

Photo Story

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Spring brings hope to the Ukrainian steppes

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The steppe zone covers the southern-east part of Ukraine with about 40% of the total country area (Korotchenko & Peregrym 2012). If we count the forest-steppe as part of the steppe biome (Loidi et al. 2022), then the steppes occupy the vast majority of the territory of Ukraine. However, the steppes are also one of the most transformed ecosystems in Ukraine (Korotchenko & Peregrym 2012), so nowadays real steppe grasslands can be seen in very few places, while most steppe lands are turned into arable lands.

The steppe zone is characterized by a continental climate, which means cold winters and hot dry summers. In the short interval between these harsh periods, the magical steppe spring comes. It begins with the very first shy sprouts and buds of early spring geophytes, which appear at the end of February and March and, later in April, gain strength and turn into bright carpets. The earliest among them are bulb-forming geophytes, such as *Colchicum bulbocodium*, *Crocus reticulatus*, *Gagea bohemica*, *Tulipa schrenkii* and *T. sylvestris* subsp. *australis*. Almost all early spring steppe geophytes are protected by the Red Data Book of Ukraine

(Didukh 2009) or Regional Red Lists of Rare Plants (Andrienko & Peregrym 2012). Less visible but very numerous are the spring therophytes that occupy the spaces between the tussocks of grasses and the bunches of herbs. Steppe annuals bloom in March and April, and in May, after fruiting, they already dry up. At the end of April and in May, the steppe changes. It becomes covered with a fluffy sea of silver feathergrasses and colourful forbs. According to the Euro+Med PlantBase, there are 22 species and five subspecies of *Stipa* genus known in Ukraine. Among them, *Stipa capillata*, *S. lessingiana*, *S. pulcherrima* and *S. ucrainica* are the most common in the steppe zone.

Pronounced interannual fluctuations are among the characteristic features of steppe vegetation, which depends on the amount of precipitation. Even perennial species may not vegetate every year, waiting for more favourable conditions. Geophytes are specially adapted to such long waiting periods since they have nutrient reserves in bulbs, corms, rhizomes, or taproots. Grasses and forbs can significantly change the projective cover of green biomass in different

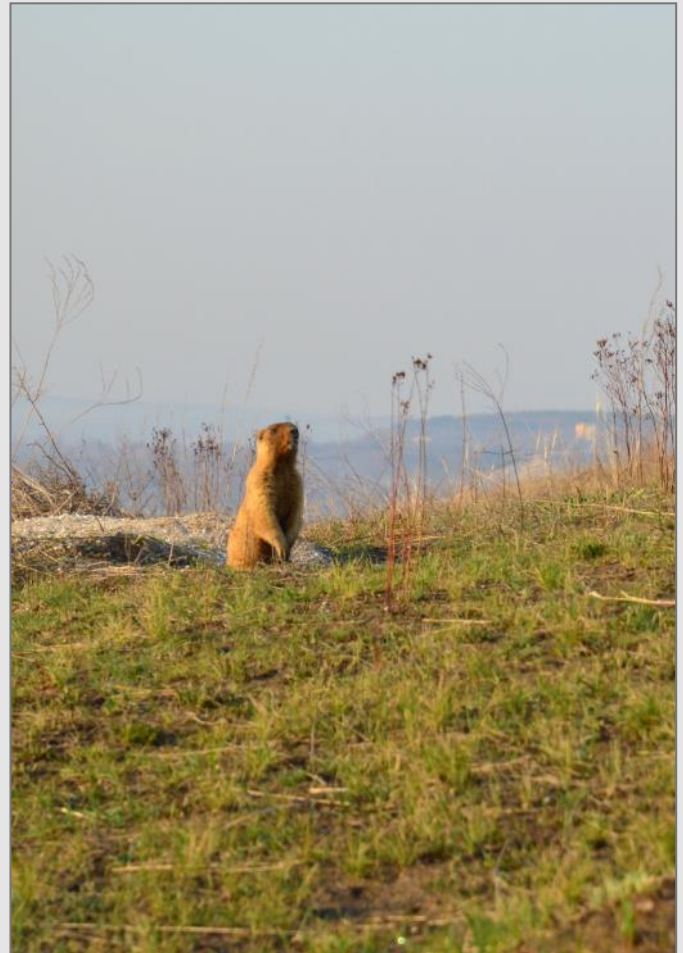


Tulipa sylvestris subsp. *australis* and *Muscari neglectum* in bunchgrass steppe, Mykolaiv Region.

years as a reaction to environmental conditions. Annuals wait for long periods in the form of seeds, which quickly develop when favourable times come. Therefore, every spring in the steppe is different. The flowering of plants begins at different times, and has different intensity, while some species can be seen not every year.

Today, I invite you to a bright journey through the steppe spring in Ukraine. These fascinating sights attract many naturalists and scientists. Be careful though! After one visit to the steppe in spring, it is difficult to stop and not come again and again.

My first visit to the steppes took place a long time ago, as I was born in the steppe zone. Therefore, many of my childhood memories are related to the steppes. My family had a summer house (so-called "dacha") in the floodplain of the Bila River near Luhansk City. Steep slopes covered by steppes and chalk outcrops rose above the summer cottages, and we traditionally visited them throughout the year. The spring started when we caught the first warm sunshine and admired the blooming flowers of *Adonis vernalis* (Ukrainian: 'горицвіт' – 'horytsvit') and *Paeonia tenuifolia* (Ukrainian: 'півонія' – 'pivoniia', or 'воронець' – 'voronets'). In May, we walked in the fluffy feathergrasses (*Stipa* spp.) and ran away frightened by the steppe vipers (*Vipera renardi*). In summer time, we came to watch late sunsets and breathed in the hot spicy steppe aroma of chalk thyme (*Thymus calcareus*) and wormwoods (*Artemisia* spp.). In autumn, we sat on the still warm ground and looked into the clear autumn air at distant coal mines, waste dumps and endless agricultural fields on the horizon. Finally, in winter, when our slopes were covered with snow, we sledged and then warmed up near the wood stove in the house.



Marmota bobak, known as the bobak marmot or steppe marmot, wakes up from a long winter sleep and announces spring with its thin whistles.



First flowers of *Iris pumila*.

The summer cottage of my family existed long before I was born. Next to the house, there was a huge plant of *Adonis vologensis* growing. As my mother told me, this plant was older than her. It was already existing back in the times when my grandfather started to build the house with his own hands and when this place was still part of the steppe slope. My grandparents decided to leave the steppe *Adonis* plant growing near the house. Then it grew in width vegetatively for dozens of years and I remember it being so huge that my kid arms would not have been enough to embrace it. The *Adonis* plant announced the arrival of spring with its bright yellow flowers, visible from far distance when you come. The plant confirmed its Ukrainian name – ‘horytsvit’ literally means ‘flaming flower’, and in the rays of the sun, the yellow petals of numerous flowers looked indeed burning brightly.



Flowering *Adonis vologensis*.



Bright flaming flowers of *Adonis vernalis*.



Colchicum bulbocodium subsp. *versicolor* – one of the first flowers in Ukrainian steppes, which start blooming in February or at the beginning of March.

So, after each year passed, the new springs of my youth were steadily bringing warmth and flowers of hope. When you get used to something, you do not believe it could change. But in 2014, this land became an occupied territory, ruled by undeclared Russian tanks. Since then, I have never returned to the steppe slopes of my childhood again.

However, every year I still visited steppes in spring – from the seashores in Odesa, Kherson and Zaporizhzhia Regions to forest-steppe landscapes of Kyiv and Cherkasy Regions, from Mariupol in the east to Dnipro Upland in Central Ukraine, and Podilla in the west. Who knows if this way, I was catching my dream steppe spring from childhood?



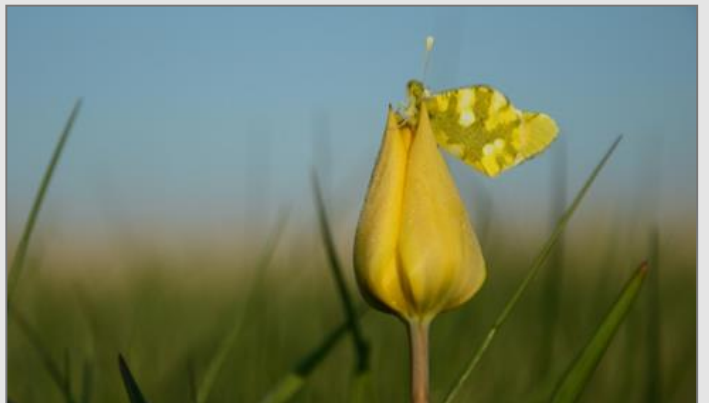
Pulsatilla pratensis with an unusual pale pink colour of petals. Cherkasy Region, central Ukraine.



Colour gradients of the spring steppe flowers: from blue-violet *Muscari neglectum*, through light blue *Hyacinthella leucophaea*, and to white *Ornithogalum kochii*.

Wild tulip *Tulipa suaveolens* (also known as *T. gesneriana*, or *T. schrenkii*) is a fascinating flower of the spring steppe. This species is considered a wild ancestor of cultivated tulips. One of the places where the history of tulip cultivation began was the territory of modern Ukraine, namely Crimea. According to the historical records, in the 16th century,

300,000 tulip bulbs were collected in the vicinity of the town of Kefe (now Feodosia) and sent across the Black Sea to Istanbul, where they were planted in the gardens of the Topkapi Palace during the reign of Sultan Selim II (Peregrym et al. 2009). Those tulips were named "Kefe Lâlesi", which means Kefe tulip.



Wild tulips *Tulipa suaveolens* in the steppes along Syvash Lake between Kherson Region and Crimea.



Colourful fields of *Iris pumila* occur in Ukrainian steppes across all regions. The flowers of this plant can be of different colors and shades, among which the most common are blue, purple and yellow.



Tiny flowers of the spring steppe: *Gagea bulbifera*, *Cerastium pseudobulgaricum*, *Alyssum turkestanicum*.



Orchids are rarely found in the steppe zone. One of them is *Anacamptis morio*, which can form large orchid fields with other species of *Orchidaceae* on the sands in southern Ukraine.



Violet and pink colours in spring steppes: *Iris pontica*, *Prunus tenella*, *Clematis integrifolia*.



Yellow and white in spring steppes: *Tulipa sylvestris* subsp. *australis*, *Viola tricolor* subsp. *matutina*, *Ornithogalum melanolicum*.



Bright yellow *Gagea bohemica* and tiny white *Draba verna* in rocky grasslands in Mykolaiv Region.

Thermophilous steppe forests and shrubs of steppe zone are also rich in bright flowers. Such forests are called "bairak" in Ukraine and are spread mainly on the slopes of

river valleys and in ravines. The bairak forests consist mainly of oak (*Quercus robur*), ash (*Fraxinus excelsior*), maple (*Acer campestre*, *A. tataricum*) and lime (*Tilia cordata*) trees.



Spring flowers of steppe forests and shrubs: *Ornithogalum boucheanum*, *Primula veris*, *Convallaria majalis*, *Viola suavis*, *Corydalis solida*, *Fritillaria ruthenica*.

Not only plants but also the entire landscape of the steppe in spring has a special appearance and changes every month. It starts with grey and brown colours in the early spring. Then, it changes from the appearance of splashes of

bright flowers to the development of a green carpet of grasses. Finally, the steppe is covered with feather grasses and various forbs at the end of spring.



Early spring in Chalk Flora Nature Reserve, Donetsk Region.



Early spring steppe flowers: *Crocus reticulatus*, *Draba podolica*.



Adonis vernalis among dry grasses, early spring in Mykolaiv Region.



Flowering *Iris pumila* and *Valeriana tuberosa* in steppes along Azov Sea coast, Meotyda National Nature Park.



Fruiting *Pulsatilla pratensis* in rocky steppe, Mykolaiv Region.



Spring in Podilski Tovtry National Nature Park, Khmelnytskyi Region.



Salvia nutans and *Carduus nutans* in feathergrass steppe, Kamianska Sich National Nature Park, Kherson Region.



Late spring in the southern bunchgrass steppe, Mykolaiv Region. The expanses of the southern steppes give a feeling of freedom and the opportunity to imagine the endless steppes of the past times.

Spring is the best time to visit the Ukrainian steppes, but more and more areas of the steppes have become inaccessible over the last decade. Russian invasion in Ukraine began in 2014 from two steppe regions, namely Crimea and Donbas. With the full-scale Russian aggression started in 2022, most of the steppe zone has been affected by hostilities, and many territories remain under occupation now.

Now another long and difficult winter is ending, when Ukraine is courageously defending itself. With each new spring, green grasses and flowers bring moments of joy and hope, but at the same time, a new spring means another year of hard struggle and losses passed. With my photo story, I would like to thank everyone who supports Ukraine and Ukrainians, that you do not forget and do not turn away these days. And especially I thank all the Ukrainian defenders, who are fighting for our freedom and future.

Slava Ukraini! Glory to Ukraine!

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Stunning flowers and fluffy tender fruits of *Pulsatilla pratensis* in sunrise light, Donetsk Region.



Gladiolus imbricatus in Meotyda National Nature Park, Mariupol District, Donetsk Region.



Sunset in the steppe near Syvash Lake, Kherson Region.



Gymnospermium odessanum, Odesa Region.



Crocus reticulatus, Odesa Region.



Colchicum triphyllum, Odesa Region.