

**SIMPLIFIED ASSESSMENT OF THE REGIONAL CATEGORY OF RARITY
OF MACROFUNGI (ON THE EXAMPLE OF *MORCHELLA STEPPICOLA*
AND *HEMILECCINUM IMPOLITUM* IN THE BELGOROD REGION OF
THE RUSSIAN FEDERATION)**

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Abstract. The article is devoted to the development of a simplified scheme for assessing the regional category of rarity of macrofungi on the example of *Morchella steppicola* and *Hemileccinum impolitum*, which live in the Belgorod region of the Russian Federation (RF). Based on data from field studies (2009-2020) conducted in the ecotopes of the Belgorod region, and a comparative analysis of global and regional approaches to assessing the category of rarity of biological species and optimizing the evaluation criteria for the regional level, a simplified scheme for evaluating the regional category of rarity of macrofungi has been developed. The technical side of the assessment according to the developed scheme is shown. According to the results of the assessment, at the moment *M. steppicola* is considered as a rare species in the territory of the Belgorod region, requiring increased protection measures. *H. impolitum* is considered as a non-rare species that does not require increased protection measures on the territory of the Belgorod region.

Keywords: regional category of rarity, conservation status, macrofungi, *Morchella steppicola*, *Hemileccinum impolitum*, Belgorod region, habitat, population.

Introduction

Assessment of the category of rarity and the conservation status of biological species at the regional level is an important component of biomonitoring the state of the environment and a necessary procedure that precedes conservation measures. There are some problems in assessing regional categories and statuses, which is due to objective reasons that cause methodological difficulties [1,2]. And also is due to subjective reasons that determine the lack of necessary information [3]. This article is devoted to the development of a simplified scheme for assessing the regional category of rarity of macrofungi on the example of *Morchella steppicola* and *Hemileccinum impolitum*, which live in the Belgorod region of the Russian Federation.

Material and Methods

The research was conducted in 2009-2020 in ecotopes of the Belgorod region of the Russian Federation. The search for habitats of macrofungi *Morchella steppicola* and *Hemileccinum impolitum* was carried out by the route method [4-8] during the most probable formation of fruit bodies. The methodological scheme of category and status assessment was developed in the process of comparative analysis of global and regional approaches [1-3] and optimization of assessment criteria for the regional level [1-3, 9].

Results and Discussion

Morchella steppicola Zerova (1941) [10] is distributed in forest-steppe and steppe regions of Russia, Ukraine, Moldova (Eastern Europe) and steppe regions of Turkmenistan, Kazakhstan, Uzbekistan, Tajikistan (Central Asia). The regional population of *Morchella steppicola* is part of the Eastern European population located

in Russia. In the Belgorod region *M. steppicola* has been recorded in 3 habitats: Gubkinsky district (near the village of Dubravka, the Yamskaya Steppe section of the Belogorye protected area) [11], Shebekinsky district (near the village of Bezlyudovka), Belgorod district (near the village of Nikolskoye) [12]. The distances between neighboring populations are 20-140 km.

Hemileccinum impolatum (Fr.) Šutara (2008) [13] is distributed in the zone of broad-leaved forests of Europe and North America [14]. It is found in North Africa [15]. In Europe, *Hemileccinum impolatum* is found in many countries, but it seems to be more common in the South and absent in the Far North [16-18]. The regional population of *H. impolatum* is part of the population located on the territory of Russia in the Eastern part of the range of this species in Europe. On the territory of the Belgorod region, 3 habitats of *H. impolatum* have been identified: Belgorod district ("Massive" area), Novooskolsky district ("Novooskolskaya dacha"), Valuysky district ("Valuyskaya dacha") [9]. The distances between neighboring populations are 60-110 km.

To assess the category of rarity and conservation status of *M. steppicola* and *H. impolatum* the following assumptions were put forward:

- The generalized "Threatened" category [1] includes the "Critically Endangered" (CR), "Endangered" (EN), and "Vulnerable" (VU) categories. They correspond to the categories accepted in the Russian Federation: 1 is "endangered", 2 is "Declining in number" and 3 is "Vulnerable" or "Rare" [3,6,19]. The next category, which logically should be numbered as 4, since it is a step above category 3 is Near Threatened (NT) which includes species that cause concern for their condition in the near future.

Note that in the row 1 – 2 – 3 – 4 the category of rarity is formally raised, while, in essence, the level of rarity (conservation status) is lowered (the threat level becomes less).

- The IUCN guidelines [1-2] recommend a two-step rarity assessment procedure: first for the global population (stage 1), then for the regional population (stage 2).

- The main quantitative measure for assessing the rarity of a species at the regional level is a known number of habitats, which is reflected in criteria B: B2a [1-2]. At the same time, you should take into account the availability of suitable (suitable for the species) habitats in the region and the preservation of the species in known habitats.

This inevitably chosen measure corresponds to the existing realities, when in the subjects of the Russian Federation, as a rule, there are no systematic long-term observations of rare species that require attention, and finds a response in the works of other researchers of regional populations of Russia [3]: "...the rarity or ordinariness of a regional population is considered through the representation (number), the nature of distribution and the degree of specificity of its habitats. The main one is the number of available habitats. The rarer they are in the region, the rarer and more vulnerable the regional population that uses them becomes."

In accordance with the proposed provisions, a simplified scheme for assessing the category of rarity of macrofungi was developed (Fig. 1). Using the example of *M. steppicola* and *H. impolitum*, which live in the Belgorod region, we will show how the regional category of rarity is evaluated.

As the number of known habitats of *M. steppicola* on the territory of Belgorod region at the moment is 3 (cross-national category – EN, Russian category – 2: criterion B2a [1-2]), the security measures are complied with only partially (near the village of Dubravka, section "Yamskaya Steppe" protected area "Belogorye") [11] and suitable habitat are quite common, according to the scheme (Fig. 1), the species was put into category of rarity 3 (2+1), which corresponds to the international category VU. Thus, *M. steppicola* is considered a rare species on the territory of the Belgorod region, requiring increased conservation measures, which is recorded in the latest edition of the regional Red Book [11].

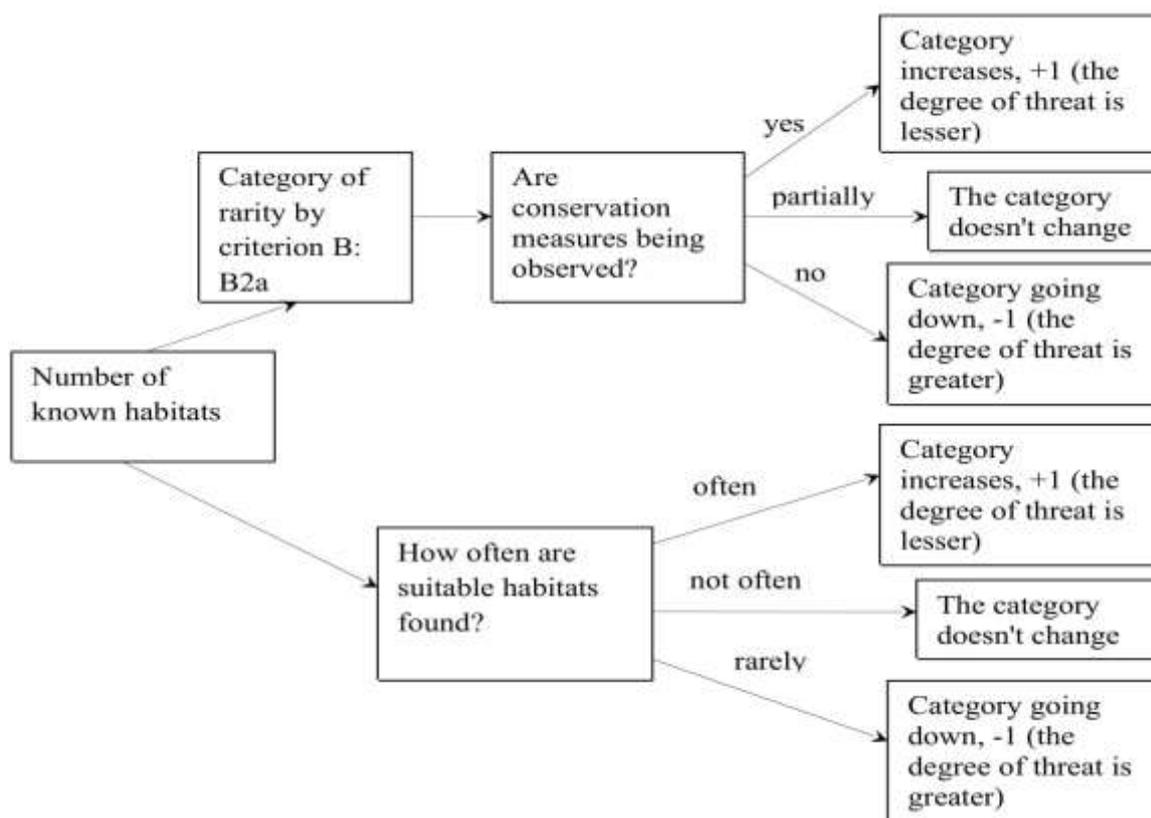


Fig. 3. Scheme of assessment of the category of rarity of macromycetes in Belgorod region

Since the known number of *H. impolitum* habitats on the territory of the Belgorod region is currently 3 (international category – EN, Russian category – 2: criterion B2a [1-2]), conservation measures are observed, and suitable habitats are quite common, then, according to the scheme (Fig. 1), the species was assigned a category of rarity 4 (2+1+1), which corresponds to the international NT category. Thus, *H. impolitum* is considered not a rare species that does not require increased conservation measures on the territory of the Belgorod region, but is a candidate for the main list of the Red Book of the Belgorod region (as of July 10, 2019), which is recorded in the latest edition of the regional Red Book [11].

Conclusion

Based on a comparative analysis of global and regional approaches to assessing the category of rarity of biological species and optimizing the assessment criteria for the regional level, a simplified scheme for evaluating the regional category of rarity of macrofungi has been developed. Using the example of *Morchella steppicola* and

Hemileccinum impolitum, which live on the territory of the Belgorod region of the Russian Federation, the technical side of the assessment according to the developed scheme is shown. According to the results of the assessment, at the moment *M. steppicola* is considered as a rare species in the territory of the Belgorod region, requiring increased protection measures. *H. impolitum* is considered not a rare species that does not require increased protection measures on the territory of the Belgorod region, but is a candidate for the main list of the regional red book.

The research has been done within the framework of State Assignment of the Russian Federation Ministry of Science and Higher Education № FZWG-2020-0021

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