

# Standard flora as a standard quantitative evaluation of vascular plant diversity of terrestrial ecosystems

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**Abstract.** A new method of accounting for the diversity of vascular plants in the reference area of standard flora, covering an area of 1 sq. km, has been tested in the basins of the Lena and Indigirka rivers. Quantitative indices of the diversity of 3 standard floras in different latitudinal and altitudinal ranges of North-East Asia are presented.

Quantitative assessment of vascular plant diversity of a particular region is usually based on the method of specific flora studying developed by A. I. Tolmachev [1, 2] and his followers [3-5]. A.I. Tolmachev initially proposed the area of 100 km square for a specific flora. However, the allocation of this area depends on a variety of geographical and other factors, and is determined subjectively by the researcher. As a result, the boundaries of specific or local flora become vague, and quantitative indicators of the diversity of different floristic areas are comparable with a high degree of conditionality. It is very difficult to investigate a complete flora in the area of 100 sq. km during one summer season. Besides, no one researcher can assure that he keeps the boundaries of a selected transect strictly. Owing to this, additionally to commonly approved methods of a specific flora study within its natural boundaries (which are admeasured conventionally), I offer to emphasize on a 1 sq. km plot as a standard flora (SF) unit for thorough investigation of vascular plants diversity [6, 7]. Before going to the research area, it is advisable to pre-schedule the site under the standard flora and set the coordinates of its boundaries. For example, you can use a public Google Earth resource to do this. On the sites, you comply the boundaries of this transect uses an electronic Navigator (GPS). For the study of standard flora it is preferable to choose a smooth, viewable areas (river valleys, saddles, passes, plateau). On the borders of the standard flora, on the ground it is desirable to establish noticeable landmarks. The selected area should be investigated as fully as possible. It is convenient when the standard flora is on the border or surrounds the base camp. In the lists of specific flora of the surveyed area, the species within the standard flora should be marked with an apostrophe or other sign. It is assumed that the investigated area can serve as a standard for monitoring observations of changes in the composition of the flora.

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At the moment, this method has been tested, some material has been accumulated, data on 2 sites in the Lena river basin and 1 site in the Indigirka river basin have been published. The first site is located in the middle reaches of the Lena river, within the subzone of the middle taiga forests [8, 9], on the Kharyyalakh Island (SF coordinates: 61°04'21.34" N and 126°20'46.97" E – 61°04'53.50" N and 126°20'28.22" E – 61°05'01.03" N and 126°21'33.44" E – 61°04'28.49" N and 126°21'49.68" E) [7]. The second section is located in the Lena River Delta, on the right Bank of the Bykovskaya duct, it covers the territory adjacent to the International Biological Station "Lena-Nordenskjold", located within the subzone of the Arctic tundra (SF coordinates: 72°11'48.97" N and 128°01'34.14" E – 72°11'50.72" N and 128°03'21.59" E – 72°11'18.95" N and 128°03'14.17" E – 72°11'16.21" N 128°01'32.36" E) [10]. The third site is located in the headwaters of the Artyk-Yuryue stream (the Indigirka river basin), in the Tas-Kistabit range (SF coordinates: 64°27'26.6" N and 143°21'35.2" E – 64°27'36.5" N and 143°22'49.2" E – 64°27'53.1" N and 143°20'49.9" E – 64°28'02.0" N and 143°22'03.2" E) [11]. In addition to the latitudinal position, biodiversity is also affected by the altitude factor. The surveyed areas, according to the electronic resource Google Earth, are located in the following high-altitude limits: 1 – 110 – 115; 2 – 10 – 25; 3 – 1100 – 1300 m above sea level. The specific flora of Kharyyalakh island is stated to comprise 299 species of vascular plants, while its SF includes 228 species. The specific flora of the Lena River Delta is represented by 258 species of vascular plants, and its SF by 170 taxons (161 species, 1 hybrid and 8 subspecies). In the North-East of Yakutia, in the range of Tas-Kistabit, in the specific flora of Nelkanskogo mountain there are 122 total identified taxons (114 species of, 1 hybrid, 3 subspecies and 4 varieties), of which SF is noted 92 taxons (87 species, 3 subspecies and 2 varieties).

It is clear that these data are indicative of an overall decline in diversity to the North and with elevation. It is too early to analyze them in depth, it is necessary to accumulate such data for a more objective assessment of biodiversity of different territories. It would be desirable that such observations were supported by botanists from other regions. This would help to have more objective assess to the diversity of vascular plants in different geographical and environmental conditions and to understand the patterns of its formation.

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