



## Short notice concerning the current conservation status of dark-barked birch taxa and the proposed changes to the next edition of the Red Book of Ukraine

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### Abstract

Recently in Ukraine, there were many discussions about proposed changes to the next edition of the Red Book of Ukraine. Kingdom Plantae. In this short communication, we clarify one particular aspect within the discussions concerning the proposition to exclude dark-barked birch *Betula obscura* from the next edition of the Red Book of Ukraine. It is argued by the new research data obtained and published during last years, and which provide evidence that there is no reason to treat *B. obscura* as a separate species because it represents only one of at least two different dark-barked birch forms of two widely distributed birch species in Ukraine (*B. pendula* f. *obscura* and *B. pubescens* f. *sibakademica*), respectively. Therefore, the proposition to exclude *B. obscura* from the next edition of the Red Book of Ukraine is reasonable since it is aimed to protect plants on the species level only.

**Keywords:** Betulaceae, *Betula obscura*, dark-barked birches, Red Book of Ukraine, nature conservation

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The taxonomy of so-called dark-barked birches in Europe is challenging, and there were many changes, controversies, and discussions regarding their taxonomic status. Meanwhile, clarification of their taxonomic status is important not only for taxonomy itself but also for correct conservation measures. Therefore, below we provide a brief overview of new data supporting the proposed changes in their taxonomy.

The first dark-barked birch was observed by Kotula in Poland and later described by Fiek as a separate species *Betula obscura* Kotula ex Fiek (Fiek, 1888). There is no type specimen for this species (Jentys-Szaferowa, 1959), but according to the initial description, it is morphologically similar to *B. pendula* Roth. Based on this similarity, Olšavská (2006)

proposed to treat this birch as *B. pendula* var. *obscura* (A. Kotula ex Fiek) Olšavská.

Another dark-barked species *B. sibakademica* Baranov that is close to *B. pubescens* Ehrh. was described by Baranov (1924) nearby Omsk. In the Flora of USSR (Kuzeneva, 1936) it was proposed to lower its taxonomic rank down to the level of the variety *B. pubescens* var. *sibakademica* (Baranov) Kuzeneva. Although Skvortsov (1986) suggested that such birch may occur in the territory of Ukraine, there was no strict evidence of that until recently, when such an occurrence was proved (Tarieiev et al., 2019).

In 1927, the third dark-barked birch *B. atrata* Domin was described in Czech Republik (Domin, 1927). The protologue for this species is confusing in many aspects, and

the type specimen likely represents a mix of two different birch species. Later this taxon was mainly treated as a synonym of *B. obscura* (Hejtmánek, 1956; Walters, 1993; Tzvelev, 2004). However, it was also considered as *B. pubescens* by Dostál (1948). There is a need for additional research to solve this ambiguity.

In 1964, Zaverukha described the new species *B. kotulae* Zaverucha as similar to *B. pendula* and simultaneously proposed to treat *B. obscura* as one that is close to *B. pubescens* (Zaverukha, 1964; Zaverukha et al., 1986). However, such a description contradicts the original description in Fiek's protologue.

Finally, findings of dark-barked trees of *B. ×aurata* Borkh. (*B. pendula* × *B. pubescens*) were reported in the Ruhr basin in Germany (Gausmann & Loos, 2014).

To resolve this controversy briefly mentioned above, we have done our own investigation based on herbarium material and data morphology, distribution, occurrence, and sequences of both internal transcribed spacers ITS1 and ITS2, which were analyzed in samples collected from the living trees in Ukraine (Tarieiev et al., 2019). ITS1 and ITS2 are molecular-genetic markers commonly used in plant phylogeny (Mai & Coleman, 1997; Coleman, 2000, 2003, 2007, 2009; Wolf et al., 2013). The research included a corresponding type specimen of *B. kotulae* (KW006426; for the whole list of birch types kept in KW see Olshanskyi et al., 2016) and authentic material of *B. sibakademica* (LE01041129 and LE01041130). For more detailed information on these samples, see Tarieiev et al. (2019). As a result of the study, we identified the occurrence of two dark-barked birch taxa in Ukraine and proposed to treat them as forms *B. pendula* f. *obscura* (Kotula ex Fiek) Tarieiev and *B. pubescens* f. *sibakademica* (Baranov) Tarieiev in accordance with the current definitions of infraspecific taxa (Christensen, 1987; Cronquist, 1988; Hamilton & Reichard, 1992). The decision was based on several types of data and facts that came from literature analysis and a series of personal observations:

- there are no differences in ITS sequences between white- and dark-barked birches;
- dark-barked birches occur only as single individuals or small groups but never form stable populations;

- they occur only within the ranges of *B. pendula* and *B. pubescens*, respectively;
- the color of birch bark (in particular, for silver and downy birches, but also other species) is a variable trait with a whole range of intermediate colors from pure white to completely dark. This variation could be observed by the naked eye in many places across Europe.

In the current edition of the Red Book of Ukraine, dark-barked birches (Kagalo, 2009) are considered as *B. obscura* A. Kotula (incl. *B. kotulae* Zaverucha; *B. pendula* Roth subsp. *obscura* (A. Kotula) Á. Löve, *B. verrucosa* Ehrh. subsp. *obscura* (A. Kotula) Á. Löve et D. Löve). At present, such consideration is outdated since it does not reflect at least two significant findings in the current research:

- there is no evidence to treat these birches as separate species;
- *B. pubescens* f. *sibakademica* is not considered for conservation at all, although it occurs much more rarely than *B. pendula* f. *obscura*.

These taxonomic changes should be considered regarding the protection status of these dark birches since, according to the Law of Ukraine on the Red Book of Ukraine (2017), the Red Book of Ukraine is a legal document dedicated to protecting separate species only (Art. 2–4), and not designed to protect the taxa of any other levels. That is why lowering the taxonomic rank should automatically lead to the exclusion of such taxon from the Red Book of Ukraine. There is no scientific evidence to treat these birches as separate species since they have only one distinctive character – the color of their bark.

That is why the proposition to exclude *B. obscura* from the Red Book of Ukraine made by the National Commission for the Red Book of Ukraine is entirely reasonable.

### Final suggestions on prospective protection measures for dark-barked birches in Ukraine after exclusion from the Red Book of Ukraine

Taxa below the species level could also be protected. However, a different strategy should be used compared to the existing one. In particular, birches with the rare occurrence and unusual color of bark still could be protected on the local level as local botanical nature monuments according to

the [Law of Ukraine on the nature-sanctuary fund of Ukraine \(2020\)](#). Another mechanism of protection will be possible after the consolidation of Ukrainian nature protection legislation with the EU Habitat Directive ([Council Directive, 1992](#)).

## Conclusions

The proposition to exclude dark-barked birch from the Red Book of Ukraine. Kingdom Plantae is well-justified because there is no evidence that they are separate species. Moreover, there is strong evidence that they represent dark bark forms of not endangered birch species. The current edition contains outdated data that should be fixed in the next one. Based on all the facts mentioned above, *B. obscura* should be excluded from the Red Book of Ukraine.

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## Коротке повідомлення щодо поточного статусу й охорони таксонів темнокорих беріз в Україні та пропоновані зміни до наступного видання Червоної книги України

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Нещодавно в Україні відбулося чимало дискусій щодо запропонованих змін до нового видання Червоної книги України. Рослинний світ. Це коротке повідомлення має на меті прояснити один із аспектів у межах дискусій щодо пропозиції вилучити березу темну (*Betula obscura*) з наступного видання Червоної книги України. Аргументом для вилучення, зокрема, є нові дані, отримані та опубліковані впродовж останніх років, і в яких наведено докази того, що немає підстав вважати *B. obscura* окремим видом, оскільки вона представляє одну з як мінімум двох різних темнокорих форм двох поширеніших в Україні видів беріз (*B. pendula* f. *obscura* та *B. pubescens* f. *sibakademica*). Тому пропозиція виключити *B. obscura* з наступного видання Червоної книги України в контексті сучасного законодавства є слушною, оскільки остання призначена винятково для охорони таксонів видового рангу.

**Ключові слова:** Betulaceae, *Betula obscura*, темнокорі берези, Червона книга України, охорона природи