

# Conservation status of the current state of cryptogamous diversity in Mongolia

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**Abstract.** In recent years, cryptogamous biodiversity and scop their areal in Mongolia have begun to decline due to human activities, global warming and desertification, and have become one of the reasons for the threat of their extinction. At the regional level, a study was carried out to determine their conservation status in accordance with the criteria of the International Union for the Conservation of Nature and Natural Resources. First of all, according to the assessment results, 221 species (5.0%) need protection.

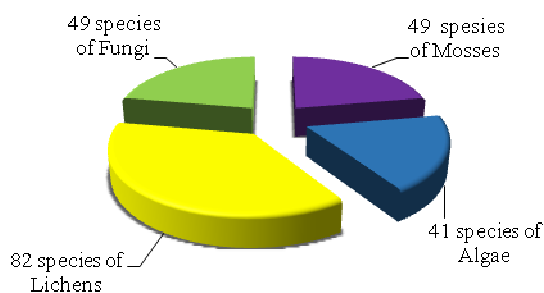
Today in our country 7725 species of biodiversity of plants and fungi are known. About 60 percent of them or 4525 species, belong to lower cryptogamous plants. This includes 580 species of mosses, 2,248 species of algae, 630 species of fungi and 1,067 species of lichens. [1, 7, 8, 9]. However, only 0.35% of all of these cryptogamma representatives are protected [3, 5, 6], which is completely unsatisfactory. And so, in 2018-2020, for the first time in Mongolia, 373 endangered species or 8.2% of all lower cryptogamous species were assessed in accordance with the criteria of the International Union for Conservation of Nature and Natural Resources, IUCN (IUCN).

According to the assessment results, it was found that 49 (8.4%) species of mosses; 41 (1.8%) species of algae; 82 (7.8%) species of lichens and 49 (7.7%) species of fungi, or a total of 221 species (5.0%) need protective measures (Table 1).

**Table 1.** Conservation status rating of cryptogamous diversity included in the regional Red List in Mongolia as endangered (2020)

Threat rating in the Red List of Mongolia	Percentage of the total number of species				Total amount
	Mosses	Algae	Lichens	Fungi	
CR	10	5	16	6	37
EN	22	14	32	13	81
VU	17	22	34	30	103
Total	49 (8.4%)	41 (1.8%)	82 (7.6%)	49 (7.7%)	221 (5.0%)

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**Fig. 1.** The percentage of taxa representatives of the total number of endangered cryptogamma species included in the Red List of Mongolia

In Mongolia, in accordance with the categories and criteria of the IUCN Red List (IUCN) were determined on the basis of general principles and taking into account the individual characteristics of each taxon. The categories of the protected status of species of cryptogamma plants have been established, 37 species or 16.8% are “on the verge of complete extinction or endangered (CR), 81 species or 36.6 percent are “endangered” (EN), 103 species or 46.6 percent are “vulnerable” (VU).

Based on the status of the threat, the main reasons for their threat and measures to protect them were developed [4, 7]. Based on the above results, 118 (2.6%) species of cryptogamous lower plants are classified as “very rare”, and 103 (2.3%) as “rare” (Table 2).

**Table 2.** Data on the number of species of mosses, algae, lichens and fungi from the Red List in need of protection (2020)

Taxon name	Threatened species status				Rating of threats according to the criteria of the International Red List							In Appendix to the Natural Plants Act		In Appendix to the Natural Plants Act	
	Red Book (1997)		Red Book (2013)		Red list (2018)			Red list (2019)			Number of species required for protection	1995		2018-2019	
	Very rarely	Rarely	Very rarely	Rarely	CR	EN	VU	CR	EN	VU		Very rare	Rare	Very rare	Rare
Mosses	-	4	-	12	1	10	4	9	12	13	<b>49</b>	-	4	32	17
Algae	-	-	1	17	5	12	18	0	2	4	<b>41</b>	1	4	19	22
Lichens	-	12	3	12	4	14	14	12	18	20	<b>82</b>	-	12	48	34
Fungi	-	-	-	12	3	4	14	3	9	16	<b>49</b>	-	6	19	30

Total	-	16	4	53	13	40	50	24	41	53	<b>221</b>	1 (0,02%)	26 (0,5%)	118 (2,6%)	103 (2,3%)
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Thus, Table 3 summarizes the results of assessing the conservation status of the cryptogamic, i.e., the lowest plant in Mongolia, and their threat status in accordance with the criteria of the International Red List.

**Table 3.** Assessment of the conservation status of the current state Cryptogamous Diversity in Mongolia (2020)

Group of cryptogamous plants	Assessment according to the criteria of the international Red List (2018/2020)							Total number of species in the survey		
	Rating threat status			No threat rating						
	Number of species required for protection			Number of species outside protection						
	CR	EN	VU	NT	LC	DD	NA	assess	assessed	studied
Mosses	10	22	17	133	232	116	24	580	562	18
Algae	5	14	22	73	1472	147	315	2248	2208	40
Lichens	16	32	34	226	125	597	-	1067	1030	-
Fungi	6	13	30	13	45	327	196	630	630	-
<b>Total</b>	<b>37</b>	<b>81</b>	<b>103</b>	<b>445</b>	<b>1874</b>	<b>1187</b>	<b>535</b>	<b>4525</b>	<b>4430</b>	<b>48</b>

It is noteworthy that a Red List of endangered lower plant species that require conservation measures has been compiled, and a basis has been developed to update the list of very rare and endangered lower plants in the Natural Plants Law of Mongolia. Extensive work is expected to be done on 538 (11.8%) of the 1,187 (26.2%) assessed as lack of information (DD) and 535 (11.8%) as not assessed (NA).

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