranium pratense* R (2), *Geum urbanum* + (8, 9), *Heracleum sphondylium* R (15, 16), *Hypericum perforatum* + (8), R (9), *Juncus tenuis* + (13), *Leontodon autumnalis* + (14), *Lepidium ruderales* + (14), *Leucanthemum*

*vulgare* + (8, 11), *Lotus corniculatus* + (8), *Lysimachia nummularia* + (8, 14), *Lythrum salicaria* R (4), *Malva neglecta* 1 (15, 16), *Matricaria perforata* + (17), *Mentha arvensis* + (14), *Mentha longifolia* + (4), + (8), *Myosotis arvensis* R (3), *M. sylvatica* + (14), *Pastinaca sativa* + (11, 16), *Polygonum mite* + (12), *Potentilla argentea* + (8), *Ranunculus acris* + (8, 14), *Rorippa sylvestris* 1 (15), *Rumex acetosa* + (14), *R. conglomeratus* + (14), *Salix fragilis* R (9), *Senecio vulgaris* 1 (7), R (9), *Sisymbrium officinale* R (7, 9), *Spergula arvensis* + (14), *Trifolium pratense* + (14, 19), *Urtica urens* + (6), *Verbena officinalis* + (11, 13), *Veronica anagallis-aquatica* + (7), *V. arvensis* + (14), *V. beccabunga* + (8, 9), *V. officinalis* R (2), *V. persica* R (3).

### Localities of relevés:

Abbreviations: E - east; S - south; N - north; W - west; b. - brook; h. - house; r. - river; v. - village

Tab. 14 - 1. Lenartov, near the cooperative, pasture, 10.9.86; 2. Malcov, centre of v., dust heap, 11.9.86; 3. Snakov, road between b. and h. no. 57, 12.9.86; 4. Becherov, in front of the h. no. 74, 22.9.90; 5. Becherov, roadside near the garden fence of h.s no. 15 and 16, 22.9.90; 6. Mikulášová, bank of the b., 22.9.90; 7. Stebník, ditch at the border of v., 21.9.90; 8. Krivé, yard of the h.s no. 28 and 37, 12.9.86; 9. Malé n. Cirochou, roadside in front of the h. no. 85, 26.9.91; 10. Havaj, border of dust heap in the back of pub, 24.9.91; 11. Jakubany, S border of v., near the h. no. 248, 8.7.91.

Tab. 15 - 1. Zborov, site of a ruin near the cemetery, 19.9.90; 2. Mikulášová, manure pit near the field, 22.9.90; 3. Bardejov, bank below the fortification walls, 3.7.84; 4. Nová Ľubovňa, right bank of the b. Jakubianka, wastage from cooperative, 8.7.91; 5. Zborov, in front of the cinema, ruins of the barn, 19.9.90; 6. Stará Ľubovňa, building site near the farming school, bank of the soil, 10.7.91; 7. Stará Ľubovňa, SE border of the tow, abandoned place near the new road, 10.7.91.

Tab. 16 - 1. Jakubany, S border of v., trampled place near the road, 8.7.91; 2. Jakubany, yard among h.s, trampled place, 8.7.91; 3. Zlaté, yard near the h. no. 107, 6.7.91; 4. Lenartov, centre of v. near the shop, trampled habitat at the bank of b., 9.7.91; 5. Hervartov, S, track to the yard of the h. no. 54, 11.7.91; 6. Šiba, N border of v., along field track, 11.7.91; 7. Hertník, in front of the gate of h. no. 710, 11.7.91; 8. Fričkovce, trampled place in front of the fire station, 11.7.91; 9. Rovné, centre of v. near the park, along the road, 25.9.91; 10. Vyšná Polianka, trampled place between the h.s no. 107 and 104, 25.9.91; 11. Krásna Lúka, S, field track, 7.7.91; 12. Šambron, trampled place near the h.s no. 110 and 115, 7.7.91; 13. Jakubany, S border of v., along the road near the h. no. 201, 8.7.91; 14. Nová Ľubovňa, along the road near the h. no. 199, 8.7.91; 15. Miroľa, along the road near the h. no. 5, 24.9.91; 16. Osadné, trampled place near the h. no. 133, 26.9.91; 17. Modra n. Cirochou, trampled place near the h. no. 51, 26.9.91; 18. Osadné, trampled place near the bus stop, 26.9.91; 19. Stebník, the border of v. near tennis court, 20.9.90; 20. Nižný Tvarožec, field track near the cemetery close of church, 13.9.86; 21. Zborov, near cemetery trampled border of asphalt road, 19.9.90; 22. Zborov, new street in direction to Stebnická Huta, trampled place among h.s, 20.9.90.

Tab. 17 - 1. Jakubany, along a low wall of front-garden of the h. no. 224, 8.7.91; 2. Rovné, centre of v., along a low wall of the park, 25.9.91; 3. Lukov, along asphalt road near the h. no. 64, 11.9.86; 4. Cigeľka, forest track along b., 6.7.91; 5. Zborov, trampled place near the h. no. 51, 20.9.90; 6. Šambron, trampled habitat between the road and h. no. 56, 7.7.91; 7. Brezovička, near the h. no. 48, 7.7.91; 8. Frička, centre of v., yard of the h. no. 37, 6.7.91; 9. Jakubany, N, field track on the terrace of the b. Jakubianka, 8.7.91; 10. Jakubany, N,

field track on the dam of the b. Jakubianka, 8.7.91; **11.** Nová Ľubovňa, S, gravel track on the top of dam near the b. Jakubianka, 8.7.91; **12.** Malcov, centre of v., in front of the mortuary, 11.9.1986.

- Tab. 18 - **1.** Modra n. Cirochou, along the road near the h. no. 54, 26.9.91; **2.** Stakčín, near the h. no. 41, trampled place near the garrage, 26.9.91; **3.** Rohožník, trampled place near the h. no. 21, 24.9.91; **4.** Rovné, trampled place near the kindergarten, 25.9.91; **5.** Vyšné Ružbachy, along the road, 20.9.69, KRIPPELOVÁ.
- Tab. 19 - **1.** Šambron, trampled place in front of the gate of h. no. 119, 7.7.91; **2.** Jakubany, yard of the h. no. 269, 8.7.91; **3.** Stará Ľubovňa, castle, upper courtyard, 5.7.91; **4.** Lenartov, near the b., 10.9.86; **5.** Snakov, yard of the h. no. 27, 12.9.86; **6.** Becherov, yard of the h. no. 76, 22.9.90; **7.** Vyšný Vrbík, near the h. no. 70, 22.9.90; **8.** Stebník, yard of the h. no. 98, 21.9.90; **9.** Stebnická Huta, yard of the h. no. 22, 21.9.90; **10.** Stebnická Huta, yard of the h. no. 14, 21.9.90; **11.** Livovská Huta, along the asphalt road near the h. no. 13, 11.9.86; **12.** Cigeľka, in front of the gate of the h. no. 48, 6.7.91; **13.** Nižný Slavkov, yard of the h. no. 22, 7.7.91; **14.** Jakubany, trampled place in front of block of flats no. 166, 8.7.91; **15.** Jakubany, ruderal place in the back of barns towards the bank of b. Jakubianka, 8.7.91; **16.** Jakubany, ruderal place in alluvium of Jakubianka b. in the back of the pub, 8.7.91; **17.** Jakubany, near the h. no. 224, 8.7.91; **18.** Bodružal, trampled place near the shop and pub, 24.9.91; **19.** Havaj, 24.9.91; **20.** Vyšná Polianka, along the road near the h. no. 106, 25.9.91; **21.** Havaj, trampled place near the fire station, 24.9.91.
- Tab. 20 - **1.** Jakubany, near the h. no. 269, 8.7.91; **2.** Bardejov, Gorkého str., abandoned border of playground, 3.7.84; **3.** Zlaté, yard of the h. no. 109, 6.7.91; **4.** Frička, ruderal place between road and b., in front of the church, 6.7.91; **5.** Osikov, trampled place in front of the pub, 11.7.91.
- Tab. 21 - **1.** Bardejov, W, border of the lawn near path, 3.7.84; **2.** Zborov, settlement round a castle, lawn near the fence, 4.7.84; **3.** Zlaté, yard in front of the h. no. 85, 6.7.91; **4.** Havaj, goose pasture near the b. in front of local office, 24.9.91; **5.** Nižný Tvarožec, 6.7.91; **6.** Šambron, goose pasture near the h. no. 120, 7.7.91; **7.** Jakubany, yard in front of the h. no. 163, 8.7.91; **8.** Lenartov, left bank of b., near the h. no. 43, 10.9.86; **9.** Malcov, between the road and b., 10.9.86; **10.** Bardejov, W, along the asphalt path, 3.7.84; **11.** Mikulášová, roadside near the b., 22.9.90; **12.** Mikulášová, roadside near the h. no. 64, 22.9.90; **13.** Mikulášová, trampled place between road and fence of garden, near the h. no. 64, 22.9.90; **14.** Nižný Mirošov, centre of v., near the bridge, 22.9.90; **15.** Zborov, yard of the h. no. 6, 20.9.90; **16.** Zborov, along the road, 20.9.90; **17.** Hervartov, roadside near the h. no. 48, 11.7.91; **18.** Hertník, yard of the h. no. 60, 11.7.91; **19.** Vyšná Polianka, between road and fence of garden, in front of the h. no. 106, 25.9.91.

Received: 11 November 1994

Revised: 17 July 1995

Accepted: 17 July 1995