Geographical distribution, habitats and modern state of Carlina cirsioides (Asteraceae) populations

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Introduction

Development of the scientific basis of the protection of floristic diversity is a relevant task of ecological research. The paper presents the results of the study of systematic position, habitats and modern state of populations of a rare species included in the Red Data Book of Ukraine Carlina cirsioides Klokov (=C. acaulis L.). Carlina cirsioides is well-known to European phytosociologists as an endemic and relic species of the Flora of Ukraine. At the same time, the species independence of this taxon is not recognized by the authors of monographs on the Carlina genus and by the authors of "Flora Europaea". Comparative morphological, chorological and ecological-coenotic analyses do not give sufficient reasons to consider C. cirsioides described by Klokov as a separate species, endemic and relic species of the Flora of Ukraine. According to the morphological traits, the specimens from the lowland part of Ukraine belong to the C. acaulis caulescens subspecies, which is distributed mostly in the lowland regions of Europe. Ecological-coenotic conditions of habitats of C. acaulis in the plains of Ukraine are different from those in the mountain regions and are close to the plains habitats of this species in Central Europe. Steppe communities of class Festuco-Brometalia, of which C. acaulis is component in the plains part of Ukraine, are close to xerothermic herbaceous communities of Central Europe; forest communities of Erica-Pinetalia with C. cirsioides in Ukrainian Polisia and the North-East Poland are very close by floristic composition. The removal of separate species status of the plains populations of C. acaulis near the eastern border of the range does not at all downplay its zoological significance. Taking into account the low number of C. acaulis in the Volhynian-Podolian Upland and in the Polesian Lowland, all localities of this species in the lowland part of the range in Ukraine must be taken under protection in situ.

Keywords: rare species; flora; systematic position; range; communities; protection.

尔斯态位置, 辅助现代状态。C. cirsioides 为欧洲受威胁物种。C. acaulis 描述为欧洲受威胁物种。C. cirsioides 在乌克兰的平原部分, 是 C. acaulis 的一个变种, 分布在乌克兰的低地地区。乌克兰的林地和波兰北部的森林社区的 Erico-Pinetalia 与 C. cirsioides 在乌克兰的波西亚和东北波兰非常接近。物种的独特地位, 平原部分的族群, 平原部分, 茫然不同。C. acaulis 的小种, 不同于乌克兰西部的高地地区。C. acaulis 的小种, 花序和花序的分布, 稀有和灭绝的 Flora of Ukraine。因为这个物种是包括在欧洲红名单 (Melnik, 2011), C. acaulis 是分配到欧洲红名单的全球受威胁物种。"Flora Europaea", 1991)。尽管其植物群

Materials and methods

The study was based on the materials of field surveys performed in 2010–2020. Population of C. cirsioides was surveyed in the plains of Ukraine in Rivne, Zhytomyr, Lviv, Ivano-Frankivsk, Ternopil and Khmel-

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nystytsk regions. We studied herbarium samples of *C. cirsioides* kept in the herbaria of the M. G. Khodoly Institute of Botany of the National Academy of Sciences of Ukraine (KW), M. M. Gryshko National Botanical Garden (KWA), Taras Shevchenko National University of Kyiv (KU), Ivan Franko National University of Lviv (LW), National Museum of Natural History of the National Academy of Sciences of Ukraine (NAS) in Lviv (LWKS), Institute of Ecology of Carpathians of the NAS of Ukraine (LWKS), and Rivne Regional Museum of Local Lore. Schematic range maps for the species were developed using the point method of cartographic image. For determination of ontogenetic spectrums of populations of *C. cirsioides*, we used diagnostic traits of the stages of the ontogenesis of the species described by Zelenchuk (1987). The account of density of the populations was made on 1 m² transects, within which 1x1 m² experimental plots were arranged.

**Results**

Geographic distribution of *C. cirsioides* in Ukraine. Polesian Lowland

Volkynian Polissa

Rivne region
1) Kostopol district, outskirts of Derazhne village (Antonova, 1989,
Rivne Regional Museum of Local Lore);
2) Rivne district, Oleksandrivske Forestry (Antonova, 1991, Rivne
Regional Museum of Local Lore);
3) Rivne district, Liubomirskie Forestry (Melnyk, 2002, KWAHA).

Zhytomyr region
4) Zhytomyr, Sokolova Hora (Klokov, 1962);
5) Pulyny district, Zelena Dibrova village (Klokov, 1962);
6) Romantiv district, Yasnolhorod village (Klokov, 1962);
7) Bendychiv district, Katerinyvka village, the Ahatynka Tract (Kha-
keych, 1947, KW).

Kyiv Polissa

Kyiv region
8) outskirts of Kyiv, Bilychy (Rakochi 1901, LE, Vavrysh, Dubovyk,
1972, KW);
9) Bravory (Shmalhausen, 1886, KW);
10) Bravory district, Liubky Forestry, Zalissia (Selezhynskiy), 1904,
KW.

Volkynian Upland

Rivne region
11) Hoshecha district, outskirts of Ruchyshehe village (Zozniuk, An-
tonova, 1991, Rivne Regional Museum of Local Lore);
12) Zolodivniv district, outskirts of Bohdashiv (LE);
13) Zolodivniv district, outskirts of Varenyevychi-Orkiv near
Rivne (Panev, 1925, Volkynian Museum of Local Lore in Lutzk).

The Podolian Upland

Lviv region
14) Zolochiv district, Chervone village, Lysa Hora mountain (Moty-
ka, 1947; Buhalo, 1955, LW; Panchushyna, 1960, LW; Sheliah-Sosonko,
Kukovytsia, 1968, KW; Zelenchuk, 1981, LW; Kahalo, 1983, LW; Ze-
lenchuk, 1985, LW; Zaverna, 1986, KW; Zahnalsky, 1988, LW);
15) Zolochiv district, outskirts of Chervone village, the Sypuhu
mountain (Buhalo, 1955, LW);
16) Zolochiv district, Stinlka village, Holohhirka Tract (Zaverukha, LW,
1961; Skoroplias, Batohochno, KWAHA, 2012);
17) Zolochiv district, outskirts of Zarnavtsia village, Zarvantsia
mountain (Skoroplias, Batohochno, KWAHA, 2013);
18) Zolochiv district, Holohory village (Melnyk, 1957, KW);
19) Zolochiv district, outskirts of Trudovych village (Motyka, 1947);
20) Brody district, the Makitra mountain in the outskirts of Buchyn
village (Motyka, 1947; Melnyk & Parubok, 2004);
21) Zolochiv district, Puhav village (Melnyk, 2013, KWAHA);
22) Rohatyn district, Chortova mountain between villages Pukiv and
Babynska (Didulka, Sheliah-Sosonko, 1977, KW; Shamiloava, 1981, KW;
Kahalo, 1987, LW; Melnyk & Parubok, 2004; Dmytrash & Shumska,
2011; Skoroplias, KWAHA, 2012);
23) Rohatyn district, outskirts of Pukiv village, the mountain Chorna
(Kukovytsia & Sheliah-Sosonko, 1968, KW).

24) Rohatyn district, north-east outskirts of Malynivka village, the
Knyshova mountain (Melnyk & Parubok, 2004);
25) Halych district, outskirts of Bosov village, Kasova mountain
(Kahalo, 1988, LW; Kuziarin, 1991, LWS; Drapailo, 2002, KW; Dmy-
trash & Shumska, 2011; Skoroplias, 2012);
26) Halych district, outskirts of Bosov village, Dachne Tract (Dmy-
trash & Shumska, 2011);
27) Halych district, near Mezhhyhiria village, Karnin Tract (Dmytrash &
Shumska, 2011);
28) Halych district, outskirts of Hohohniv village, Bruchcheva Tract
(Dmytrash & Shumska, 2011);
29) Halych district, outskirts of Meduha village, the Simlyn Tract
(Dmytrash & Shumska, 2011);
30) Halych district, Korostyvechi village, Hora Hareva Tract (Dmy-
trash & Shumska, 2011);
31) Halych district, Byshiv village, Horezhanka Tract (Dmytrash &
Shumska, 2011; Skoroplias, 2014);
32) Rohatyn district, outskirts of Luchynitsi village Velykiy Holdy
Tract (Dmytrash & Shumska, 2011);

Tempol region
33) Berezhany district, the outskirts of Demnia village, Mohyla
mountain (Melnyk & Parubok, 2004; Skoroplias, KWAHA, 2011);
34) Berezhany district, the outskirts of Hutyso and Demnia villages,
the Holytsia mountain (Melnyk & Parubok, 2004);
35) Pidvolochysk district, Herodnitsia village, meadow steppe on the
second Horodnitsia Hill (Khalo, 1995, LWKS; Oliar, 2010; Skoroplias,
KWAHA, 2013);
36) Pidhatsi district, outskirts of Nosivka village, the Pid Kornem
Tract (Skoroplias, KWAHA, 2013);

Khmelnitsky region
37) Khmelnytsky (Shmalhausen, 1886, KW);
38) Izaialiv district, the Adamove Zaimyksko Tract (Zeidenwik, Mel-
nyk & Batohonko, 2005, KWAHA; Melnyk & Skoroplias, 2011, KWA-
HA);
39) Letychiv district, Lysokhorka village (Montrezor, 1998, KW);
40) Letychiv district, Medzyhizh village (Montrezor, 1998, KW);
41) Kraysliv district, Velyki Zozulentsi village (Klokov, 1962).

Vinnytsia region
42) Kalyntivka district, the outskirts of Velyki Kutshycha village
(Klokov, 1962);
43) Vinnytsia (Klokov, 1962);
44) Lypovets district (Klokov, 1962);
45) Nemiriv district, Luka village (Klokov, 1962).

Thus, throughout the period of floristic surveys in the lowland part of
Ukraine, a total of 45 localities with *C. cirsioides* (Fig. 1) were recorded,
15 of which by now have gone.

Habitats and modern state of the populations. We provide phytocoe-
notic descriptions and modern state of populations of *C. cirsioides* in the
locations we surveyed.

Volkynian Polissia

Habitat of *C. cirsioides* was found in 39th quarter of the Liubomyrnyk
Forestry near the Railway Station Liubomyrnyk, which is allocated with
forest cultures of *Quercus robur* L. The trees are around 50 years old,
the average trunk diameter measuring 25 cm, and the average tree height
equaling 18 m. The tree layer includes single trees of *Carpinus betulus* L.,
*Populus tremula* L., *Pyrus communis* L. The herb layer is thinned-out, and
its projective cover equaled 50%. It was formed by *Anthericum ramosum*
L., *Betonica officinalis* L., *Campanula persicifolia* L., *Convallaria majalis*
L., *Fragaria vesca* L., *Melampyrum nemorosum* L., *Maianthemum bifol-
ium* (L.) F. W. Schmidt, *Digitalis grandiflora* Mill. There we found only
two single specimens of *C. cirsioides*.

The Podolian Upland

The Mohyla Mountain looks like a rounded hill elevated up to 100 m
above the surroundings with slanted slopes (10–20°) and is located near
the Holytsia Mountain in the outskirts of Hutyso village of Berezhany
district of Tempol region. The area of the mountain accounts for 32 ha.
Plant cover of this mountain is represented by meadow steppe. The floris-
tic composition of this mountain is similar to the meadow steppe flora of
the Holytsia Mountain, though slightly poorer. The projected area of
The dominants – *Dactylis glomerata* and *Brachypodium pinnatum*, which compose associations *Dactylis glomerata + Galium verum*, *Brachypodium pinnatum + Poa pratensis*. The dominants are *Dactylis glomerata* (30%), *Galium verum* (20%), *Brachypodium pinnatum* (L.) P. Beauv. (30%), *Poa pratensis* (20%), *Molinia caerulea* (L.) Moench (30%), *Anthericum ramosum* L. (20%), co-dominants are *C. cirsioides* (10%), *Veratrum nigrum* L. (15%). The herbaceous layer comprises also *Achillea millefolium* L., *Artemisia vulgaris* L., *Asparagus officinalis* L., *Anemonia narcissiflora* L., *Campanula rapunculoides* L., co-dominants – *Ranunculus minor* L., *Thalictrum minus* L., 10%. The herbaceous-shrub layer comprises also *Adonis vernalis* L., *Anthemis ramosa* L., *Anthyllis vulneraria* L. The population of *C. cirsioides* is small, containing around 150 specimens (Table). Plants are arranged as groups, 10–12 specimens in each.

![Geographical distribution of *Carlina cirsioides* (= *Carlina acardis caudescens*) in lowlands of Ukraine](image)

**Fig. 1.** Geographical distribution of *Carlina cirsioides* (= *Carlina acardis caudescens*) in lowlands of Ukraine
The projected area of the grass stand is 90%. The dominants are Elatrygia intermedia (Host) Nepvsksi (40%), co-dominants – Inula ensifolia L. (30%). The projected area of C. cirsoides equals 5–10%. The herbaceous cover also includes Aegopodium podagraria L., Adonis vernalis L., Anemone sylvestris L., Anthericum ramosum L., Agrimonia eupatoria L., Carlini vulgari L., Campanula persicifolia L., Carex humilis Ley., Centaurea scabiosa L., Cephalaria dactylina (Mill) Drace, Dactylis glomerata L., Iris Junegracea Waldst., et Kt., Melittis melissophyllum L., Origamum vulgare L., Salvia verticillata L., Thesium linophyllum L., Trifolium rubens L. In the Holohirka Tract the population of C. cirsoides is small, comprising about 627 specimens. The average density of the population is 2–9 specimens/m², and the highest is 10–19 specimens/m² (Table).

Chortova Mountain is a Botanical Monument of National Significance, it is located between Pukiv and Babynitsi villages of Rohatyn district of Ivano-Frankivsk region. The area of the protected territory is 13 ha. The mountain is a butte with step (20–30°) slopes, elevated 100–150 m above the surrounding surface. The soils are podzolized chernozems. The meadow-steppe vegetation is represented by formations of Brachypodietta pinnati and Cariceta humilis, which are represented by associations Brachypodium pinnatum + Carex humilis, Carex humilis + Anthericum ramosum. The projected area of the grass stand is 100%, that one of C. cirsoides measures from 15%. The herbaceous cover is also composed of Achillea millefolium L., Aconitum molyvicum Haug., Adonis vernalis L., Anemone sylvestris L., Aster amellus L., Betonica officinalis L., Bromopsis inermis (Leuss). Holub., Centaurea sanguineam L., Dactylis glomerata L., Elatrygia intermedia (Host) Nepvski, Euphorbia cyparissias L., Filipendula vulgari Moench, Galium verum L., Geranium sanguineum L., Hypericum perforatum L., Inula ensifolia L., Iris Junegracea Waldst., et Kt., Lemtritis nigricans L., Melittis melissophyllum L., Plantago media L., Prunella grandiflora L., Scholl., Pulsatilla latifolia Rupr., Polygononatum odoratum (Mill.) Drace, Potentilla praetiosa L., Ranunculus acris L., Salvia verticillata L., Sanguisorba officinalis L., Scabiosa ochroleuca L., Solidago virgaurea L., Stachys recta L., Trifolium rubens L., Thalictrum minus L., Veratrum nigrum L. The population of the species on the Chortova Mountain is the largest. It includes around 1,000 specimens, with the density of 10–20 specimens/m².

Kasova Mountain (Fig. 2) is located west of Bovshiv village of Halych district of Ivano-Frankivsk region. It is a steppe reserve within the Halych National Nature Park. The area of the reserve is 160 ha. The mountain stretches 4 km along the left slope of the Hryla Lypa River and the Burshtyn Water Reserve. The mountain is 340 m above sea level and 100 m above the valley of the Hryla Lypa River.

The meadow-steppe vegetation is represented by formations of Anthericum ramosum, Brachypodietta pinnati, composed of associations between Anthericum ramosum + Carex humilis, Brachypodium pinnatum + Carex humilis, Brachypodium pinnatum + Anthericum ramosum (Fig. 2). The projected area of the vegetative layer is 100%, that one of C. cirsoides is less than 1%. The herbaceous cover includes Achillea millefolium L., Adonis vernalis L., Agrimonia eupatoria L., Anemone sylvestris L., Anthyllis schiwereckii (Leuch) Hacq., Astragalus onobrychis L., Brachypodium retusum (Kit.) DC., Campanula rotundifolia (L.) L., Centaurea phrygia L., Convolvulus arvensis (L.) Moench., Crataegus monogyna (DC) Bloski, Dactylis glomerata L., Dactylis glomerata L., Dasylium sanguineum L., Digitalis grandiflora L., Dianthus armeria L., Elytrigia repens L., Elytrigia intermedia + Inula ensifolia L., Elytrigia intermedia + Inula ensifolia L., Euphorbia cyparissias L., Filipendula vulgari Moench, Galium verum L., Geranium sanguineum L., Hypericum perforatum L., Inula ensifolia L., Iris Junegracea Waldst., et Kt., Lemtritis nigricans L., Melittis melissophyllum L., Plantago media L., Prunella grandiflora L., Scholl., Pulsatilla latifolia Rupr., Polygononatum odoratum (Mill.) Drace, Potentilla praetiosa L., Ranunculus acris L., Salvia verticillata L., Sanguisorba officinalis L., Scabiosa ochroleuca L., Solidago virgaurea L., Stachys recta L., Trifolium rubens L., Thalictrum minus L., Veratrum nigrum L. The population of the species on the Kasova Mountain is large, comprising over 967 specimens, which occupy the area of about 1.5 ha in the central part of the mountain.

The Horozhanka Tract is located between Bystiv village of Halych district of Ivano-Frankivsk Oblast and Horozhanka village of Pidhitski district of Ternopil region. Near the foothills of the mountain, the vegeta-
tion is represented by the formations of Festuceta rubrae with associations Festuca rubra + Elytrigia repens + Filipendula vulgaris, Centaurea sanguineum + Festuca rubra. The projected area of the herbaceous layer equals 90%, that of C. cirsoides (5–15%), Anthericum ramosum L. (10%), Bromopsis inermis (Leu. F.) Holub (30%), Centaurea sanguineum L. (10–40%), Elytrigia repens (L.) Nevski (20%), Festuca rubra L. (30–50%). Herbaceous layer also includes Achillea millefolium L., Adonis vernalis L., Allium podolicum (Asch. & Graebn.) Bloch Kiel., Betonica officinalis L., Carex humilis Leyss., Chamaecytisus blockianus (Pawt.) Klask., Dactylis glomerata L., Euphorbia cyparissias L., Fragaria vesca L., Filipendula vulgaris Moench, Galium verum L., Hypericum perforatum L., Lembotropis nigricans (L.) Griseb., Lilium martagon L., Medicago falcata L., M. lapulina L., Potentilla alba L., Ranunculus acris L., Salvia verticillata L., Sanguisorba officinalis L., Scabiosa ochroleuca L., Solidago virgaurea L., Teucrium chamaedrys L., Trifolium pratense L., Thalictrum aquilegiifolium L., Viola odorata L., Veronica spicata L.

The population of C. cirsoides in the Horozechka Tract is small, occupying the area of around 0.5 ha in the central part of the mountain, at 316 specimens. Plants grow singly and in small groups of 5–20 specimens/m².

The Simlyn Tract is located near Meduha village of Halych district of Ivano-Frankivsk region. The local population of C. cirsoides is confined to the meadows on flat interfluvies at the distance of 60 m from the Simlyn Forest which is included in the Halych National Nature Park. The site is completely surrounded by arable agricultural fields. The area of the site accounts for 13.4 ha. The vegetation is represented by formation of Brachypodietata pinnati with association Brachypodium pinnatum + Molinia caerulea (L.) A. DC, Elytrigia repens (L.) Nevski (20%). Projected area of the grass stand is 100%. The dominants are Brachypodium pinnatum (L.) P. Beauv (50%), co-dominants – Molinia caerulea (L.) Scholl., Elytrigia repens (L.) Nevski (20%). Projected area of C. cirsoides equals < 1%. The herbaceous layer comprises Adenophora lilifolia (L.) A. DC, Anthericum ramosum L., Betonica officinalis L., Campanula glomerata L., Centaurea sanguineum L., Chamaecytisus blockianus (Pawt.) Klask., Chenopodium album L., Filipendula vulgaris Moench, Galium verum L., Holcus lanatus L., Lembotropis nigricans (L.) Griseb., Lysimachia nummularia Aurea, Lilium martagon L., Origanum vulgare L., Polygonatum odoratum (Mill.) Druce, Rubus caesius L., Sanguisorba officinalis L., Solidago virgaurea L., Tanacetum vulgare L., Thalictrum aquilegiifolium L., Vicia cracca L., Veratrum nigrum L. The population of C. cirsoides in the Simlyn Tract is small (89 specimens), the plants grow singly and in small groups of 5–14 specimens/m² (Table).

The local population of C. cirsoides in the Brucheva Tract on the outskirts of Hohoniv village of Halych district is confined to the middle and the lower parts of the north-west slope of the hill. The soils are podzolized chernozems of up to 50 cm thickness, formed on limestones. Vegetation is represented by the formation of Brachypodietata pinnati which forms the association Brachypodium pinnatum + Sesleria caerulea. Projected area of the grass stand is 100%. The dominants are Brachypodium pinnatum (L.) P. Beauv (40%), co-dominants – Sesleria caerulea (L.) Ard. (50%). Projected area of C. cirsoides is < 1%. The herbaceous layer is composed of Achillea millefolium L., Anthericum ramosum L., Aster amellus L., Asperula odorata L., Betonica officinalis L., Bromopsis inermis (Leu.) Holub, Brista media L., Campanula glomerata L., Carex montana L., Carina vulgaris L., Centaurea scabiosa L., C. stricta Waldst. & Kit., Chamaecytisus blockianus (Pawt.) Klask., Coronilla varia L., Clematis recta L., Dactylis glomerata L., Euphorbia helioscopia L., Filipendula vulgaris Moench, Hieracium umbellatum L., Lilium martagon L., Medicago falcata L., Pyrethrum corymbosum (L.) Scop., Prunella grandiflora (L.) Scholl., Salvia verticillata L., Sanguisorba officinalis L., Sesleria haefleri Schur, Solidago virgaurea L., Tanacetum vulgare L., Teucrium chamaedrys L., Thalictrum minus L. In the Brucheva Tract, the population of C. cirsoides is small, comprising 33 individuals; the plants grow singly and in small groups of 6–14 individuals/m². (Table).

Fig. 2. Habitat of Carina cirsoides (= C. acutis caulescens) in Kasova Horá (Podolian Upland, Ivano-Frankivsk region, Halychy national natural park)
The Hora Hareva Tract of 9.6 ha area is located near Korostovychi village of Halych district of Ivano-Frankivsk region. Near the foothill, the herbaceous layer is represented by the formation of Brachypodietta pinnati with association between Brachypodium pinnatum and Festuca valesiaca. The projected area of herbaceous layer is 90%, and that of C. cirsioides < 1%. The dominants are Brachypodium pinnatum (L.) P. Beauv (50%) and Festuca valesiaca Gaudin (30%). The vegetation also includes Adonis vernalis L., Anthericum ramosum L., Asplenium ruta-muraria L., Bistorta officinalis L., Briza media L., Centaurea scabiosa L., Filipendula vulgaris Moench, Inula ensifolia L., Lathyrus vicicinicus (L.) Griseb., Polygonatum multiflorum L., Salvia verticillata L., Scabiosa ochroleuca L., Thalictrum minus L., Veronica officinalis Moench. The population of C. cirsioides in the Hora Hareva Tract is small, occupying the area of 100 m² in the central part of the mountain. It consists of 23.0% immature, 30.8% vegetative, and 46.2% generative individuals. The plants grow singly and in small groups of 6–13 individuals/m².

The Kamin Tract is located near Mezhlyhirtsi village of Halych district of Ivano-Frankivsk region. The northern slope (25° steep) is covered by meadow-steppe grass-forbs vegetation. The soils are podzolized chernozems. The vegetation is presented by formation of Brachypodietta pinnati with association Brachypodium pinnatum + Inula ensifolia. Projected area of the grass stand is 100%. The dominants are Brachypodium pinnatum (L.) P. Beauv (60%) and Inula ensifolia L. (30%). Projected area of C. cirsioides equals 5%. The herbaceous layer comprises Agrimonia eupatoria L., Anemone sylvestris L., Anthericum ramosum L., Aster amellus L., Asperula cynanchica L., Betonica officinalis L., Briza media L., Campanula glomerata L., Carex humilis Ley., Centaurea scabiosa L., C. rhaeta Boreae, Euphorbia cyparissias L., Eryngium campestre L., Filipendula vulgaris Moench, Galium verum L., Geranium sanguineum L., Iris germanica L., Iris xiphurensis Waldst. et Kit., Lotus corniculatus L., Medicago falcata L., Melampyrum nemorosum L., Origanum vulgare L., Paeonanemone oregesinum L., Plantago media L., Prunella grandiflora (L.) Scholl, Pulsatilla grandis Wender, Salsola verticillata L., Scabiosa ochroleuca L., Teucrium chamaedrys L. Because forbs, particularly grasses, have significantly overgrown the slopes of the mountain, rare species, particularly C. cirsioides, may soon vanish. The population of C. cirsioides in the Kamin Tract is small, with around 136 individuals counted. The plants grow singly and in small groups of 5–12 individuals/m².

The Adamove Zaimytsky Tract is located in the lands of Radoshiv village of the Council of Iziaslav district of Khmelnytska region, near Plishchyn village of Shepetivskyi district of Khmelnytskyi region. The area accounts for 7.5 ha. The soils are sod-podzolized, loamy-sandy.

The growing location is confined to the ecotone between oak-hornbeam forest and meadows in the valley of the ravine. At the edge of the forest, Betula verrucosa Ehrh grows, young undergrowth of which is massively invading the neighbouring meadows. There are separate trees between Byshiv village of Halych district of Ivano-Frankivsk region, Zaimysko Tract is small, only 62 individuals of this species were counted. The plants grow singly, with association Carex cirsioides – Betonica officinalis – Carex hirta – Campanula persicifolia – Centaurea jacca – Cinemigphi europeae – Corverallia najalis – Crepis biennis – Dactylis glomerata – Dentaria bulbifera – Fragraea vernu – (L.) Crantz, Galiurn odoratum – (L.) Scop., Geum rivale – Geranium palustre – Helianthemum nummularinum – (L.) Mill., Lathyrus vernus – (L.) Bernh., Lysimachia nummularia – Aurea, Primula saxifraga – Polygonatum multiflorum (L.) All., Potentilla alba – P. erecta – (L.) Raenex, Primula veris – L., Serratula tinctoria – Sacciosa inflexa – (Kulak) G. Beck, Tanacetum vulgare – Thalictrum aquilegifo- folium – T. sylvestre – Trifolium rubens – V. atratum nigrum – Carlines cirsioides – Kloxov. The population of C. cirsioides in the Adamove Zaimytsky Tract is small, only 62 individuals of this species were found. Spectra of ontogenetic stages of surveyed populations of C. cirsioides are presented in the Table (Table).

**Table**

| Location | Formations | Area, m² | Total number | Spectra of ontogenetic stages | j | v | g |
|----------|------------|----------|--------------|-------------------------------|---|---|---|
| Mohyla Mountain (outskirts of Hutysko village, Berezhany district, Ternopil region) | Carexetum humilis, Bromopsis inermis | 20000 | 150 | 13 | 8.6 | 25 | 16.7 | 79 | 52.7 | 33 | 22.0 |
| Syropu Mountain (outskirts of Chervone village, Zolochiv district, Liviv region) | Festuca valesiacae, Helictotrichonemus desertorum, Inula ensifoliae | 100 | 25 | 3 | 12.0 | 7 | 28.0 | 8 | 32 | 7 | 28.0 |
| Kasova Mountain Tract (outskirts of Bohovshiv village, Halych district, Ivano-Frankivsk region) | Brachypodietta pinnati | 15000 | 967 | 94 | 9.7 | 79 | 8.2 | 278 | 28.7 | 516 | 53.4 |
| Hora Hareva Tract (near Korostovychi village, Halych district, Ivano-Frankivsk region) | Brachypodietta pinnati | 100 | 65 | 0 | 15 | 23.0 | 20 | 30.8 | 30 | 46.2 |
| Karnin Tract (near Mezhlyhirtsi village, Halych district, Ivano-Frankivsk region) | Brachypodietta pinnati | 345 | 138 | 0 | 13 | 9.4 | 29 | 21.0 | 96 | 69.6 |
| Horozhanka Tract (between Byshiv village of Halych district of Ivano-Frankivsk region and Horozhanka village of Pidhutisa district, Ternopil region) | Festuca rubrae | 200 | 316 | 2 | 0.6 | 4 | 1.3 | 26 | 8.2 | 284 | 89.9 |
| Simlych Tract (outskirts of Moduhu village, Halych district, Ivano-Frankivsk region) | Brachypodietta pinnati | 13400 | 89 | 0 | 4 | 4.5 | 14 | 15.7 | 71 | 79.8 |
| Brachove Tract (outskirts of Holoniv village, Halych district, Ivano-Frankivsk region) | Brachypodietta pinnati | 300 | 33 | 0 | 0 | 5 | 15.2 | 28 | 84.8 |
| Makita Mountain (outskirts of Budychno village, Brody district, Liviv region) | Carexetum humilis | 8 | 3 | 0 | 0 | 0 | 1 | 33.3 | 2 | 66.7 |
| Holokhira Tract (Sinka village, Zolochiv district, Liviv region) | Elytrolepia intermedia | 150 | 627 | 0 | 122 | 19.5 | 135 | 21.5 | 370 | 59.0 |
| Adamovce Zaimytsky Tract (outskirts of Pleshchyn village, Shepetivskyi district, Khmelnytskyi region) | Dactylorhiza glomerata | 50 | 62 | 0 | 2 | 3.2 | 10 | 16.1 | 50 | 80.7 |
| Chortova mountain (between villages Pukiv and Babrynts, Rohatyn district, Ivano-Frankivsk region) | Brachypodietta pinnati, Carexetum humilis | 50000 | 1000 | 40 | 4.0 | 248 | 24.8 | 562 | 56.2 | 150 | 15.0 |
| Horodyntsi Tovtry Park (outskirts of Horodokan village, Pidholochynskyi district, Ternopil region) | Brachypodietta pinnati, Elytrolepia repens | 10000 | 580 | 21 | 3.6 | 124 | 21.4 | 81 | 14.0 | 354 | 61.0 |
| Pid Konem Tract (Nosivka village, Pidhutisa district, Ternopil region) | Brachypodietta pinnati | 10000 | 35 | 2 | 5.7 | 10 | 28.6 | 11 | 31.4 | 12 | 34.3 |
| Zarvanysia mountain (outskirts of Zarvanysia village, Zolochiv district, Ternopil region) | Brachypodietta pinnati, Molinietum caeruleae | 20000 | 1000 | 21 | 2.1 | 121 | 12.1 | 46 | 4.6 | 812 | 81.2 |
We provide a generalized list of communities with *C. cirsioides*:

**Formation Cariceta humilis**
- Associations: *Carex humilis* + *Bromopsis inermis*;
- *Carex humilis* + *Thalictrum foetidum*;
- *Carex humilis* + *Anthericum ramosum*.

**Formation Bromopsideta inermis**
- Association: *Bromopsis inermis* + *Carex humilis*.

**Formation Festuceta valesiacaee**
- Associations: *Festuca valesiaca* + *Inula ensifolia*;
- *Festuca valesiaca* + *Helictotrichon desertorum*.

**Formation Festuceta rubrae**
- Association: *Festuca rubra* + *Elytrigia repens* + *Filipendula vulgaris*.

**Formation Anthericeta ramosi**
- Associations: *Anthericum ramosum* + *Carex humilis*;
- *Anthericum ramosum* + *Bromopsis inermis*;
- *Anthericum ramosum* + *Brachypodium pinnatum*.

**Formation Elytrigieta intermediae**
- Association: *Elytrigia intermedia* + *Inula ensifolia*.

**Formation Elytrigieta repentis**
- Association: *Elytrigia repens* + *Melamphyrum arvense*.

**Formation Brachypodieta pinnati**
- Associations: *Brachypodium pinnatum* + *Carex humilis*;
- *Brachypodium pinnatum* + *Anthericum ramosum*;
- *Brachypodium pinnatum* + *Festuca valesiaca*;
- *Brachypodium pinnatum* + *Inula ensifolia*;
- *Brachypodium pinnatum* + *Molinia caerulea* + *Elytrigia repens*;
- *Brachypodium pinnatum* + *Sesleria caerulea*;
- *Brachypodium pinnatum* + *Poa pratensis*;
- *Brachypodium pinnatum* + *Elytrigia intermedia*.

In the Polissia *C. cirsioides* grows in thinned-out open broad-leaved and mixed forests, and around them.

**Discussion**

*Carlina cirsioides* Klok. was described by Klokov (1954) using a herbarium sample collected by A. H. Rakochy in 1901 from the outskirts of Bilychi village near Kyiv (the sample is stored in the Komarov Botanical Institute of the Russian Academy of Sciences in Saint Petersburg). According to the first description by Klokov (1954) and his description in “The Flora of USSR” (Klokov, 1962), *C. cirsioides* is monocarpic, biennial plant, endemic and relic plant of the Ukrainian flora. Its root system is represented by a strong central root which goes 30–40 cm deep. The stems are singular, around 5–55 cm (up to 1 m) long, usually well-developed, rarely shortened, erect, regular, spiny-woolly, thin felt-like until bloom, dirty-purple under the indumenta, with one large petiole. The leaves are arranged into basal rosette and are located along the stem, light-green, hard, petiolate, with brownish dirty purple, the petiole which is only slightly enlarged at the base and three times shorter than the lamina, with no spines on the margins, elongated-elliptic to elliptic on the outline, of around 11–45 cm long and 7–15 cm wide, notably woolly on both sides during bloom, quite densely woolly to sparsely woolly at a young age; there are 4–10 pairs of lateral segments of leaf lobes, about 10–68 mm long and 6–50 mm wide, pinnate and partly separated, with elongated-lanceolate spiny lobes, serrated (together with the apical part) on the margins.

The capitulum is about 4–5 cm long (with simple inner leaves of the involucre) and about 9–13 cm in diameter with outward bent horizontal leaves, the capitulum disk (without leaves) is 4.0–7.5 cm in diameter; the upper leaves which support the capitulum partly resemble the basal and stem ones, up to 20 cm long and 9 cm wide, but mostly smaller, with broad petioles and feathery-ramified spines below the middle, transitional in shape and sizes to leaves of the involucre of the outer row; the latter are sessile, with ramified spines on the sides, slightly enlarged or narrowed on the apices, spine-sharpened, in general elongated on the outline, 14–50 mm long, 7–15 mm wide, mostly dark brown; their spines are divided into 2–8 parts; the middle leaves are ovoid or narrow lance, 11–25 mm long and 2.5–5.0 mm wide (at the base), thinly sharpened, brownish on the outer side, notably woolly, the broader and shorter of these leaves above the middle have notable dense spines on the sides; the inner leaves are linear or narrow linear, 33–37 mm long and 2–5 mm wide; slightly broadened on the sides above the middle, glossy and yellowish in this region; brownish-dark purple below the middle on the outer side, almost the same on the inner side as above, sharpened at the apices; the corollas are oblong, 3.8–6.0 mm long, 1.5–2.0 mm wide, dark grey, densely hairy, with a circle of up to 2.5 mm long hairs at the apex, the pappus is 14–17 mm long and its hairs are stuck together in bundles of 5–7.

Fig. 3. *Carlina acaulis acaulis*
Klokov (1954) summarizes the analysis of morphological traits of *C. cirsioides* as a new species by noting that “our species is notably different from *Carlina acaulis* L., except for distinct developed stems, other shape of leaves and more distinguished indumenta on them, and also much finer capitula”.

Are there enough such small traits to identify a new species? – Obviously not. Therefore, it is not by chance that this taxon has not been identified as a separate in the monographs on *Carlina* (Meusel & Kästner, 1994). While not recognizing the species *C. cirsioides*, they identified specimens with distinct stems to subspecies *C. acaulis* ssp. *caulescens* (Lam.) Schirher et Martens. Unlike the stemless or short-stemmed subspecies *C. acaulis acaulis* (Fig. 3), *C. acaulis caulescens* (Fig. 4) is a plant composed of well developed flower-bearing shoots of 20–40 (up to 90) cm height, with no leaves or with pre-stem leaves. Unlike *C. acaulis acaulis*, distributed in the mountains of Europe (Pyrenees, Alpennine Moun-
tains, Balkans, Alps, the Carpathias), *C. acaulis caulescens* grows not only in mountains, but also in the lowlands of Europe. Therefore, in the Herzynian massifs of Europe, this subspecies is distributed in the Bourgogne Upland, the Rhenish Massif, Thuringian Forest (Meusel & Kästner, 1994).

The author of description of *Carlina* species in “Flora Europaea” (Webb, 1976) also distinguishes two subspecies of *C. acaulis*. *C. acaulis caulescens* in sense of the monographs on the genus *Carlina* corresponds to subspecies *C. acaulis simplex* (Waldst. et Kit) Nyman, with ramified or regular stems. He did not recognize the species independence of *Carlina cirsioides*.

Hegi (1987) distinguishes two subspecies of *C. acaulis*, and within subspecies *C. acaulis acaulis*, he distinguishes form var. *caulescens* Lam., which is distinct by developed stems of up to 30 cm long and the rosette of leaves located around the inflorescence. Another subspecies of this spe-
cies, *Carlina acaulis aggreta* Waldst. et Kit (= *C. acaulis simplex* (Waldst. et Kit), has developed stems and no rosette around the inflorescence.

In the flora of Romania (Nyarady, 1964), three forms of *C. acaulis* are described: typical var. *typical* Beek – stemless or short-stemmed plant with a rosette of leaves; var. *alpinae* Beek. l.c. (var. caulisfigera Bauneg.) – with developed 10–40 (50) cm stems and rosette of leaves around the capitulum; var. *agregata* W. et K. – with developed stems and singular leaves on them. In Poland, *C. acaulis* is common in mountain regions (Carpathians, Sudetes), and also in Malopolska Upland. In other lowland territories (Wielkopolska, Kujawy, Masurian Lake district, Pomerania) it occurs rarely. At the same time the populations are represented mostly by subspecies *C. acaulis caulescens* (Wasilowska & Wolkowski, 2009).

The review we provided indicates that *C. acaulis* is a complex syn-
gameon composed of mostly highland stemless or short-stemmed sub-
pecies *C. acaulis acaulis* and mostly lowland subspecies *C. acaulis cau-
lescens*. Morphological traits of the species *C. cirsioides* described by
Klokov completely coincide with the traits of the latter subspecies. The analysis of herbarium samples of *C. cirsioides* kept in the Herbarium of the M. G. Kholodny Institute of Botany of the National Academy of Sciences of Ukraine showed that there are plants both having well-
developed stems with rosettes of leaves around the inflorescences or with-
out them, and stemless plants.

The folders under the name “*Carlina acaulis*” in the Herbarium of the M. G. Kholodny Institute of Botany of the National Academy of Sciences of Ukraine, along with stemless and short-stemmed plants also contain plants with well-developed stems which morphologically do not differ from the samples stored in the folders titled “*C. cirsioides*”. The difference between them is in botanical distribution. The first were collected in the Carpathians, whereas the latter come from the plains part of Ukraine. Therefore, a logical question is why highland plants are identified to *C. acaulis*, while the lowland plants to *C. cirsioides*. It would be worth rejecting the species name *C. cirsioides* and use the priority name *C. acaulis* for plants from the entire territory of Ukraine. By the way, all the sam-

Fig. 4. *Carlina cirsioides* (= C. acaulis caulescens)

ple of the plants initially collected in the lowlands, starting from the col-
cections of Montrezor (1898), were identified as *C. cirsioides*.

the International Red Lists (European..., 1991), it is acceptable to use
this name as *C. acaulis* synonym. Klokov (1954; 1962) describing the new species *C. cirsioides*, identifies it to biennial monocarpic plants. Fol-
owing Klokov, this species was related to monocarpic by Shishkin & Bobrov (1962), Belousova et al. (1979) and other authors. Based on the observations on the plant in the conditions of nature and cultivation, Zelenchuk (1987) came to a conclusion that *C. cirsioides* is perennial polycarpic plant. Our multi-years monitoring of growth and development of this species in the natural and cultivation conditions confirms this point of view.

The data provided above do not allow the population of the lowland part of Ukraine to be identified as a separate species *C. cirsioides*. According to all morphological traits it is *C. acaulis*. Therefore, the statement of Klokov (1962) that *C. cirsioides* is a separate species, endemic and relic plant of the flora of Ukraine is erroneous. Neither has the relic nature of it been confirmed by phytogeographical data. There are no relic-characteristic types of disjunct distribution in the range of this “species”.

The Ukrainian lowland populations adjoin directly to the Carpathian part of the range of *C. acaulis* and plains populations of this species in Poland. In general, *C. acaulis* is a Central European species, the range of which mostly includes mountain regions of Europe (Pyrenees, Alps, Apennine Mountains, Jura Mountains, Balcan, Carpathias and the neighbouring plains of the Hercynian massifs of Europe (Bourgogne Upland, the Rhenish Massif, Thuringian Forest), Poland (Pomerania, Masurian Lake district, Wielkopolska, Kujawy, Malopolska Upland) and Ukraine (Volynian-Podolian Upland and the Polesian Lowland).

In Ukraine *C. acaulis* is chiefly distributed in the Carpathians (Fig. 5), and plains (Fig. 1), this species grows near the north-east border of its range and is quite rare. Its range border runs along the edge of the Polesian Lowland near Derazhne village of Kostopil district of Rivne region, Zhytomyr, Kyiv and Brovary, from where it makes a turn toward the south, passing near Berdychiv, Vinnytsya, Khmelnytskyy, and Pidvolochysk.

According to the data of Klokov (1962), the new species of the *Carlina* genus which he described, grows in thinned-out forests, dry meadows and steppe slopes. Our detailed analysis of it habitat revealed that in the Podolia it is confined mostly to meadow steppes on the slopes of the buttes of south, west and east exposition, where it grows in calcimophily herbaceous communities with domination of *Molinia caerulea* (*Festuco-Brometea* class, and much rarer the mountain habitats of *Carlina acaulis* acaulis). In the plains of Ukraine, *C. acaulis* is a component of communities formed by *Festuca ovina* L., *Brachypodium pinnatum* L., *Brachypodium pinnatum* + *Carex humilis*, *Brachypodium pinnatum* + *Anthericum ramosum*, *Brachypodium pinnatum* + *Inula ensifolia* (*Carex-Festucetum umilis*), *Brachypodium pinnatum* + *Bromopsis inermis* (*Brachypodium pinnatum* + *Bromopsis inermis*), *Brachypodium pinnatum* + *Elytrigia intermedia* + *Inula ensifolia* (*Brachypodium pinnatum* + *Elytrigia intermedia* + *Inula ensifolia*), *Brachypodium pinnatum* + *Carex humilis* (*Festuco-Brometea* class and meadow-forest ecotones). Therefore, in the plains of Ukraine, *C. acaulis* is mostly a component of the forest communities of *Eriko-Pinetea* class and meadow-forest ecotones.

Mountain habitats of *C. acaulis* significantly differ from the plains ones. In the Carpathians, *C. acaulis* is a component of mountain meadows, confined to warm slopes covered with dense peat formations of matgrass *Nardus stricta*, wood small-reed *Calamagrostis epigejos* and bonfire grasses, reaching the altitude of 2,000 m (Malynovsky, 1980).

Simular habitats are in Alps, where it grows in subalpine meadow with dominated *Bromus erectus* Huds., *Nardus stricta* L., *Festuca valesiaca* Gaudin (Hegi, 1987).

In Sudetes, *C. acaulis* grows in mountain pastures and is a component of of the plant community Molino-Arthenathereta class (Nadolna, 2013).

In the lowland regions of the Central Europe, the habitats of *C. acaulis* are very different from the mountain ones. There, the species is confined mostly to xerophilous herbaceous communities on calcium-rich soils. Such communities are reported for the Vosges, Schwarzwald, Bavarian Forest, Swabian Alb, Swabian-Bavarian Plateau (Messel & Kastner, 1994).

In North-West Germany, *C. acaulis* is a component of the xerotherm calciphilous herbaceous communities with domination of *Brachypodium pinnatum* (L.) P. Beauv., *Festuca valesiaca*, *Bromus erectus* Huds., and participation of *Cirsium arvense*, *Carlina vulgaris* L., *Gentianella ciliata*. Together with *Brachypodium pinnatum* (L.) P. Beauv., *C. acaulis* grows in the Württemberg Lowland (Ellenberg, 2009).

In the Thuringian Basin, *C. acaulis* grows on calcium-rich soils and is a component of communities formed by *Bromus erectus* Huds., *Sesleria caerulea* (L.) Ard., *Festuca ovina* L. with participation of *Pulsatilla vulgaris* Mill., *Gentiana cruciata* L., *Bupleurum falcatum*, *Laserpitium latifolium* L. (Hegi, 1987). In the lowland regions of Poland in the valleys
of the Vistula, the Lower Odra, Małopolska Upland (Kielec-Sandomierz Upland), Lublin Upland Kraków Upland, locations with *C. acaulis* include steep slopes of the river valleys, outcrops of rocks in xerothermic meadows. In the North-East Poland, *C. acaulis* grows in pine forests (Wasławowska & Wólcowski, 2009).

Comparison of ecological-coenotic conditions of habitats of *C. acaulis* revealed significant differences between plains and mountain ecotopes. In the Carpathians and Alps, this species is a component of mountain meadows, while in the plains regions of Europe it is confined mostly to meadow steppes in the east of the range and xerothermal herbaceous communities in the western part. These communities are floristically close and confined to calcium-rich soils. Forest communities with *C. acaulis* in the Polesian Lowland are close to the adjacent ecotopes of the North-East Poland. Thus, ecological-coenotic habitat conditions of the plains part of Ukraine are not specific, and rather are typical for all the plains part of the range of *C. acaulis*.

In general, the data on morphology, chorology and phytocoenology do not allow us to consider *C. cirsioides* described by Klokov a separate species, endemic and relic plant of the Flora of Ukraine. Plains localities of this “species” in Ukraine may conditionally be considered geographic population of *C. acaulis*. Identification of this population to *C. acaulis* does not in any way reduce its phytosozological value at all, the reason being that xerothermal meadow communities involving *C. acaulis* are rare in plains throughout Europe and this species has been included in the lists of species which need protection in France and Poland (Boron et al., 2019; Strzemski et al., 2019).

Analysis of the abundance of the population of *C. acaulis* in the plain part of its range in Ukraine showed that near the eastern border of the range this species is extremely rare. A count of the number of specimens in populations of *C. acaulis* in the Podolian Upland (Table) revealed that they comprise 3 to 2,000 individuals. The population was the lowest on the Makitma Mountain (Livr region) – only three specimens. In five of 14 surveyed populations, there are several dozens of specimens – 25 to 90, or several hundreds of specimens – 135 to 630 specimens (Table). And only in two local populations – on the Chortova Mountain in Ivano-Frankivsk region and the Zarvanytsia Mountain in Ternopil region, did the population accounts for around 1,000 specimens in each (Table). Therefore, the abundance of the populations is extremely low. Average density of populations equaled 3–3.5 specimens/m², maximal – 20 specimens/m².

The data we obtained correlate with the materials of accounts of populations of this species conducted in the Burushyn Opallia (Ivano-Frankivsk region) in 2009–2011 by Dmytrash, Shumska (2011). The number of specimens from nine populations they surveyed was 25 to 5,000 specimens. Outside the Podolian Upland, on the border of the Polesian Lowland, only singular individuals of *C. acaulis* were found.

*C. cirsioides (=C. acaulis)* within Volhynia-Podillia was noted by high parameters of seed productivity. According to the data of Zelenchuk (1987), the actual seed productivity of this species accounted for 270 seeds per individual, the seed yield from area of 25 m² was 8,800 seeds, and the seed germination rate equaled 70–80%.

In the conditions of good seeding of the habitats, dense herbaceous cover with dominance of grasses is an obstruction to seeds, preventing them from entering the mineral part of soil. Therefore, in germination-favourable conditions, only a small portion of seeds is introduced to the soil. The parameter of dying of seedlings is fairly high, related to deficiency of moisture in the soil during summer. A total of 42–50% seedlings die (Zelenchuk & Zelenchuk, 1987).

Moderate cattle grazing (animals break up the turf with their hooves) would obviously have helped the seeds to enter the mineral part of soil, where conditions for growth and development of sprouts are optimum. Thus, grazing cattle would provide the conditions of intensive replenishment of populations with new generations of individuals.

Significant damage to populations of *C. acaulis* near the Eastern border of the range is caused by preparation of medicinal raw materials from its herbs. This species is used in both official and folk medicine, especially in Germany and Poland (Link et al., 2014; Strzemski et al., 2019).

In general, populations of *C. acaulis* near the eastern border of its range in Volhynia-Podillia are mainly homeostatic (Table), indicating that ecolotypic conditions of meadow steppes which cover the slopes of the buttes meet the ecological needs of *C. acaulis*. Beyond the borders of the existing localities, there is not a sufficient amount of ecotopes favourable for the development of invasive populations, though the seeds there are easily distributed to large distances. In Vohlynia-Podilla, there was found one invasive population on the Makitma Mountain (Livr region), consisting of only three specimens. As mentioned above, in the Polesian Lowland, only single individuals of this species occur.

Populations of *C. cirsioides (=C. acaulis)* have sufficient protection in the plains of Ukraine. They are protected in the Halysky National Nature Park (Ivano-Frankivsk region), in Medobory Nature Reserve (Temtropil region), Botanical monuments of the National Importance: Lyza Hora Mountain and Sypuhu Mountain (Livr region), Chortova and Kasova Mountains (Ivano-Frankivsk region), Botanical Reserve of Local Significance Mohyla Mountain and the Kurylyha Mountain (Temtropil region), in the Adamove Zaimyisko Tract (Khmelnytskyi region).

Following our scientific recommendations, a botanical reserve Kurylyha Mountain was created in Temtropil region. Taking into account the high phytosozological value of *C. acaulis* near the eastern border of the range, in the future all populations of this species in Volhynia-Podillia and Polisia should be taken under protection.

**Conclusions**

*Carlina cirsioides* Klokov (Asteraceae), a well-known endemic plant of the Flora of Ukraine, is actually not an endemic of our Flora. Comparative-morphological and geographical analyses revealed that the populations of this “species” are identified to *Carlina acaulis* L. and have no significant differences from the populations in the plains regions of Central Europe which belong to subspecies *C. acaulis* candidescens. Diagnostic traits according to which *cirsioides* was described are so insufficient that they provide no reasons for distinguishing it as a species different from *C. acaulis*.

Identification of populations from Volhynia-Podillia and Polisia to relic plants of the Flora of Ukraine is erroneous because they are not separate and directly adjoin to the Carpathian part of the range of *C. acaulis* and its populations in Poland.

Ecological-coenotic conditions of habitats of *C. acaulis* in the plains of Ukraine are different from the Carpathian ecotopes and close to plains regions of Central Europe. Meadow steppe formations of *Brachypodietea pinnati*, *Bromopsideta inermis*, *Cariceta humilis*, *Festuceta valesiacae*, including *C. acaulis*, in Volhynia-Podillia, according to ecological-coenotic conditions and floristic composition, are close to xerothermal herbaceous communities of Central Europe, and open pine and mixed forests are habitats of *C. acaulis* in Ukraine and North-East Poland.

Analysis of age structure of populations of *C. acaulis* in the plains of Ukraine revealed that most of them are homeostatic with right-sided spectra of ontogenetic states. A minimum was seen in juvenile and immature specimens, which is related to obstructions for seeds to enter the mineral soil due to the high level of development peat and significant rate of death of sprouts under the dense herbaceous layer. The share of invasive populations is small due to absence of favourable ecological-coenotic conditions outside the existing localities of *C. acaulis*.

Despite the removal of separate species status of the population in the plains of Ukraine due to the correction of their identification from endemic species *C. cirsioides* to the broadly-distributed European species *C. acaulis*, their phytosozological importance remained unchanged.

*C. acaulis* is rare in the Ukrainian plains because of its narrow ecological amplitude and negative anthropogenic impact on habitats and populations (forestation of slopes, collection of plants as medicinal raw material and bouquets). To protect the gene fund of *C. acaulis*, all populations of *C. acaulis* near the eastern border of the range of the species should be taken under protection.

**References**

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