

CENTAUREA X PULBERIANA PÎNZARU NOTHOSP. NOVA (ASTERACEAE) IN THE FLORA OF THE REPUBLIC OF MOLDOVA

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Abstract: The article brings up a description of morphological, biological and chorological features of a new hybrid species *Centaurea x pulberiana* Pinzaru in the flora of the Republic of Moldova.

Key words: Asteraceae, *Centaurea x pulberiana* Pinzaru nothosp. nova, biology, ecology, distribution, illustration.

INTRODUCTION

The genus *Centaurea* L. *sensu lato* includes about 400-746 species, found mostly in the Mediterranean Region [16]. In the wild flora of the Republic of Moldova, the genus *Centaurea* L. *sensu lato* includes 27 species [8, 13] and *sensu stricto* – 24 [9]. The genus *Centaurea* L. *s.l.* comprises annual, biennial and perennial herbaceous plants. They produce one or several anthodia, which are heterogamous, polifloral, of different size, spheroid, ovate, oblong or, rarely, cylindrical. The involucre is imbricate, the hypsophiles – pilose, ending with an appendicle (at least the internal ones) or without appendicle, with a narrow, transparent membrane on the edge. The appendicles are erect or recurved at the tip, with the margin entire or pectinate-fimbriated (with an aculeus at the tip), feathery or with a simple or branched thorn (the central one – obviously bigger). The flowers are of various colours, tubular, with 5 teeth. In some species, the marginal flowers are sterile, tubular-funnel-shaped (divided in 4 lacinia), clearly larger than the tubular, fertile, central ones. The receptacle with caducous squamas or setae. Achenes without rostrum, usually smooth, more rarely rugulose, disperse pubescent, rarely glabrous. Double pappus ± as long as the achene, with unequal, scabrous, serrate, serrate-ciliated setae, more rarely setaceous-squamiform setae. Rarely, the pappus is simple or absent, or replaced by a small caruncle at the tip of the achene [1-3, 8-13, 12, 16].

MATERIALS AND METHODS

For the study, the literature in the given field was consulted [1-6, 8-13, 15-16], as well as materials collected in June-July 2017 and those from the Herbarium of the Botanical Garden of Chisinau [CHIS], in the State University of Chisinau [CHIS-US] and Botanical Museum of the University "A.I.Cusa", Iasi (România).

Specimens of plants from the vicinity of Rădulenii Vechi commune, Floresti district are preserved in the Herbarium of the Botanical Garden of Chisinau and are considered as typical examples.

The plants were identified according to the classical comparative-morphological method [14]. The species indicated in the paper are presented according to "Flora vasculară din Republica Moldova" (Vascular Flora of the Republic of Moldova) [9].

RESULTS AND DISCUSSIONS

According to the International Code of Nomenclature for algae, fungi and plants the hybrid species of

the genus *Centaurea* L.: *C. x moehrleniana* Vetter (*C. orientalis* x *scabiosa*), *C. x barbeyana* Vetter (*C. diffusa* x *maculosa*), *C. x favratii* Vetter (*C. orientalis* x *sadleriana*), *C. x aschersoniana* Vetter (*C. barbeyana* x *solstitialis*), indicated by L.Favrat (1889), at the request of the botanist J.J.Vetter, are not valid according to Art. 32.4, because they are not accompanied by a Latin description of the morphological characteristics [7].

The hybrid *Centaurea x podolica* Prodan, 1930 (*C. orientalis* x *scabiosa*), described for the flora of Romania, cannot be considered valid because in the specialized literature this name has already been published by V. Gugler (1907) – *Centaurea x podolica* Gugler (*C. arenaria* x *maculosa*).[6]

As a result of the floristic research carried out in the field in Rădulenii Vechi commune, Floresti district, Republic of Moldova, several plants with similar or intermediate morphological characteristics between *Centaurea orientalis* L. and *C. scabiosa* L. were observed, these two being the only species of the genus *Centaurea* L. on the hill with steppe vegetation from there.

The critical analysis of the exsiccatae of *C. orientalis* L. from the Herbaria of the Botanical Garden (I) and Moldova State University allowed the identification of other 15 exsiccatae of plants that are similar to those from Rădulenii Vechi commune:

- Glodeni district, Cobani commune, on toltry (limestone), 07.VII.1986, collected and determined by M. Mârza [CHIS-US];
- Făleşti district, Măgura commune, slope with steppe vegetation, 29.VI.1948, collected by V. Andreev, determined by A. Ivankov [CHIS];
- Bălți city, slope with steppe vegetation, 02.VII.1953, collected by Vladimirov, determined by V. Kononov [CHIS];
- Soroca district, Trifăuți commune, scrubland on steep slope of the Dniester river, 29.VII.1962, collected and determined by K. Vitko [CHIS];
- Florești district, Țîrgul-Vertiujeni commune, the edge of the forest, limestone slope of Dniester river, 24.VI.1976, collected by T. Gheideman, determined by D. Gociu [CHIS];
- Telenești district, in the vicinity of Telenești town, slope with steppe vegetation, 07.VIII.1948, collected and determined by A. Ivankov [CHIS-US];
- Orhei district, Trebujeni commune, forest, on rocks, 08.VII.1988, collected and determined by P. Pînzaru [CHIS];
- Strășeni district, Lozova commune, slope with steppe vegetation, 30.VI.1957, collected and determined by Gaikovskaia [CHIS-US];
- Călărași district, Sadova commune, glades forest, 30.VI.1953, collected and determined by Sârbul [CHIS-US];
- Ungheni district, Petrești commune, glades forest, 23.VII.1952, collected by V. Andreev, determined by L. Nicolaeva [CHIS];
- Anenii Noi district, Cobusca Nouă commune, slope with steppe vegetation, 24.VII.1949, collected and determined by L. Pojarisscaia [CHIS];
- Ștefan-Vodă district, Olănești commune, 06.VII.1955, collected by L. Nicolaeva, determined by H. Davidova [CHIS-US];
- Taraclia district, Tvardița commune, glades forest, 12.VI.1949, collected and determined by A. Ivankov [CHIS];
- Administrative-Territorial Units of the Left Bank of the Dniester: Camenca town, slope with steppe vegetation, 16.VI.1950, collected and determined by T. Gheideman; Iantarnoe village, slope with steppe vegetation, 10.VII.1987, collected by P. Pînzaru, determined by D. Gociu [CHIS].

Three exsiccatae of *Centaurea x podolica* Prodan (*C. orientalis* x *scabiosa*), from the Herbarium of the Botanical Museum of the “A.I.Cuza” University of Iasi (Iași county, locality Apărești on Valea Lupului, hayfields, 12.VII.1972, leg. I.Sârbu, no. 36951; Vânători, 28.VII.1939, no. 4921, Mârzești village, Oct. 1938, no. 4722), which are similar to those indicated above, have been found recently.

Taking into account that the hybrid species indicated above – *Centaurea x moehrleniana* Vetter ex Favrat, 1889 and *Centaurea x podolica* Prodan, 1930 – are not valid, a new name is proposed, *Centaurea x pulberiana* Pînzaru, with the morphological description of the new taxon.

Centaurea x pulberiana Pînzaru (*C. orientalis* L. x *C. scabiosa* L.) nothosp. nova (Asteraceae). – *C. x moehrleniana* (*C. orientalis* x *scabiosa*) Vetter ex Favrat, 1889, Bull. Soc. Bot. Genève, 5: 11, nom. nud.; Gugler, 1907, Annal. Mus. Nat. Hung. VI : 227, 284. – *C. x podolica* Prod. (*C. orientalis* x *scabiosa*) 1930, Cent. Rom.: 107, nom. illeg., non Gugler 1907: Prodan, E.Nyárády, 1964, Fl. R.P.Rom. 9: 943; Beldie, 1979, Fl. Rom. Determ. Ilustr. Pl. Vasc. 2: 212; Sârbu, Ştefan et Oprea, 2013, Pl. Vasc. Rom. Determ. ilustr.: 874. – **Centauree-Pulbere**. – **Василек Пулбере**. – **Fig. 1a, 2.**

Perennial plants, 30-110 cm tall. The stem is erect, angular, as a rule, purple at the angles and white-puberulent between them, branched at the top, ± arachnoid pubescent or glabrescent. The leaves are alternate, simple, lanceolate, pinnatisect and scabrous. The lower leaves grow up to 32 cm long and 14 cm wide, petiolate, the petiole and the rachis are dispersedly arachnoid pubescent, the middle laciniae of the leaf blade are partite-sectate, the terminal lacinia of the leaf has 1-2 lobes. The middle and upper leaves are smaller, gradually short petiolate to sessile. The anthodia – by (1) 3-7 on a stem, 15-20 mm in diameter. The appendices of the hypsophiles of the involucre are short pubescent, ovate-triangular, triangular-lanceolate, with a central, blackish-brown macula, with brown, 1-3 mm long fimbriae on the edges, the sinus between fimbriae is rounded, with an aculeus at the tip. The marginal flowers are sterile, tubular-funnel-shaped, towards the tip – deeply divided in 4 linear, white laciniae. The central flowers are fertile, tubular, with 5 teeth, yellow. The achenes are blackish-brown, 4-5 mm long, shortly pubescent. The pappus is double, greyish-white, with unequal setae, up to 3 mm long. Flowers in June-July. Fruits in July-August.

Plante perene, de 30-110 cm înălțime. Tulpină erectă, costată, de regulă, cu coaste purpurii, între coaste alb-puberulentă, ramificată în partea superioară, ± arahnoideu pubescent sau glabrescentă. Frunze alterne, simple, lanceolate, penat-sectate, scabre. Frunze inferioare până la 32 cm lungime și până la 14 cm lățime, pețiolate, pețiol și rahis dispers arahnoideu pubescent, lacinii mijlocii ale laminei partit-sectate, iar lacinia terminală cu 1-2 lobi. Frunze mijlocii și superioare mai mici, treptat scurt pețiolate până la sesile. Antodii pe o tulpină câte (1) 3-7, de 15-20 mm în diametru. Apendiculi hipsofilelor involucrelui scurt pubescenti, ovat-triunghiulari, tiunghiular-lanceolați, cu o maculă centrală brun-negricioasă, pe margini cu fimbrii brune, lungi de 1-3 mm, sinusul între fimbrii rotunjit, la vârf cu un aculeu. Flori marginale sterile, tubular-pâlniate, spre vârf adânc divizate în 4 lacinii liniare, albe; flori centrale fertile, tubuloase, cu 5 dinți, gălbui. Achene brun-negricioase, lungi de 4-5 mm, scurt pubescente. Papus dublu, alb-cenușiu, cu sete inegale, lungi până la 3 mm. Înfloreste în iunie-iulie. Fructifică în iulie-august.

Typus: «R. Moldova, Florești district, Rădulenii Vechi commune, 47°968'248" N and 28°292'763" E, slope with steppe vegetation, 16.VI.2017, 22.VII.2017, P. Pînzaru» [CHIS] (Fig. 1a, 2).

T i p: «R. Moldova, raionul Florești, comuna Rădulenii Vechi, 47°968'248" lat. Nord, 28°292'763" long. Est, colină stepizată, 16.VI.2017, 22.VII.2017, P. Pînzaru» [CHIS].

Paratype: «R. Moldova, Anenii Noi district, Cobusca Nouă commune, slope with steppe vegetation, 24.VII.1949, collected by L. Pojarisscaia» [CHIS]; «R. Moldova, Glodeni district, Cobani commune, on toltry (limestone), 07.VII.1986, leg. M. Mârza» [CHIS-US].

Affinity. The hybrid species *Centaurea x pulberiana* is similar to *C. orientalis* L. (Fig. 1b, 3) and *C. scabiosa* L. (Fig. 1c, 4) in stem, leaves, colour of the achenes and pappus, but differs from both in the intermediate size of the anthodia – 15-20 mm in diameter (not 20-25 mm like *C. orientalis* and 10-15 mm like *C. scabiosa*), the colour of the flowers – the outer ones white and the inner ones pale yellow (not all cream, rarely reddish like *C. orientalis* or purple like *C. scabiosa*), in the appendices of the hypsophiles of the involucre – non-decurrent, triangular-ovate appendices with a central, blackish-brown macula, rounded sinus between fimbriae, light

brown fimbriae (not non-decurrent appendices but wide-ovate, yellowish, with or without light-brown macula, acute sinus between fimbriae, yellowish fimbriae like *C. orientalis* or decurrent appendices, with rounded sinus between fimbriae, but smaller, and blackish fimbriae like *C. scabiosa*).

Specii înrudite. Specia hibridă *Centaurea x pulberiana* se aseamănă cu *C. orientalis* L. (Fig. 1b, 3) și *C. scabiosa* L. (Fig. 1c, 4) după tulpină, frunze, culoarea achenelor și a papusului, dar se deosebește de ambele după mărimea intermediară a antodiilor – de 15-20 mm în diametru (nu 20-25 mm cum la *C. orientalis* și 10-15 mm la *C. scabiosa*), culoarea florilor – externe albe, interne palid gălbui (nu toate crem, rareori roșietice cum la *C. orientalis* sau purpurii cum la *C. scabiosa*), după apendiculi hipsofilelor involucriului - apendiculi nedecurenți, triunghiulari-ovați cu o maculă centrală brun-negricioasă, sinusul între fimbrii rotunjit, fimbrii brun deschis (nu apendiculi nedecurenți dar lat-ovați, gălbui, cu sau fără maculă brun deschisă, sinusul între fimbrii acut, fimbrii gălbui la *C. orientalis* sau apendiculi decurenți, cu sinusul între fimbrii rotunjit, dar fimbrii mai mici și negricioase la *C. scabiosa*).

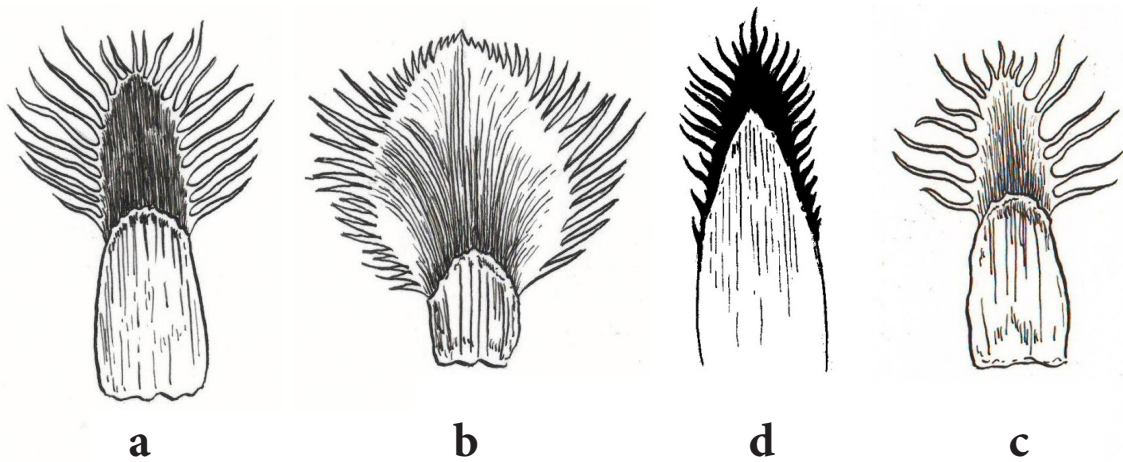


Fig. 1. Middle hypsophiles: a – *Centaurea x pulberiana*; b – *C. orientalis*; c – *C. scabiosa*; d – *C. neiceffii*



Fig. 2. *Centaurea x pulberiana* Pinzaru (typus)

Fig. 3. *C. orientalis*Fig. 4. *C. scabiosa*Fig. 5. *C. neiceffii*

The hybrid species *C. x pulberiana* is also similar to *Centaurea neiceffii* Degen et J.Wagner (Fig. 1d, 5), which have in common such characteristics as non-decurrent, triangular-ovate and triangular-lanceolate appendices of the hypsophiles of the involucre and rounded sinus between fimbriae, but differ in appendices of the hypsophiles of the involucre with a blackish-brown macula (not pale-brown), with fimbriae that are up to 3 mm long (not 4 mm), yellowish tubular central flowers (not yellow or white), achenes that are 4-5 mm long (not 3-4 mm long) and pappus 3 mm long (not 5 mm long).

Some botanists consider that *Centaurea neiceffii* Degen et J.Wagner, 1908, Period. Spis. Bulg. Kníž. Druž. 20 (69) is a hybrid between *C. orientalis* L. and *C. apiculata* Ledeb. subsp. *spinulosa* (Rochel ex Spreng.) Dostál [2], or *C. orientalis* L. and *C. stereophylla* Besser [12]. In the studied literature, the corolla of *C. neiceffii* plants is indicated as yellow [1, 2, 6], but in the pictures put on a web site by Alexandru Bădărău [17], the corolla is white (plants cultivated in a garden in Florești, Cluj county, obtained from seeds collected on Babadag plateau, Tulcea county).

Habitat and ecological characteristics. *Centaurea x pulberiana* – xeromesophilic hemicytopyte, it grows on hills with steppe vegetation, limestone slopes, at the edge of forests, in glades and scrublands. This species is characteristic of the vegetation of the alliance *Festucion valesiacae* Klika 1931.

The plants of the newly found species grow on hills with steppe vegetation, in clayey-sandy soil. They are found on slopes with western and eastern exhibition. The inclination of slopes varies between 25 ° and 35 °. The coverage of the herbaceous layer is 90-100 %.

It grows in phytocoenoses dominated by *Inula ensifolia* L. and *Cytisus austriacus* L. accompanying species: *Adonis vernalis* L., *Agrimonia procera* Wallr., *Allium albidum* Waldst. & Kit., *A. sphaerocephalon* L., *Anemone sylvestris* L., *Asparagus officinalis* L., *Asperula cynanchica* L., *Aster amellus* L., *Astragalus austriacus* Jacq., *A. onobrychis* L., *Ajuga laxmannii* (Murray) Benth., *Bromus inermis* Leys., *Campanula glomerata* L. var. *cervicarioides* (Schult.) A.DC., *C. sibirica* L., *Carex humilis* Leys., *Centaurea orientalis* L., *C. scabiosa* L., *Cephalaria uralensis* (Murray) Roem. et Schult., *Cichorium intybus* L., *Clematis integrifolia* L., *Dianthus andrzejowskianus* (Zapal.) Kulcz., *Eryngium campestre* L., *Erysimum canescens* Roth, *Euphrasia* sp., *Festuca valesiaca* Gaudin, *Filipendula vulgaris* Moench, *Galatella linosyris* (L.) Rchb.f., *Galium verum* L., *Goniolimon besserianum* (Schult.) Kusn., *Helichrysum arenarium* (L.) Moench, *Hieracium umbellatum* L., *H. viosum* Pall., *Hypericum elegans* Steph., *Iris halophylla* Pall., *I. pumila* L., *Jurinea mollis* (L.) Rchb., *Klasea radiata* (Waldst. & Kit.) Á. Löve & D. Löve, *Knautia arvensis* (L.) Coult., *Koeleria pyramidata* (Lam.) P.Beauv., *Leopoldia tenuifolia* (Tausch) Heldr., *Linum flavum* L., *Origanum vulgare* L., *Oxytropis pilosa* (L.) DC., *Pilosella echioides* (L.) F.W.Schultz & Sch.Bip., *Plantago media* L., *Potentilla arenaria* Borkh., *P. patula* Waldst. & Kit., *Pseudolysimachion spicatum* (L.) Opiz, *Rapistrum perenne* (L.) All., *Reseda lutea* L., *Salvia nemorosa* L., *S. nutans* L., *Securigera varia* (L.) Lassen, *Seseli tortuosum*

L., *Silene otites* (L.) Wib., *Stachys officinalis* (L.) Trevis., *S. recta* L., *Stipa pennata* L., *Tanacetum corymbosum* (L.) Sch.Bip., *Teucrium chamaedrys* L., *Thalictrum minus* L., *Thlaspi perfoliatum* L., *Thymus pannonicus* All. s.l., *Verbascum phoeniceum* L., *Vincetoxicum hirundinaria* Medik., *Viola hirta* L.

Range. In the Republic of Moldova, it has been found in the districts: Glodeni (Cobani), Făleşti (Măgura), Soroca (Trifăuți), Florești (Rădulenii Vechi, Țirgul-Vertiujeni), Telenești (Telenești), Orhei (Trebujeni), Strășeni (Lozova), Călărași (Sadova), Ungheni (Petrești), Anenii Noi (Cobusca Nouă), Ștefan-Vodă (Olănești), Taraclia (Tvardița), Bălți town and the Administrative-Territorial Units of the Left Bank of the Dniester (Camenca, Iantarnoe). It has also been found in Romania (Galați and Iași counties), Hungary and Switzerland (obtained and cultivated in gardens in Orbe city).

The species is named in honour of the Pulbere family – my university professors Eugenia and Pavel Pulbere, from Tiraspol State University.

CONCLUSIONS

As a result of the floristic research conducted in the field and in the laboratory, after consulting literature on the genus *Centaurea* L., it was identified a hybrid species in the flora of the Republic of Moldova, which is new to science – *Centaurea x pulberiana* Pînzaru.

The typus and paratype specimens of the species *C. x pulberiana* were established.

According to the data from the Herbarium, *C. x pulberiana* is rarely found on the entire territory of the Republic of Moldova.

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