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THE GENUS *PILOSELLA* HILL (ASTERACEAE DUMORT.) IN “IAGORLÎC” SCIENTIFIC RESERVE

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Abstract. The floristic investigations of the genus *Pilosella* Hill revealed six species in the flora of “Iagorlic” Scientific Reserve – *Pilosella officinarum* F. Schultz et Sch. Bip., *P. caespitosa* (Dumort.) P. D. Sell et C. West, *P. echioides* (Lumn.) F. Schult. et Sch. Bip., *P. glaucescens* (Bess.) Sojak, *P. flagellaris* (Willd.) Arv.-Touv., *P. praealta* (Vill. ex Gochn.) F. Schultz et Sch. Bip., the last three of which were new taxa for this area. After the chorological analysis, it was concluded that 3 species are rare: *Pilosella caespitosa*, *P. glaucescens* and *P. flagellaris*.

INTRODUCTION

The genus *Pilosella*, known by the common name hawkweed, was described by J. Hill (1756), soon after the publication of the genus *Hieracium* (Linnaeus, 1753). For a long time, it was not accepted as an independent generic taxonomic unit, but was considered a taxonomic unit with the status of subgenus – *Pilosella* (Gray, 1821) or section – *Piloselloidea* (Koch, 1837) in the genus *Hieracium* s. l. [11]. The definitive delimitation of the genera *Hieracium* L. s. str. and *Pilosella* Hill was made in the last decades of the 20th century, as a result of the research and the published works of botanists such as: J. Sojak, P. D. Sell and C. West, J. Holub, J. Dostal, R. Shlyakov (1989) and others [10].

The genus *Hieracium* s.l. is known as a polymorphous and difficult taxonomic unit, previously represented, in the flora of the Republic of Moldova, by a single genus – *Hieracium* L. As a result of the monographic processing of the subfamily *Cichorioideae* Kitam. in the flora of this area, the genus *Pilosella* Hill and the genus *Hieracium* L. s. str. were recognized as two different, independent genera. The genus *Pilosella* Hill differs from the genus *Hieracium* L. s. str. mainly in the structure of the achene, which, as a rule, shows far more advanced conservative properties, unlike vegetative properties, and is more safely used in the activities of delimiting superspecific taxonomic categories [1].

In the summer of 2016, a floristic research on the family *Asteraceae* Dumort. was carried out in the territory of “Iagorlic” Scientific Reserve, located on the left bank of Dniester River, in Dubăsari district, at a distance of 12 km from Dubăsari town, at the mouth of Iagorlic River. About 780 species of wild vascular plants, which belong to 357 genera and 82 families, were found in the flora of “Iagorlic” Scientific Reserve [12]. The family *Asteraceae* included 127 species, of 49 genera, accounting for the largest share, about 16%. The reserve is characterized by various ecotopes, which determine the floristic richness of the territory.

MATERIALS AND METHODS

This study was based on the floristic research on the genus *Pilosella* Hill (*Asteraceae* Dumort.) in “Iagorlic” Scientific Reserve and on consulting the literature and the collections from the Herbarium. The critical analysis of the *Pilosella* species was carried out according to the classical comparative-morphological method [9]. Guides for determining plant species and basic literature on floristics, related to the researched territory, were consulted for the determination of the taxonomic belonging of the specimens from the Herbarium and the specification of the bio-ecological, phytogeographical and chorological features of the species [5-8, 13, 15]. The evaluation of the rare species and the determination of their conservation status were performed according to the criteria of the International Union for Conservation of Nature (IUCN) (2001, 2003) [3, 4]. The nomenclature of taxa is

presented according to the fundamental papers in this field [5, 7, 8, 14].

RESULTS AND DISCUSSIONS

As a result of the floristic and taxonomic research on the genus *Pilosella* in "Iagorlic" Scientific Reserve, 6 species were found: *Pilosella officinarum* F. Schultz et Sch. Bip., *P. caespitosa* (Dumort.) P. D. Sell et C. West, *P. echioides* (Lumn.) F. Schult. et Sch. Bip., *P. glaucescens* (Bess.) Sojak, *P. flagellaris* (Willd.) Arv.-Touv. and *P. praealta* (Vill. ex Gochn.) F. Schultz et Sch. Bip., the last 3 of which were new taxa for the flora of the reserve. According to the chorological analysis, we came to the conclusion that 3 of the studied species are rare: *Pilosella caespitosa*, *P. glaucescens* and *P. flagellaris*.

The brief description of the genus *Pilosella* is given below. The synonymy, the first source where it was mentioned, the name in Latin, Romanian and English, the geoelement, the flowering and fruiting stage, the habitat, the local distribution, the abundance and the range of each species are presented. The rare species have been classified into categories according to their conservation status, the limiting factors have been identified and the necessary measures for their conservation have been proposed.

The genus *Pilosella* Hill – **hawkweed**

Perennial plants, with the basal leaves arranged in a rosette, some species with marcescent leaves in the flowering stage, often with above-ground flexuous stolons (runners). The leaves are obovate, linear-lanceolate or linear, at the base gradually narrowed, with entire or distantly small-toothed margin. The anthodia (flower heads) with bisexual ligulate flowers are arranged in simple or compound corymbiform inflorescences, rarely, they are found by 1-2 on the tip of stems and shoots, or solitarily on scapiform stems. The involucre is (5) 6-12 (14) mm long, the involucral bracts are unevenly imbricate, herbaceous, often covered with simple, glandular and star-shaped hairs in various proportions. The receptacle is flat or slightly convex, foveolate (pitted), glabrous, without bracts. The flowers are yellow, rarely reddish-orange. The achenes are 1.2-2.5 mm long, without rostrum, grooved, with apical crenate corona. The pappus is uniseriate, composed of simple, fragile, white-gray hairs [6, 7, 10, 14].

L e c t o t y p e : *P. officinarum* F. Schultz et Sch. Bip.

There are a few thousand species common in the extratropical regions of Eurasia (excluding East Asia) and North Africa. In the flora of the Republic of Moldova, there are 11 species.

The presence of the species and intermediate forms, which are usually of hybrid origin, complicates the determination of the species of this genus. Many of them are the result of hybridization between different basic collective species (*species collectivae principales*), often three or more [13]. A mandatory condition for the accurate determination of the hawkweed is to collect the specimens correctly, making sure that the decumbent stolons, if present, are preserved.

1. *P. caespitosa* (Dumort.) P. D. Sell et C. West, 1967, *Watsonia*, 6, 5: 314, s. restr.; Шляков, 1989, Фл. евр. части СССР, 8: 349. – *Hieracium caespitosum* Dumort. 1827, *Fl. Belg.*: 27; P. D. Sell et C. West, 1976, *Fl. Europ.* 4: 373; Гейдеман, 1986, *Опред. высш. раст. МССР*, изд. 3: 584; Доброчаева, Котов, Прокудин, 1999, *Опред. высш. раст. Укр.* изд. 2: 385; Negru, 2007, *Det. pl. fl. R. Mold.*: 270; Ciocârlan, 2009, *Fl. Ilus. Rom.*: 870. – **Vulturică cespitoasă. – Meadow hawkweed, yellow hawkweed.**

Perennial, hemicryptophytic plant. Flowers and produces fruits in May-July. Praticolous species, grows solitarily or in small and diffuse groups, at the edge of forests, in glades, grasslands, slopes with steppe vegetation. The range of this species includes Central and South-Eastern Europe, the Caucasus and Western Siberia; it is an adventive species in Western Europe, North America and New Zealand. East-European-West-Siberian element.

Rare species, conservation status: **Vulnerable** VU B2b (iii, iv, v).

It has been found that, during the last decades, the number of places where this species grows has decreased in the territory of the Republic of Moldova. Seven places where it can be collected are known: Briceni, Rosoșani and Cotiujeni communes, Briceni district; Rădoaia commune, Sângerei district; Căinari railway station, Căușeni

district; Şişcani commune, Nisporeni district, Țăghira (Movila Măgura) commune, Ungheni district and Goian commune, Dubăsari district.

The species is threatened by habitat loss through forest exploitation, unregulated tourism, mowing on slopes and in forest glades. Protective measures: protection of the places where the species grows, observance of the regime of the protected natural areas and monitoring of the population of the species.

2. *P. echioides* (Lumn.) F. Schultz et Sch. Bip. 1862, Flora (Regensb.), 45: 431; Шляков, 1989, Фл. евр. части СССР, 8: 329. – *Hieracium echioides* Lumn. 1791, Fl. Posop. 1: 348; Юксип, 1960, Фл. СССР, 30: 418; Гейдеман, 1986, Опред. высш. раст. МССР, изд. 3: 582; Доброчаева, Котов, Прокудин, 1999, Опред. высш. раст. Укр. изд. 2: 380; Negru, 2007, Det. pl. fl. R. Mold.: 270. – *H. echioides* subsp. *echioides*; P. D. Sell a. C. West, 1976, Fl. Europ. 4: 375, s. restr.; Ciocârlan, 2009, Fl. Ilus. Rom.: 870. – **Vulturită echinoidă.**

Perennial, hemicryptophytic plant. Flowers and produces fruits in May-July. It is a steppe species, grows solitarily or in groups by 2-5 plants, on arid slopes, sunny hills, rocky areas and in sectors with steppe vegetation of “Iagorlic” Scientific Reserve. It sporadically occurs throughout the territory of the Republic of Moldova. The range of the species includes Central and South-Eastern Europe, the Caucasus, the Mediterranean Basin, Asia Minor, Central Asia, Iran, Mongolia. Eurasian element.



Figure 1. *Pilosella flagellaris* (Willd.) Arv.-Touv.

3. *P. flagellaris* (Willd.) Arv.-Touv. 1873, Monogr. Pilos. Hier. Dauph.: 13; Шляков, 1989, Фл. евр. части СССР, 8: 375. – *Hieracium flagellare* Willd. 1814, Enum. Pl. Horti Berol., Suppl.: 54; Юксип, 1960, Фл. СССР, 30: 643; P. D. Sell a. C. West, 1976, Fl. Europ. 4: 369, pro sp. coll. propr.; Доброчаева, Котов, Прокудин, 1999, Опред. высш. раст. Укр. изд. 2: 385; Ciocârlan, 2009, Fl. Ilus. Rom.: 869, cum auct. (Willd.) Naeg. et Peter. – **Vulturită flagelară. – Shetland mouse-ear hawkweed** (Figure 1).

Perennial, hemicryptophytic plant. Flowers and produces fruits in June-July. It is a steppe species, grows solitarily or in groups at the edge of forests, on arid slopes with steppe vegetation. The range of the species includes the Scandinavian Peninsula (Finland), Central and Eastern Europe. European element.

Rare species, conservation status: **Vulnerable** VU D2

New species for the Republic of Moldova, found for the first time in 2010 [2]. It was collected in 5 localities: Zăbriceni commune, Briceni district; Naslavcea and Lencăuți communes, Ocnița district; Rădenii Vechi commune, Ungheni district and Lozova commune, Strășeni district. During the field research conducted in the summer of 2016, it was found in the territory of “Iagorlic” Scientific Reserve. This taxon is threatened by deforestation, excessive grazing and mowing. It is an ornamental plant, the basal rosettes and the stolons

form a thick ground cover. *Protective measures*: inclusion in the list of species protected by law, protection of the areas where this species is found, rigorous observance of the regime of the nature reserve and monitoring of the population.

4. *P. glaucescens* (Bess.) Sojak, 1971, Preslia (Praha), 43, 2: 185, s. restr.; Шляков, 1989, Фл. евр. части СССР, 8: 341. – *Hieracium glaucescens* Bess. 1809, Prim. Fl. Galic. 2: 149; Юксип, 1960, Фл. СССР, 30: 462; Гейдеман, 1986, Определ. высш. раст. МССР, изд. 3: 584; Доброчаева, Котов, Прокудин, 1999, Определ. высш. раст. Укр. изд. 2: 381; Negru, 2007, Det. pl. fl. R. Mold.: 271. – *H. praealtum* Vill. ex Gochnat subsp. *thausasium* (Peter) P. D. Sell, 1976, Bot. Jour. Linn. Soc. 71: 260; P. D. Sell a C. West, 1976, Fl. Europ. 4: 372 – **Vulturită glaucescentă**. (Figure 2)

Perennial, hemicryptophytic plant. Flowers and produces fruits in May-July. Steppe species, grows solitarily or in groups by 2-4 plants, in grasslands, on dry slopes with steppe vegetation, at the edge of the forests, fields and along roadsides. The range of the species includes Central and South-Eastern Europe, the Mediterranean Basin (eastern part) and Asia Minor. Pannonian-Pontic-East-Mediterranean element.

Rare species, conservation status: **Near threatened** NT B2ab(iii, iv)D2.

The degradation and loss of steppe areas adversely affect the development of populations, reducing their viability. In the Republic of Moldova, it was found in 4 localities: Sărata-Galbenă and Bozieni communes, Hâncești district; Băcioi commune, Chișinău municipality; Țăghira commune, Ungheni district.



Figure 2. *Pilosella glaucescens* (Bess.) Sojak

In the summer of 2016, it was collected from the territory of “Iagorlic” Scientific Reserve, where it grew in small populations. This species is threatened by the expansion of agricultural lands, grazing and afforestation of slopes with non-native woody species. *Protective measures*: protection of steppe sectors, monitoring of population status, identification of new areas where the species grows.

5. *P. officinarum* F. Schultz et Sch. Bip. 1862, Flora (Regensb.), 45: 421.; Шляков, 1989, Фл. евр. части СССР, 8: 358. – *Hieracium pilosella* L. 1753, Sp. Pl.: 800, p. p.; Юксип, 1960, Фл. СССР, 30: 692; P. D. Sell a C. West, 1976, Fl. Europ. 4: 368; Гейдеман, 1986, Определ. высш. раст. МССР, изд. 3: 582; Доброчаева, Котов, Прокудин, 1999, Определ. высш. раст. Укр. изд. 2: 379; Negru, 2007, Det. pl. fl. R. Mold.: 270; Ciocârlan, 2009, Fl. Ilus. Rom.: 867. – **Vulturită comună**. – **mouse-ear hawkweed**. (Figure 3)

Perennial, hemicryptophytic plant. Flowers and produces fruits in May-September. Praticolous species, grows in grasslands, sunny areas, steppe sectors. It grows sporadically, solitarily or in groups, forming numerous populations throughout the studied territory. The range of the species includes the Scandinavian Peninsula,

Atlantic Europe, Central and Southeastern Europe, the Mediterranean Basin, Asia Minor, the Caucasus, Western Siberia; it is an adventive species in North America and New Zealand. Ornamental plant during flowering. West-European element.

6. *P. praealta* (Vill. ex Gochn.) F. Schultz et Sch. Bip. 1862, Flora (Regensb.), 45: 429; Шляков, 1989, Фл. евр. части СССР, 8: 332. – *Hieracium praealtum* Vill. ex Gochn. 1808, Tent. Pl. Cichor.: 17; Юксии, 1960, Фл. СССР, 30: 441. – *H. praealtum* subsp. *praealtum*; P. D. Sell a C. West, 1976, Fl. Europ. 4: 371, s. restr. – **Vulturică preînaltă.**

Perennial, hemicryptophytic plant. Flowers and produces fruits in June-July. Praticolous species, grows solitarily or in groups in sunny grasslands, glades, at the edge of forest sectors, in cutting areas in forests, on slopes with steppe vegetation, at the edge of fields. It grows sporadically in all the districts of the country. Recently, in the summer of 2016, it was found in a new place – Goian commune, Dubăsari district, in the territory of “Iagorlic” Scientific Reserve. The range of the species includes Central and Southeastern Europe, the Mediterranean Basin. European-Mediterranean element.



Figure 3. *Pilosella officinarum* F. Schultz et Sch. Bip.

CONCLUSIONS

The wild flora of the Republic of Moldova includes 11 species of the genus *Pilosella* Hill, 6 of them have been found in “Iagorlic” Scientific Reserve: *Pilosella officinarum* F. Schultz et Sch. Bip., *P. caespitosa* (Dumort.) P. D. Sell et C. West, *P. echioides* (Lumn.) F. Schult. et Sch. Bip., *P. glaucescens* (Bess.) Sojak, *P. flagellaris* (Willd.) Arv.-Touv. and *P. praealta* (Vill. ex Gochn.) F. Schultz et Sch. Bip.

As a result of the research, 3 new species for the flora of “Iagorlic” Scientific Reserve have been found: *Pilosella glaucescens*, *P. flagellaris* and *P. praealta*.

Three of the hawkweed species, found in “Iagorlic” Scientific Reserve, are rare: *Pilosella caespitosa* (Dumort.) P. D. Sell et C. West, *P. glaucescens* (Bess.) Sojak and *P. flagellaris* (Willd.) Arv.-Touv. The monitoring of their populations continues, as it is necessary for the development of special conservation measures.

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