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***IRIDIO APHYLLAE-QUERCETUM PUBESCENTIS* PÎNZARU –
ASS. NOVA, IN THE REPUBLIC OF MOLDOVA AND UKRAINE**

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Abstract: The description of the forests of *Quercus pubescens* Willd. with *Iris aphylla* L., on limestone slopes between Dniester and Prut, is presented in this paper. Based on 12 phytocenological relevés from Moldova and one from Ukraine, the author has identified a new association for science: *Iridio aphyllae-Quercetum pubescentis* ass. nova, included in the alliance *Quercion pubescenti-petraeae* Br.-Bl. 1932, the order *Quercetalia pubescenti-petraeae* Klika 1933, cl. *QUERCO-FAGETEA* Br.-Bl. et Vlieger in Vlieger 1937.

Key words: *Iridio aphyllae-Quercetum pubescentis* ass. nova, characteristics of phytocoenoses, ecology, range, R. Moldova, Ukraine.

INTRODUCTION

Downy oak forests (*Quercus pubescens* Willd.) occur, in the Republic of Moldova, mainly in the southern areas, sporadically in the central and rarely in the northern ones [1, 10-15, 17]. The first phytocenological research on downy oak forests in central and southern Bessarabia was carried out by Alexandru Borza [1], who described two associations: *Querceto-Lithospermetum cotinosum* Borza 1936 and *Quercetum pubescentis bessarabicum* Borza 1937, grouping them in the alliance *Quercion pubescenti-sessiliflorae* Br.-Bl. 1931. Later, downy oak forests were studied according to the dominant species (ex-soviet phytosociological school), being included by L. Nikolaeva in the associations *Quercetum pubescentis herbosum* Nikolaeva 1963, *Quercetum pubescentis-andropogonosum*, *Quercetum pubescentis stepposum* Nikolaeva 1963 and *Quercetum pubescentis fruticosum* Nikolaeva 1963 [13]. In 1964, T. Gheideman and collaborators grouped downy oak forests in the associations: *Quercetum brachypodosum* Gheideman et al. 1964, *Quercetum herbosum* Gheideman et al. 1964, *Quercetum pooso (angustifoliae) – andropogonosum* Gheideman et al. 1964 and *Quercetum stepposum* Nikolaeva 1963 [12]. In 1987-1990, the downy oak forests from the valley of Dniester River were studied according to the dominant species and, as a result, they were included in two associations: *Quercetum (pubescentis) cornoso-cotinosum* Pînzaru 1990 and *Quercetum (pubescentis) stepposum* Nikolaeva 1963 [15]; later, in 1994, these forests were included in the association *Quercetum pubescentis calcareum* Gergely 1962 [17]. In 2016, a study was focused on the forests of *Quercus pubescens* Willd. with *Paeonia peregrina* Mill. in Nisporeni district, included in the association *Paeonio peregrinae-Quercetum pubescentis* (Sârbu, 1982) Popescu et Sanda 1999 [10].

This article presents a new vision on the classification of downy oak forests on the limestone slopes of the Republic of Moldova and Ukraine and brings new data on the ecology, distribution and floristic composition of these phytocoenoses.

MATERIALS AND METHODS

The description of the association is based on the phytocoenological relevés, made by the author in 1987-2019, on the downy oak forests (*Quercus pubescens* Willd.) that occur on limestone slopes in the basins of the rivers Dniester and Prut (the tributary Draghiște). Twelve relevés from the Republic of Moldova and one from Ukraine were analyzed and were described according to the methods of the Central European School [Braun-Blanquet, 1964]. The list of plant species was presented according to the monograph “Vascular flora of the Republic of Moldova” (Flora vasculară din Republica Moldova” [Pînzaru, Sîrbu, 2016]. Rare plants – according to the Red Book of the Republic of Moldova and the Law on protected natural areas [3, 6, 7]. Air temperature and atmospheric precipitation – according to the Atlas of Climate Resources of the Republic of Moldova [8].

RESULTS AND DISCUSSIONS

The downy oak forests (*Quercus pubescens* Willd.) on limestone slopes are quite uncommon for the territory of the Republic of Moldova, they occur near eight localities in the centre and north of the country. These forests cover small areas and, mainly, have a much changed structure and floristic composition because of the inadequate care. The largest well-preserved area of such type of forest occurs on the right bank of Dniester, in Tîrgul-Vertiujeni commune, Florești district, and we would like to propose it as nomenclatural type of the described association. The *Quercus pubescens* forests are xerophilic, plenty of light gets in them, and such factors allow the development of numerous species characteristic of glades, steppe and scrubs. The constant presence of calcicoles: *Iris aphylla* L., *Viola sieheana* W. Becker, *Asparagus verticillatus* L., *Cerasus mahaleb* (L.) Mill., *Cotinus coggygria* Scop., *Polygonatum odoratum* (Mill.) Druce and the limestone-rich substrate, on which these forests develop, are peculiar features which make them a unique habitat, distinct from those formed by *Quercus pubescens* on hills with non-calcareous substrate. For these reason, we group these phytocoenoses into a new association – *Iridio aphyllae-Quercetum pubescentis*.

The phytocoenoses of the new association - *Iridio aphyllae-Quercetum pubescentis* are similar to those of the association *Galio dasypodi - Quercetum pubescentis* Donița 1970 [= *Cotino-Quercetum pubescentis* sensu Sîrbu 1982, non Soo (1931) 1932] in the abundant presence of the species *Cotinus coggygria*, in the southern areas of Romania [5], but differ in the floristic composition (the absence of the species *Quercus petraea*, *Q. dalechampii*, *Fraxinus ornus*, *Carpinus orientalis*, *Pyrus eleagrifolia*, *Paeonia peregrina*, but the presence of *Iris aphylla*, *Viola sieheana*) and in the physical-geographical conditions (occur on steep slopes with alkaline soil, alternating with limestone rocks on slightly sloping terrains, with slightly acidic or neutral soil) [4].

The species *Iris aphylla* L. – is a Pontic-Pannonian-Caucasian element, which grows only in forests with a lot of light and in glades on rocks. It has two distinct forms, which differ in the colour of the corolla: *aphylla* (Figure 1) – purplish corolla and *iulitae* Pînzaru 2013 (Figure 2) – dark violet corolla [16].

Ass. *Iridio aphyllae-Quercetum pubescentis* Pînzaru, *ass. nova, h.l.*

T y p e h. l.: Tab. 1, rel. 2. 48°024'258"N, 28°533'085"E (Figure 2, 3)

Table synthetic h.l.: Tab. 1, 13 relevés

Syn.: *Quercetum (pubescentis) cornoso-cotinosum*: ПЫНЗРУ, 1991; *Quercetum*



Figure 1. *Iris aphylla* forma *aphylla*



Figure 2. *Iris aphylla* forma *iulitae* Pînzaru



Figure 3, 4. Aspects of the type of the association *Iridio aphyllae-Quercetum pubescentis*, Tîrgul-Vertiujeni commune, Florești district

(*pubescentis*) *stepposum*: Пынзару, 1991; *Quercetum pubescentis calcareum* auct. non Gergely 1962: Пынзару, Попеску, 1994.

Locations: Altitude 70-150 m. Relief: Northern Moldovan Plateau, Dniester Hills, Central Moldovan Plateau, Podolian Upland, southern, south-western, eastern and northern exposure, the inclination of the slopes between 30° and 54°. Climate – temperate-continental, the average annual temperature is 9.0-10.5 °C, the average annual precipitation varies between 550 and 600 mm. Rocks: limestone. Soil – rendzinas, rich in limestone skeletal fragments, alternating with limestone rocks.

Characteristic species: *Quercus pubescens*, *Iris aphylla* forma *aphylla* and forma *iulitae*, *Viola sieheana*, *Polygonatum odoratum*, *Asparagus verticillatus*.

Constant species: *Cotinus coggygria*, *Cerasus mahaleb*, *Berberis vulgaris*, *Atnthericum ramosum*, *Buglossoides purpureoerulea*, *Fragaria viridis*, *Glechoma hirsuta*, *Vincetoxicum hirundinaria*, *Sedum maximum*, *Teucrium chamaedrys*, *Thalictrum minus*, *Valeriana collina*, *Veronica chamaedrys*, *Vinca herbacea*.

Rare species protected by the state: *Cotoneaster malanocarpus* (EN), included in the Red Book of R. Moldova, *Fritillaria montana* (VU), included in the Red Book of R. Moldova, *Adonis vernalis* (NT), *Amygdalus nana* (VU), *Asparagus officinalis* (NT), *A. tenuifolius* (NT), *A. verticillatus* (NT), *Crocus reticulatus* (NT), *Hyacinthella leucophaea* (NT), *Iris pumila* (NT), *Pulsatilla montana* (VU), *Stipa pulcherrima* (VU), *S. zalesskii* (= *S. ucrainica*) (VU), *Tulipa biebersteiniana* var. *biebersteiniana* (VU).

Structure – three layers are distinguished in phytocoenoses:

1. The tree layer (A), with a height of about (4) 5 and 8 m, the coverage of the canopy is about 60-70 %. This layer consists of the dominant species *Quercus pubescens*, the diameter of the stems varies between 10 cm and 30 cm, accompanying species: *Cerasus mahaleb* and *Ulmus minor*. Trees of the species *Acer campestre*, *Pyrus pyraister*, *Fraxinus excelsior*, *Quercus robur* also occur, but very rarely.

2. The shrub layer (B) is 1-3 m high, well-developed and its coverage is about 50-80 %. Constant species: *Cotinus coggygria*, *Cornus mas*, *Crataegus monogyna*, *Euonymus verrucosus*, *Prunus spinosa*, *Rhamnus cathartica*, *Rosa canina*, *Viburnum lantana*, *Berberis vulgaris*.

3. The herbaceous layer (C) has very uneven coverage, depending on the abundance of the species *Cotinus coggygria*, which may create thickets at the level of this layer (4-5). Thus, its coverage varies between 10 and 15 % in glades, but in some places, it reaches even 80 %. There are few species of ephemerals, represented by an insignificant number of individuals *Crocus reticulatus*, *Hyacinthella leucophaea*, *Muscari neglectum*, *Corydalis solida*, *Scilla bifolia*, *Fritillaria montana*, *Tulipa biebersteiniana*. In summer, in this synusia, there are constant species, which grow in clusters: *Iris aphylla*, *Polygonatum odoratum*, *Convallaria majalis*, *Vinca herbacea*, *Teucrium chamaedrys*, *Buglossoides purpureoerulea*, *Mercurialis ovata*, *Anthericum ramosum*, *Glechoma hirsuta*.

The dynamics of phytocoenoses. The structure and floristic composition of the phytocoenoses of this association and others are influenced by the anthropogenic factor. The tree layer is dominated by *Quercus pubescens*, but it has a low coverage because trees have been cut, and this fact has allowed the shrub layer to develop. In some areas, as a result of the vegetative propagation of the species *Cotinus coggygria*, there is an obvious reduction in the grass layer. In the arboretum, although there are some specimens grown from seeds, the ones grown from vegetative shoots prevail.

Range. The plant communities of *Quercus pubescens* Willd. with *Iris aphylla* L., have been recorded (Figure 5) in:



Figure 5. Locations of the association *Iridio aphyllae-Quercetum pubescentis* ass. nova

- Republic of Moldova: Edineț district (Fetești commune), Florești district (Țîrgul-Vertiujeni commune), Chișinău municipality (Ciorescu commune), Orhei district (Lopatna village), Criuleni district (Zolonceni village), Anenii Noi district (Delacău commune), Territorial Units of the Left Bank of the Dniester (Hrușca and Goian villages).

- Ukraine, Kamianets-Podilskyi district (Jaryšiv village).

Conservation value / Conservation status. The studied association is protected in “Iagorlic” Scientific Reserve, “Fetești” Landscape Reserve, in “Dubăsari”, “Zolonceni” and “Vadul” Forest Reserves [7].

Protection measures. It has been proposed to include “Țîrgul-Vertiujeni” forest in the network of protected areas, in the category Forest Reserve, as the best-preserved forest sector, selected also as a nomenclatural type.

CONCLUSIONS

1. The association *Iridio aphyllae-Quercetum pubescentis* Pînzaru comprises West-Pontic downy oak forests (*Quercus pubescens* Willd.) with leafless iris (*Iris aphylla* L.), characterized by thermo-xerophilic vegetation, occurring usually on sunny slopes, with limestone substrate, rendzina soil, neutral to alkaline, rich in limestone skeletal fragments, with limestone outcrops.

2. The vertical structure of the phytocoenoses of the association consist of 2-3 layers, the most developed of which is the shrub layer. The abundance of *Cotinus coggygria* greatly reduces the presence of herbs.

3. The floristic composition comprises 251 species, of which 53 species are characteristic of *Quercion-Quercetalia pubescentis-petraeae*, 36 – *Quercio-Fagetea*, 19 – *Rhamno-Prunetea*, 41 – *Trifolio-Geranietea*, 73- *Festuco-Brometea* and 29 – *Aliae*.

4. There are 14 protected species, including two species mentioned in the Red Book of the Republic of Moldova (2015): *Cotoneaster malanocarpus* (EN) and *Fritillaria montana* (VU).

5. *Iris aphylla* L. is a rare species, and it has been suggested to include it in the List of protected species of the Republic of Moldova, in the category (VU).

6. The association *Iridio aphyllae-Quercetum pubescentis* Pînzaru includes phytocoenoses of great interest, from scientific point of view, and it has been proposed to add it to the List of rare associations of the Republic of Moldova.

7. The association *Iridio aphyllae-Quercetum pubescentis* Pînzaru ass. nova belongs to the *Quercion pubescenti-petraeae* Br.-Bl. 1932, the order *Quercetalia pubescenti-petraeae* Klika 1933, cl. *QUERCO-FAGETEA* Br.-Bl. et Vlieger in Vlieger 1937.

Table 1. Ass. *Iridio aphyllae-Quercetum pubescentis* ass. nov

Relevé no.	1	*2	3	4	5	6	7	8	9	10	11	12	K	13
Surface of relevé (m ²)	600	600	600	600	600	600	600	600	600	600	600	600		600
Altitudine	150	124	127	90	90	95	90	91	70	120	135	135		215
Aspect	E	E	E	SV	SV	S	E	N	S	SV	SV	SV		V
Slope (°)	35	35	55	35	40	35	54	35	30	30	30	35		35
Tree layer coverage (%)	70	60	65	55	60	50	65	65	55	70	50	55		55
Tree height (m)	8	7	8	4-6	5-7	5-8	8	5-7	5-6	5-6	5-7	5-6		5-7
Tree diameter (cm)	15-25	10-25	15-30	10-20	10-25	15-20	10-27	10-25	10-20	14-24	15-25	15-20		15-25
Shrum layer coverage (%)	50	70	80	60	65	80	65	60	65	70	65	70		80
Herbaceous layer coverage (%)	55	10-30	45	60	55	5-65	10-45	10-50	40	10-40	15-35	5-30		5-55
Plots no.	9	10	10	-	-	35	1	24	37	8	7	6		-
Number of species	83	124	127	141	145	106	140	66	53	81	74	100		70
<u>Characteristic species</u>														
<i>Quercus pubescens</i>	5	3	3	3	3	4	4	5	5	3	3	3	V	3
<i>Iris aphylla</i> forma <i>aphylla</i>	-	2	1	+	+	2	1	2	+	-	-	+	IV	2
<i>Iris aphylla</i> forma <i>iulitae</i>	-	+	+	-	-	-	-	-	-	-	-	-	I	-
<i>Polygonatum odoratum</i>	-	3	2	2	2	3	2	2	-	2	2	2	V	2
<i>Asparagus verticillatus</i>	+	2	1	1	1	1	1	1	r	+	+	+	V	1
<i>Viola sieheana</i>	+	+	+	1	1	+	+	-	-	-	-	+	IV	+
<u>Quercion et Quercetalia</u>														
<u>pubescenti-petraeae</u>														
<i>Cerasus mahaleb</i>	1	2	1	1	1	+	2	+	-	+	-	+	V	+
<i>Cotinus coggygria</i>	1	3	2	2	1	3	3	3	1	3	3	3	V	4
<i>Euonymus verrucosus</i>	-	1	1	1	1	+	1	2	+	1	1	1	V	1
<i>Buglossoides purpureocaerulea</i>	1	1	2	2	2	-	1	2	2	2	-	2	V	2
<i>Sedum maximum</i>	+	+	+	+	+	+	+	1	+	-	+	+	V	+
<i>Vincetoxicum hirundinaria</i>	+	1	+	+	+	+	+	+	+	+	+	+	V	+
<i>Asparagus tenuifolius</i>	+	+	+	+	+	-	+	+	+	+	+	+	V	+
<i>Tanacetum corymbosum</i>	+	+	+	+	+	-	+	-	1	+	-	-	IV	+
<i>Clematis recta</i>	+	1	1	1	+	+	1	+	-	+	-	-	IV	-
<i>Arabis turrata</i>	+	1	1	-	-	+	1	+	+	-	-	-	III	+
<i>Laser trilobum</i>	1	+	1	-	-	-	2	-	-	-	1	-	III	-
<i>Clematis integrifolia</i>	-	1	+	1	+	-	-	-	-	+	-	-	III	+
<i>Poa nemoralis</i>	3	-	-	-	-	-	1	1	-	-	-	-	II	-
<i>Silene nutans</i>	-	+	+	+	+	-	-	-	-	-	-	-	II	-
<i>Galium schultesii</i>	1	-	-	-	-	-	-	-	-	-	+	1	II	-
<i>Mercurialis ovata</i>	-	-	-	2	2	-	2	2	-	-	-	-	II	-

<i>Piptatherum virescens</i>	-	-	-	+	+	-	-	1	-	-	-	-	II	-
<i>Campanula persicifolia</i>	-	-	+	-	+	-	+	+	+	-	-	-	II	+
<i>Alyssum murale</i>	-	-	-	1	1	+	+	-	-	-	-	-	II	-
<i>Lathyrus niger</i>	+	-	-	-	-	-	+	-	-	-	-	-	I	+
<i>Arabis recta</i>	-	-	+	-	-	-	+	-	-	-	-	-	I	-
<i>Viola jordani</i>	-	-	-	-	-	-	+	-	-	-	-	-	I	-
<i>Lathyrus pannonicus</i>	-	-	-	+	+	-	-	-	-	-	-	-	I	-
<i>Galium rubioides</i>	-	-	-	+	+	-	-	-	-	-	-	-	I	-
<i>Lembotropis nigricans</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<u>Quercus-Fagetea s.l.</u>														
<i>Glechoma hirsuta</i>	1	1	1	1	2	1	2	2	2	2	1	2	V	2
<i>Campanula rapunculoides</i>	1	+	+	+	1	-	1	-	+	-	1	+	IV	1
<i>Geum urbanum</i>	+	+	+	+	+	-	+	+	r	-	-	+	IV	+
<i>Ulmus minor</i>	-	+	1	1	1	+	1	-	+	-	1	2	IV	-
<i>Pyrus pyraeaster</i>	-	r	r	r	r	-	r	-	-	-	+	+	IV	-
<i>Convallaria majalis</i>	2	3	-	2	2	-	2	3	-	-	-	-	III	2
<i>Fraxinus excelsior</i>	+	+	+	-	-	-	-	+	+	-	-	+	III	-
<i>Euonymus europaeus</i>	+	+	-	-	-	-	+	1	-	1	+	-	III	-
<i>Scutellaria altissima</i>	1	1	1	-	-	-	1	2	-	-	-	-	III	+
<i>Quercus robur</i>	r	-	+	-	-	-	-	-	r	-	+	+	III	-
<i>Polygonatum hirsutum</i>	2	-	-	-	-	-	2	-	2	1	2	-	III	1
<i>Acer campestre</i>	+	-	-	-	-	-	1	+	r	-	-	-	II	-
<i>Scilla bifolia</i>	1	-	-	-	-	-	1	1	-	-	-	-	II	-
<i>Corydalis solida</i>	2	-	-	-	-	-	2	1	-	-	3	-	II	-
<i>Melica picta</i>	1	-	-	-	-	-	1	1	-	-	-	-	II	-
<i>Polygonatum multiflorum</i>	1	-	-	-	-	-	-	1	-	+	-	-	II	-
<i>Fritillaria montana</i>	1	-	-	-	-	-	2	1	-	-	-	-	II	-
<i>Dactylis glomerata</i>	+	-	-	-	-	-	+	+	-	-	-	-	II	+
<i>Corylus avellana</i>	-	-	-	-	-	-	1	-	-	-	+	-	I	-
<i>Pulmonaria officinalis</i>	+	-	-	-	-	-	-	-	-	-	-	-	I	-
<i>Chaerophyllum temulum</i>	+	-	-	-	-	-	-	-	-	-	-	-	I	-
<i>Iris graminea</i>	-	1	-	-	-	-	-	-	-	-	-	-	I	-
<i>Ulmus glabra</i>	-	-	+	-	-	-	r	-	-	-	-	-	I	-
<i>Carex digitata</i>	-	-	-	-	-	-	+	1	-	-	-	-	I	-
<i>Lapsana communis</i>	-	-	-	-	-	-	+	-	+	-	-	-	I	-
<i>Hypericum hirsutum</i>	-	-	-	-	-	-	+	-	-	-	-	-	I	-
<i>Carex brevicollis</i>	-	-	-	-	-	-	-	1	-	-	1	-	I	-
<i>Tulipa biebersteiniana</i> var.	-	-	2	-	-	-	-	2	-	-	-	-	I	-
<i>biebersteiniana</i>														
<i>Euphorbia amygdaloides</i>	-	-	-	-	-	-	-	+	+	-	-	-	I	-
<i>Viola suavis</i>	-	-	-	-	-	-	-	1	-	-	-	-	I	-

<i>Anemonoides ranunculoides</i>	-	-	-	-	-	-	-	+	-	-	-	-	I	-
<i>Acer platanoides</i>	-	-	-	-	-	-	-	-	-	-	+	-	I	-
<i>Cerasus avium</i>	-	-	-	-	-	-	-	-	r	-	r	-	I	-
<i>Geranium robertianum</i>	+	-	-	-	-	-	-	-	-	-	1	-	I	-
<i>Pulmonaria obscura</i>	-	-	-	-	-	-	+	-	-	-	+	-	I	-
<i>Gagea lutea</i>	-	-	-	-	-	-	-	+	-	-	+	-	I	-
<u>Rhamno-Prunetea s.l.</u>														
<i>Crataegus monogyna</i>	1	1	1	1	2	1	2	1	1	1	1	2	V	2
<i>Prunus spinosa</i>	-	1	1	1	1	1	+	+	2	1	1	1	V	-
<i>Cornus mas</i>	+	2	1	+	1	1	3	2	-	1	1	+	V	1
<i>Viburnum lantana</i>	+	2	1	1	1	2	1	2	1	1	1	1	V	1
<i>Rhamnus cathartica</i>	-	+	1	1	1	+	1	1	1	1	-	+	V	-
<i>Rosa canina</i>	+	1	1	+	1	1	1	+	+	1	1	+	V	+
<i>Cornus sanguinea</i>	+	1	-	+	+	+	1	1	1	1	2	1	V	1
<i>Berberis vulgaris</i>	-	1	+	1	1	1	1	1	r	-	1	1	V	-
<i>Acer tataricum</i>	-	1	1	1	1	+	1	1	1	1	-	-	IV	-
<i>Ligustrum vulgare</i>	-	1	1	1	1	+	1	1	1	+	-	-	IV	-
<i>Amygdalus nana</i>	1	2	1	-	-	2	-	2	2	1	2	-	III	-
<i>Caragana frutex</i>	-	-	-	-	-	3	-	2	2	2	2	-	III	2
<i>Cuscuta monogyna</i>	-	-	-	-	-	-	2	1	-	2	-	-	II	-
<i>Cotoneaster melanocarpus</i>	r	-	-	-	r	-	-	-	r	-	-	-	II	-
<i>Rosa pimpinellifolia</i>	-	2	-	-	-	2	-	2	-	-	-	-	II	-
<i>Rosa gallica</i>	-	-	-	-	+	-	-	-	-	-	-	-	I	-
<i>Erysimum cuspidatum</i>	-	-	-	-	-	-	+	-	-	-	-	-	I	-
<i>Rhamnus tinctoria</i>	+	-	-	-	-	-	-	-	-	-	-	-	I	-
<i>Spiraea crenata</i>	-	-	-	-	-	-	-	-	1	-	-	-	I	-
<u>Trifolio-Geranietea s.l.</u>														
<i>Vinca herbacea</i>	1	3	2	2	2	3	2	1	2	2	3	2	V	-
<i>Teucrium chamaedrys</i>	2	2	2	2	2	3	2	1	2	2	2	3	V	2
<i>Anthericum ramosum</i>	1	2	2	1	2	3	2	-	-	1	2	2	V	2
<i>Fragaria viridis</i>	2	1	2	2	2	2	2	-	2	-	2	3	V	
<i>Thalictrum minus</i>	+	+	1	1	1	+	1	+	+	+	+	+	V	+
<i>Asparagus officinalis</i>	+	+	+	+	+	+	r	+	+	-	+	+	V	-
<i>Veronica chamaedrys</i>	+	+	+	1	1	+	+	+	+	-	-	+	V	+
<i>Valeriana collina</i>	+	1	1	+	1	+	1	-	+	1	-	+	V	+
<i>Hypericum perforatum</i>	+	+	+	+	+	+	+	-	-	-	-	+	IV	+
<i>Carex michelii</i>	-	2	2	2	2	3	2	-	3	2	2	-	IV	2
<i>Clinopodium vulgare</i>	+	+	+	+	+	+	1	-	-	-	-	+	IV	+
<i>Agrimonia eupatoria</i>	+	+	+	+	+	+	+	-	-	-	+	+	IV	+
<i>Securigera varia</i>	1	+	+	+	1	1	1	-	-	-	-	1	IV	-
<i>Asyneuma canescens</i>	-	+	-	+	+	+	+	+	-	+	-	r	IV	-
<i>Hieracium virosum</i>	-	+	+	+	+	+	+	-	-	+	+	+	IV	+
<i>Inula ensifolia</i>	-	2	1	-	-	-	-	-	-	1	2	2	III	2
<i>Aster amellus</i>	-	2	1	+	+	+	-	-	-	-	-	-	III	+
<i>Pulsatilla montana</i>	-	1	+	-	r	+	-	+	-	-	+	-	III	-

<i>Leopoldia comosa</i>	+	-	+	-	-	+	+	-	+	-	+	-	III	-
<i>Vicia tenuifolia</i>	-	1	2	1	1	-	2	-	-	-	-	-	III	-
<i>Astragalus glycyphyllos</i>	+	+	+	+	+	-	+	-	-	-	-	-	III	+
<i>Inula hirta</i>	-	-	-	2	2	+	2	-	-	+	-	+	III	-
<i>Origanum vulgare</i>	+	-	+	1	+	1	1	-	-	-	-	+	III	-
<i>Peucedanum cervaria</i>	-	+	+	+	+	2	-	-	-	-	-	-	III	-
<i>Brachypodium sylvaticum</i>	-	+	+	1	1	-	1	-	-	-	-	-	III	+
<i>Geranium sanguineum</i>	+	1	1	-	-	-	-	-	-	-	-	-	II	-
<i>Phlomis tuberosus</i>	+	-	1	-	+	-	-	-	-	-	-	-	II	-
<i>Leopoldia tenuifolia</i>	-	1	+	-	-	-	-	-	1	-	-	-	II	-
<i>Campanula glomerata</i> var. <i>cervicarioides</i>	+	-	-	+	+	-	-	-	-	+	-	-	II	-
<i>Bupleurum falcatum</i>	+	-	-	-	-	+	1	-	-	-	-	-	II	+
<i>Chamaecytisus austriacus</i>	1	+	2	-	-	-	-	-	-	-	-	-	II	-
<i>Anchusa asurea</i>	-	-	-	+	+	-	+	-	-	-	-	-	II	-
<i>Anemone sylvestris</i>	-	-	-	2	1	-	2	-	-	-	-	-	II	-
<i>Inula oculus-christi</i>	-	-	-	2	2	-	-	-	-	-	-	-	I	-
<i>Vicia cracca</i>	-	-	-	1	2	-	-	-	-	-	-	-	I	-
<i>Rosa andegavensis</i>	-	-	+	-	-	-	-	-	-	-	-	-	I	-
<i>Galatella linosyris</i>	-	1	-	-	-	-	+	-	-	-	-	-	I	-
<i>Trifolium alpestre</i>	-	-	-	2	2	-	-	-	-	-	-	-	I	-
<i>Peucedanum alsaticum</i>	-	+	+	-	-	-	-	-	-	-	-	-	I	-
<i>Linum hirsutum</i>	-	-	+	-	-	-	-	-	-	-	-	-	I	+
<i>Melampyrum arvense</i>	-	1	-	-	-	-	-	-	-	-	-	-	I	-
<u>Festuco-Brometea s.l.</u>														
<i>Festuca valesiaca</i>	1	+	+	+	+	1	+	-	1	1	1	1	V	-
<i>Marrubium peregrinum</i>	1	+	1	1	1	1	1	-	1	+	+	1	V	+
<i>Salvia nemorosa</i>	+	+	+	+	+	+	+	-	-	+	+	+	V	+
<i>Campanula sibirica</i>	+	+	+	+	+	+	+	-	-	+	+	r	V	-
<i>Sanguisorba minor</i>	-	+	+	+	+	+	+	+	+	+	-	+	V	+
<i>Stachys recta</i>	-	+	+	+	+	1	+	-	-	+	+	1	IV	+
<i>Salvia verticillata</i>	+	+	+	+	+	+	+	-	-	+	-	1	IV	
<i>Linaria genistifolia</i>	+	+	+	+	+	+	+	-	-	-	+	+	IV	+
<i>Viola hirta</i>	-	+	+	+	+	+	+	-	-	+	+	+	IV	+
<i>Melica transsilvanica</i>	-	+	+	+	+	1	+	-	-	+	1	1	IV	1
<i>Medicago falcata</i>	-	+	+	+	1	+	+	-	+	+	-	+	IV	+
<i>Achillea collina</i>	-	1	+	+	+	+	+	-	-	+	1	1	IV	+
<i>Galium volchynicum</i>	-	+	+	1	1	+	-	-	-	2	1	1	IV	+
<i>Acinos arvensis</i>	+	+	+	+	+	+	-	-	-	+	-	+	IV	-
<i>Euphorbia agraria</i>	-	+	-	+	+	+	+	+	+	-	-	+	IV	-
<i>Potentilla argentea</i>	-	+	+	+	+	+	+	-	-	-	+	+	IV	-
<i>Viola odorata</i>	-	-	1	+	1	1	1	1	2	-	1	-	IV	-
<i>Allium flavum</i>	-	+	+	+	+	+	-	-	-	+	+	+	IV	+
<i>Sideritis montana</i>	+	+	+	+	1	+	-	-	-	+	+	1	IV	+
<i>Teucrium capitatum</i>	-	+	+	+	+	+	+	-	-	+	+	+	IV	-

<i>Veronica teucrium</i>	-	+	+	-	-	-	-	-	-	-	-	-	I	-
<i>Stipa pulcherrima</i>	-	-	-	-	-	1	-	-	-	+	-	-	I	-
<i>Cephalaria uralens</i>	-	-	-	-	-	-	-	-	-	+	-	-	I	-
<i>Linum perenne</i>	-	-	-	+	+	-	-	-	-	-	-	-	I	-
<i>Silene longifolia</i>	-	-	-	-	-	-	+	-	-	-	-	-	I	-
<i>Campanula macrostachya</i>	-	-	-	-	-	-	-	-	-	+	-	-	I	r
<i>Helianthemum nummularium</i>	-	-	-	1	1	-	-	-	-	-	-	-	I	-
<i>Centaurea scabiosa</i>	-	-	+	-	-	+	-	-	-	-	-	-	I	-
<i>Linum tenuifolium</i>	-	-	-	-	-	-	-	-	-	+	-	+	I	-
<i>Gagea pratensis</i>									+					
Aliae														
<i>Daucus carota</i>	+	+	+	+	+	+	+	-	-	-	-	+	IV	+
<i>Thlaspi amplexicaule</i>	-	-	+	1	+	+	1	-	+	+	+	+	IV	-
<i>Veronica arvensis</i>	-	+	+	+	+	+	+	-	+	+	-	+	IV	-
<i>Lamium purpureum</i>	-	+	+	+	+	+	+	+	-	+	-	+	IV	-
<i>Melilotus officinalis</i>	+	-	+	+	+	+	+	-	-	-	+	+	IV	+
<i>Allium rotundum</i>	+	+	+	-	r	-	+	-	-	-	-	-	III	+
<i>Veronica hederifolia</i>	2	-	-	1	2	-	+	-	1	-	2	1	III	-
<i>Galium mollugo</i>	+	-	+	+	+	-	+	-	-	-	-	-	III	-
<i>Buglossoides aervensis</i>	-	-	1	1	1	+	+	-	-	-	-	+	III	-
<i>Artemisia absinthium</i>	-	-	+	+	+	-	+	-	-	-	-	+	III	-
<i>Anchusa ochroleuca</i>	-	-	+	+	+	-	+	-	-	-	+	-	III	-
<i>Holosteum umbellatum</i>	-	+	+	+	+	+	+	-	-	+	-	-	III	-
<i>Senecio vernalis</i>	-	+	+	+	+	+	+	-	-	-	-	+	III	-
<i>Ajuga chamaepitys</i>	-	+	+	+	+	+	+	-	-	-	-	+	III	-
<i>Reseda lutea</i>	-	+	+	-	+	+	-	-	-	-	+	r	III	+
<i>Alliaria petiolata</i>	1	-	-	-	-	-	1	-	+	-	1	-	II	-
<i>Galium aparine</i>	-	-	-	-	-	-	1	+	-	-	1	-	II	-
<i>Papaver dubium</i>	-	-	-	r	r	+	-	-	-	-	-	+	II	-
<i>Armeniaca vulgaris</i>	-	-	-	r	r	-	-	-	-	r	-	-	II	-
<i>Urtica dioica</i>	+	-	-	-	-	-	-	-	-	-	-	-	I	-
<i>Echinops sphaerocephalus</i>	-	-	-	-	-	-	+	-	-	-	-	-	I	-
<i>Aristolochia clematitis</i>	-	-	-	-	-	-	1	-	-	1	-	-	I	-
<i>Ajuga reptans</i>	-	-	-	+	-	-	+	-	-	-	-	-	I	-
<i>Anthriscus longirostris</i>	-	-	-	-	-	-	1	1	-	-	-	-	I	-
<i>Geranium pusillum</i>	-	-	-	-	+	-	+	-	-	-	-	-	I	-
<i>Cerinthe minor</i>	-	-	-	-	+	-	+	-	-	-	-	-	I	-
<i>Ballota nigra</i>	-	-	-	+	-	-	-	-	-	-	-	-	I	-
<i>Fallopia convolvulus</i>	-	-	-	-	-	-	+	+	-	-	-	-	I	-
<i>Chelidonium majus</i>	-	-	-	-	-	-	-	-	-	-	+	-	I	-

Place and date of the relevés: rel. 1, Fetești commune, Edineț district, 18.IV.1994, 29.VII.2014; rel. *2 (typus)-3, Tîrgul-Vertiujeni commune, Florești district, 19.IX.1995, 29.IV.2009, 25.VIII.2017; rel. 4-5, Ciorescu comune, Chișinău municipality, 04.VII.2009, 03.X.2009, 11.V.2019; rel. 6, Trebujeni commune, Orhei district, 07.V.1988, 11.VI.2015; rel. 7, Lopatna village, Orhei district, 12.V.1988, 21.VI.2009, 14.V.2010, 28.V.2015; rel. 8, Zolonceni village, Criuleni district, 18.V.1988, 23.III.1989, 06.VI.2015; rel. 9, Delacău commune, Anenii Noi district, 05.VII.1988; 29.V.1994, 25.IV.2015; rel. 10, Goian village, Territorial Units of the Left Bank of the Dniester, rel. 29.III.1990, 11.V.1990, 17.VII.2003; rel. 11-12, Hrușca village, Territorial Units of the Left Bank of the Dniester, 17.VII.1987, 09.IV.1988, 07.VI.1997; rel. 13, Jaryșiv village, Kam'janec-Podolikij district, Ukraina, 19.VII.1988.

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